Proceedings of the
15th European Conference on e-Government
University of Portsmouth, UK
18-19 June 2015

Edited by

Carl Adams
University of Portsmouth, UK

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The 15th European Conference
on eGovernment

ECEG 2015

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Papers submitted to this conference have been double-blind peer reviewed before final acceptance to the conference. Initially, paper abstracts were read and selected by the conference panel for submission as possible papers for the conference. Many thanks to the reviewers who helped ensure the quality of the full papers.

Conference Proceedings

The Conference Proceedings is a book published with an ISBN and ISSN. The proceedings have been submitted to a number of accreditation, citation and indexing bodies including Thomson ISI Web of Science and Elsevier Scopus for indexing.

The Electronic version of the Conference Proceedings is available to download from **DROPBOX**. (**http://tinyurl.com/ECEG2015**) Select Download and then Direct Download to access the Pdf file. Free download is available for conference participants for a period of 2 weeks after the conference.

The Conference Proceedings for this year and previous years can be purchased from http://academic-bookshop.com

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Preface

Over the last few decades we have witnessed a fundamental change in government activity driven by Information and Communication Technologies, storage technologies, the Internet, Web 2.0 & 3.0 technologies and mobile technologies. These technologies are helping governments transform and innovate across all areas of government activity.

These proceeding provide a snapshot of current e-Government case studies, research, analysis and activity around the World representing cutting edge innovation and transformation of government service provision, government transparency, engagement with citizens and business, and the running of government itself. As such these proceeds will provide a valuable contribution to researchers and practitioners interested in e-Government activity.

These proceedings represent the work of researchers participating in the 15th European Conference on e-Government – ECEG 2015 which is being hosted this year by The University of Portsmouth, UK on the 18-19 June 2015.

ECEG is a recognised event on the European research conferences calendar and provides a valuable platform for individuals to present their research findings, display their work in progress and discuss conceptual advances in the area of e-Government. It provides an important opportunity for researchers and managers to come together with peers and share their experiences of using the varied and expanding range of e-Government available to them.

The conference will be opened with a keynote from Professor Geoff Walsham from Judge Business School, University of Cambridge, UK. The second day will be begin with a Keynote by Professor Sir Nigel Shadbolt, University of Southampton, UK.

With an initial submission of 123 abstracts, after the double blind, peer review process there are 42 academic Research papers, 11 PhD papers, 3 master's Research paper and 1 non academic paper published in these Conference Proceedings. These papers come from many different countries including: Australia, Brazil, Brunei, Czech Republic, Egypt, Germany, Greece, Hungary, India, Israel, Italy, Jamaica, Lebanon, Malaysia, Nigeria, Pakistan, Poland, Romania, Saudi Arabia, Serbia, Slovenia, Spain, Thailand, The Netherlands, Turkey, UK, USA

A selection of the best papers – those agreed by a panel of reviewers and the editor will be published in a conference edition of EJEG (the Electronic Journal of e-Government www.ejeg.com). These will be chosen for their quality of writing and relevance to the Journal's objective of publishing papers that offer new insights or practical help into the application of research methods in business research.

We wish you a most interesting conference.

Dr Carl Adams
Conference Chair
University of Portsmouth, UK

Conference Committee

Conference Executive

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Dr Roberto Fragale Filho, Universidade Federal Fluminense (UFF), Brazil
Mohammed Al-Husban, Southampton Solent University, UK
Dr Michaelene Cox, Illinois State University, USA
Peter Millard, University of Portsmouth, UK

The conference programme committee consists of key individuals from countries around the world working and researching in the e-Government community. The following have confirmed their participation:

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Biographies

Conference Chair
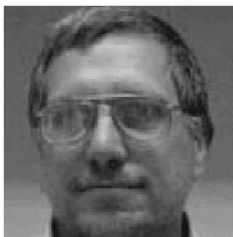
Dr Carl Adams is a Principal Lecturer/Researcher in the School of Computing, University of Portsmouth, UK. He has over a decade of professional experience as a software engineer, analyst and consultant before going into academia. His research interests explores the wider impact of the digital economy and includes e/m-commerce/government, mobile information systems, social media, electronic money, and impact of technology on society. He has over 100 peer reviewed publications in journals, international and national conferences as well as several book chapters and a book. He has been a key note and invited speaker at conferences and workshops.

Keynote Speakers
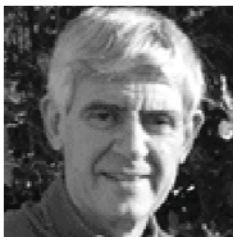
Prof Geoff Walsham is an Emeritus Professor of Management Studies (Information Systems) at Judge Business School, University of Cambridge. In addition to Cambridge, he has held academic posts at the University of Lancaster in the UK, the University of Nairobi in Kenya, and Mindanao State University in the Philippines. His research is focused on the question: are we making a better world with information and communication technologies? He was one the early pioneers of interpretive approaches to research on information systems.

Professor Sir Nigel Shadbolt is Professor of Artificial Intelligence at the University of Southampton in the Web and Internet Science Group within Electronics and Computer Science. He is also a Director of the University's Web Science Institute. He has made significant contributions to Artificial Intelligence, Computer Science, Psychology and Web Science and has over 400 publications including the critically acclaimed book 'The Spy in the Coffee Machine: The End of Privacy as We Know It'. Sir Nigel is also the Chairman and Co-Founder of the Open Data Institute (ODI). Launched in December 2012, the ODI focuses on unlocking supply and stimulating demand for open data. It promotes the creation of economic, environment and societal value from open data releases.Since 2009, he has acted as an Information Advisor to the UK Government, helping transform public access to Government information, including the widely acclaimed data.gov.uk site. In May 2010, Sir Nigel was appointed to the Public Sector Transparency Board responsible for setting open data strategy across UK Government. He Chairs the Local Public Data Panel, seeking to promote and develop open data approaches within local government and the UK midata programme whose goal is to empower consumers through access to their data. In 2013 he was appointed a member of the UK's Information Economy Council.In 2006 he was one of three founding Directors of Garlik Ltd, which in 2008 was awarded Technology Pioneer status by the Davos World Economic Forum and won the prestigious UK national BT Flagship Award. Garlik was acquired by Experian Ltd in 2011.In 2013 he was awarded a Knighthood for services to science and engineering and in December 2013 he was listed as one of 50 influential leaders in UK IT in Computer Weekly's "UKtech50".

Mini Track Chairs

Mohammed Al-Husban is a Senior Lecturer/Researcher in the Technology faculty in Southampton Solent University. Al-Husban has worked alongside consultants for several eGovernment projects in the Middle East region. He is involved in eGovernment implementation using Enterprise Architecture frameworks, and his main research interests are in eGovernment personalization and integration, connected government, backend to frontend technology. His current research involves web services and data interoperability in the context of public service integration in electronic government. He has produced a technical framework to aid towards indexing and further integrating public services. He is working on a massive dataset which has emerged from a recent field study, and is looking particularly at integrating specific online services and data sharing between service providers.

Dr Michaelene Cox holds a PhD in political science and is associate professor in the Department of Politics and Government at Illinois State University. She teaches courses in international law, international relations and European Politics, and has authored a number of publications on political participation, social capital, cultural identity and corruption. Her interest in e-government also reflects the interdisciplinary nature of her research. For instance, papers to date that she has delivered at ECEG conferences address topics of corruption and ethics training, and benchmarking East European e-participation.

Professor Roberto Fragale Filho teaches at the Universidade Federal Fluminense (UFF) and is a Labor Judge at the Tribunal Regional do Trabalho from Rio de Janeiro (TRT-RJ). He holds a PhD on Political Science obtained at the Université de Montpellier I and has been a Visiting Professor at the University of Illinois at Urbana-Champaign (2006), at the Université Paul Valéry – Montpellier III (2009 and 2010), at the Centro de Estudos Sociais (CES) from the Universidade de Coimbra (grant A month at the CES. 2011) and at the University of Macao (2014) as well as a Fellow of the Institut d'Études Avancées de Nantes (2012-2013).

Peter Millard with his background of a first class honours degree in Sociology, a Masters degree in Information Systems, together with three years working in the computer industry as a Systems Analyst, is well placed to take an interdisciplinary approach to the study of Information and Communication Technologies. He has worked at the University of Portsmouth for over twenty years and is the Course Leader for BSc (Hons) Business Information Systems and BSc (Hons) Computing and Society teaching modules such as 'The Networked Society' and 'Social & Legal Aspects of Computing'. His research interests are in the social aspects of the internet and mobile computing, focusing in recent years on e-Democracy as a means of enhancing and extending democratic processes.

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Biographies of Presenting Authors

Yakup Akgül studied at the Department of Information Management at the University of Hacettepe, Ankara (Turkey), from which he graduated in 2001. He received Master (2010) and Ph.D. student in Business Administration at Süleyman Demirel University, Isparta, Turkey. He works as a lecturer at the Dumlupınar University, Kütahya, Turkey.

Mohammed Aladalah is a Ph.D. candidate in Information Systems at the Faculty of Information Technology, Clayton, Monash University, and Melbourne, Australia. His research interests include e-Government, Citizen-governmental collaboration, citizens' participation and empowerment, service science, value co-creation and social media. Prior to commencing his PhD, he completed a bachelor's degree in science and a master's degree in Business Information Systems.

ISultan Alotaibi is from Saudi Arabia, graduated from King Soud University. Isultan was awarded a bachelor degree in Computer from faculty of science in 2007. After graduating from the University, received a full scholarship, so went to Australia for a Master degree in Computer Science, and graduated from faculty of Science, Technology and Engineering at La trobe University in 15 July 2011. Isultan is a PhD researcher in Strathclyde University in Glasgow.

Sukaina Al-Nasrawi is an Associate Statistician at the United Nations Economic and Social Commission for Western Asia with expertise in technology and social affairs. She published technical papers and spoke at renowned international conferences. Sukaina holds a BSc/MSc. in Computer Science from the American University of Beirut and is currently a Ph.D. candidate in Information Systems.

Dr.Choompol Boonmee received his PhD. in computer engineering from Nagaoka University of Technology, Japan. He is now a lecturer at Thammasat University, Thailand. He has been leaders of many e-government interoperability projects including e-ASIA award winning project. He is the president of electronic data interchange promotion association (EDIPA).

Eirini Chalelli holds a M.Sc. 's degree in Computer Science from Computer Engineering and Informatics Department at the University of Patras. For the last 4 years she has been working as a software engineer at the Computer Technology Institute and Press "Diophantus". She is experienced in software requirements, design, development and maintenance of complex software systems.

Dr. Michaelene Cox (Ph.D. 2002) is Associate Professor in the Department of Politics and Government at Illinois State University. She teaches courses in international law, international relations, and European Politics, and has authored a number of articles and edited books on political participation, social capital, and political corruption.

Paola Dameri graduated in Economics in 1990. She is associate professor in Business Administration at the University of Genova, Department of Economics. She has been teaching ERP Systems, Business administration, Accounting Information systems, Management Information systems, Managerial accounting, Financial Accounting.

Mitja Dečman is an Assistant Professor at the Faculty of Administration, University of Ljubljana, teaching undergraduate and postgraduate level. He holds a Ph. D. in Administration Science and a MSc. in Computer Science. His project and research work includes development of information systems, benchmarking systems, digital preservation, information security, e-government, e-governance, web 2.0 and others.

Kate Dingley is a lecturer in human computer interaction (human factors) and project management. My PhD research was in remote working and learning and I have continued to have an interest in this in research into e-learning, mobile learning, e-government and mobile usability. I put this knowledge into practice as a course leader for an online course.

Duruji, Moses Metumara is currently, the Head of Department of Political Science and International Relations, Covenant University, Ota, Nigeria where he has been teaching for over ten years. He holds a doctorate degree

in Political Science as well as a PGD in Journalism. He is the author of 'Ethnic Militias and Subnationalism in Nigeria'.

Prof.(Dr.) Florian Evequoz. I am a Professor for Business Informatics at the University of Applied Sciences of Western Switzerland (HESSO Valais). My current research focuses on HumanComputer Interaction (HCI) with an emphasis on Visual Analytics, and Business Process Management (BPM) applied in particular to the eGovernment domain.

Dr. Oluyemi Fayomi is a tenured faculty in Covenant University, department of Political Science and International Relations, School of Human Resource Development, College of Development Studies, Ota, Ogun State, Nigeria. She is the Programme Adviser, International Relations and her research areas include Migration, Diaspora, Gender, e-Governance, Regional Integration, Conflict Resolution and Development Issues.

Dr. Daniel Eseme Gberevbie is an Associate Professor in the Department of Political Science and International Relations, Covenant University. He obtained a BSc., MSc. and PhD degrees in Political Science and Public Administration. His interest includes e-Governance, Ethics and Accountability. He is a member of Nigerian Institute of Management and Nigerian Political Science Association.

Markus Jakob studied information systems at the University of Applied Sciences Deggendorf. During his studies, he was, amongst others, working for Siemens Medical Solutions, USA, and BMW. Before he joined fortiss in 2012, he was working for the Free State of Bavaria in the field of e-Government and webservice development.

Terence Keefe is a Senior Lecturer at Sheffield Hallam University teaching IT Project Management, Professional Ethics, Business Analysis and Strategy. Public sector experience includes 6 years managing research and development in e-learning and 20 years in the UK Civil Service, providing IS consultancy in organisational change projects. Research experience includes e-government, cyber-ethics and e-learning.

Tawa Khampachua is a Ph.D. student and a lecturer in the Department of Computer Education at King Mongkut's University of Technology North Bangbok (KMUTNB), Thailand. He is also a senior researcher at the Research Center of Information and Communication Technology, KMUTNB. His research interest includes eGovernment, data mining, and software engineering.

Péter József Kiss is consultant at the Hungarian Academy of SciencesInformation Technology Foundation (MTA ITA) and works on public administration projects. He received his master's degree inEngineering Information Technology in 2013 and is currently a PhD student at the University of Pannonia, Hungary. His researchtopic is image processing.

Rajiv Kumar is a FPM scholar in Indian Institute of Management Ranchi, India, M.Tech. from Indian Institute of Technology Kharagpur, India. He has worked with Texas Instruments as a Software System Engineer and with Samsung Software (India) as Lead Engineer and also as Technical Lead, totally for about four years. Areas of Interest: eGovernance, eJudiciary and text mining.

Tamas Molnar. 2001 – 2003: University of Technology Budapest – Electrical Engineering , 2003 – 2008: Corvinus University Budapest – Business Information Systems (E-Government Systems), 2008: University Potsdam, Exchange Student Applied Computer Science , 2009 – 2014: Humboldt-University Berlin – Ph.D. Program (Software Usability of E-Government Systems). Currently: Project Manager at Humboldt-University Berlin.

Donald F. Norris (Ph. D., University of Virginia) is Director of the School of Public Policy and Director of the Maryland Institute for Policy Analysis and Research at the University of Maryland, Baltimore County. He has published widely in leading journals in public administration on the subject of including IT and government and e-government.

Jonathan Okewu is an indigene of Benue State, Nigeria. An academic with the Federal University Lafia, Nassarawa State, Nigeria, he lectures in the Department of Visual and Creative Arts. His Information Technology interest is Graphics Design while research interests span Ceramics (Ceramics), Archaeological Method & Theory, Archaeometry, Ceramic Analysis (Archaeology), Ceramics (Archaeology), and Fine Art Ceramics.

Aderonke A. Oni, holds Ph.D in MIS. She has co-authored a number of peer-reviewed journals, proceedings, and chapters in books. Her research interests are in: e-commerce, e-government, and technology adoption. She is a lecturer in the Department of Computer and Information Sciences, Covenant University and currently a post-doctoral fellow at ICITD, Southern University, LA, USA

Onyekachi Onwudike, is currently a PhD Student in the Department of Computer Science in Loughborough University. She graduated with an MSc in Artificial Intelligence from the University of Manchester where she carried out a research on Describing the Phenotypes of plants using an OWL ontology. Her research interests include E-Government systems, ontologies of E-Government, reuse of solutions across governments and risk analysis of E-Government systems.

Marioara Piroi has audited EU-funded projects worth more than EUR 1bn in the fields of innovation, competitiveness, environment etc. The financial services company which she has started 16 years ago has steadily developed, reaching the threshold of 30 employees and 200 international clients, and is now a member of The International Accounting Group.

Dhata Praditya is a researcher in the Information and Communication Technology section of the Faculty of Technology, Policy and Management at Delft University of Technology, The Netherlands. His research focuses on shared services and information infrastructure between public and private sectors.

Claudio Russo is aPhD student and a research fellow at Politecnico di Milano. His main research interest is organizational development of the smaller Municipalities, aimed at guaranteeing them the possibility of providing public services, if compared to bigger Public Entities, of a similar service level.

Dr. Tony Verheijen is Country Manager for the World Bank in Serbia. Since joining the World Bank in 2002 he held managerial and technical positions in the Public Sector Management Practice. Previously, he worked for various international organizations and academic institutions. He holds academic degrees from the Erasmus University in Rotterdam, Université Libre de Bruxelles and Leiden University.

Muslimin Wallang is a PhD Candidate from the University of Queensland, Australia. He is also a senior lecturer at the School of Government, University Utara Malaysia, Kedah, Malaysia. His research interest is in e-government topics particularly on technology usage in the public sectors or local authorities.

Dr. Nawaporn Wisitpongphan is a lecturer in the Faculty of Information Technology and also a director of the Research Center of Information and Communication Technology at King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand. While her expertise is in computer network analysis and planning, her current research focus is on Information Technology Management.

Dr. Rowland Worlu is the Head, Business Management Department, Covenant University, Ota. His research interest is in Political Marketing & Management. He has authored many books across disciplines and published a number of research findings in both local and foreign journals as well as conference proceedings.

Ahmet Yapici currently works as a software engineer at Turkey e-Government Gateway Project, TURKSAT Corporation, Ankara, since 2014. He has 10 years experience in software development. He has graduated from Ege University Computer Engineering Department and completed his M.Sc. in METU Software Engineering Department.

Husam Yaseen is a PhD student in the School of Computing at the University of Portsmouth. His research interests are e-commerce, awareness, e-trust, and security and privacy issues in e-commerce. His PhD research will investigate the relationship between awareness and the e-commerce, particularly in Jordan.

Burcu Yilmaz has graduated from Computer Engineering Department of Atılım Univertsity in Ankara, 2009. She has been working as a Software Engineer at Turkey e-Government Gateway Project, TURKSAT Corporation, Ankara, since 2010.

Muhammad Yusuf is a PhD student in School of Computing, University of Portsmouth, UK. He is also a lecturer in Informatics Engineering Department, Informatics Management Department, also Multimedia and Network

Engineering Department, Universty of Trunojoyo, Madura, Indonesia. His research interests are E-Government, Information System, Web 2.0, E-Commerce, Cloud Computing, Social Computing and Research Philosophy.

Dr Anowar Zahid is a Senior Lecture at the Faculty of Law, Universiti Kebangsaan Malaysia- UKM (National University of Malaysia). I received my LLB (Honours) degree from the University of Dhaka, LLM from Dalhousie University and PhD from the University of Manchester. My area of interest in teaching and research is international Business and Islamic Law.

Joseph Zernik. "Machine Learning" textbook found Joseph Zernik's data-mining in Human Rights research among "Notable uses", summed: "Data mining of government records - particularly records of the justice system (i.e., courts, prisons) - enables the discovery of systemic human rights violations in connection to generation and publication of invalid or fraudulent legal records by various government agencies."

Ewa Ziemba is an Associate Professor of Economics at the University of Economics in Katowice, Poland. Her principal research areas are focused on management information systems, e-business and e-government. She has published over 150 papers and 11 books. She has led and participated in several research projects. She is the editor-in-chief of OJAKM, the associate editor of numerous journals, e.g. IJITCS and IJELLO.

Anneke Zuiderwijk is a researcher in the Information and Communication Technology section of the Faculty of Technology, Policy, and Management at Delft University of Technology, the Netherlands. Her research focuses on the development of a socio-technical infrastructure that improves open government data use.

Web Content Accessibility of Municipal web Sites in Turkey

Yakup Akgül
Dumlupınar University, Kütahya, Turkey
yakupakgul@gmail.com

Abstract: The accessibility of the public web sites is crucial for the successful implementation of the information society. Therefore, it is essential that all citizens must have equal accessible opportunities to all e-government recourses. This research evaluates the accessibility of each of the 30 metropolitan municipal web sites in Turkey by the disabiled people based on the Web Content Accessibility Guidelines (WCAG) 2.0 and employing automated testing tool. It identifies the major problem of accessing the website content to those who have hearing, listening, impairments or other physical disabilities. The Intention of this study is to highlight the ignorance of the government and common people towards people with the disabilities. The Slight concern of the developers during the website development can assist these people in their website usage significantly. The Detailed results are presented after comprehensive evaluation of the metropolitan municipal websites against WCAG 2.0. The analysis of the results reveals a relatively low web accessibility of the municipal web sites and highlights several aspects.

Keywords: accessibility, WCAG 2.0., metropolitan municipal web sites

1. Introduction

The use of Information and Communication Technologies for the delivery of the public services is becoming more and more popular throughout the world. In the last few years, The Turkish municipalities have made great efforts to harness the implementation and the employment of the information technologies. The municipalities' portals have become a significant source of information for the authorities and citizens, within the scope that denominates e-government.

While the proportion of the people with disabilities (visual impairment, hearing impairment, cognitive disability etc.) in the society has been rapidly increasing due to the demographic trends long documented by many researchers, governmental leaders have paid little attention to their needs when planning and implementing the web projects. Therefore, it is essential that all citizens must have equal accessible opportunities to all e-government recourses. The Web accessibility encompasses all disabilities that affect access to the web, including visual, auditory, physical, speech, cognitive and neurological disabilities. WCAG 2.0 identifies the techniques to create and manage web content (i.e. dynamic and static textual, visual, or audio electronic information) in ways that are more accessible to the people with disabilities–for instance, through assistive technologies like the screen readers. The Websites that are more accessible are also generally more user-friendly to everyone.

Currently, there are a number of guidelines and tools that the web designers and webmasters can use to make their websites accessible to the people with disabilities. Such guidelines include the Web Content Accessibility guidelines (WCAG) developed by the World Wide Web Consortium (W3C), the US government's Section 508 Initiative, Americans with Disabilities Act (ADA), Australians with Disabilities Act and the National Institute on Ageing Guidelines (NIA). The Similar guidelines exist in Canada, UK and Portugal. The most common standards Based website Design and the development are W3C Web Content Accessibility Guidelines 1.0 or 2.0 (WCAG 1.0 or WCAG 2.0). WCAG 2.0 was approved as an ISO/IEC 40500 International accessibility standard in October 2012 (ISO/IEC 40500, 2012). In other words, more countries can formally adopt WCAG 2.0 and many countries are updating their laws to the new version.

An international organization World Wide Web Consortium (W3C) launched the web accessibility initiative (WAI) in order to improve the web accessibility for the people with disabilities (WAI, 1997). For the consortium, web accessibility was defined as "access to the web by everyone, regardless of disability" (Zeng, 2004). The Web accessibility means that the people with disabilities can perceive, understand, navigate, and interact with the web. In 1999, W3C published the first version of the accessibility guidelines (WCAG 1.0) (WCAG1, 1999). The second version was published in 2008 (WCAG 2.0), and this is the reference recommended for use in the accessibility policies (WCAG2, 2008). There are four key principles that underlie WCAG 2.0: perceivable, operable, understandable, and robust. "Perceivable" means the web contents and user interface modules which must be offered to the people as obvious objects. "Operable" refers to the user interface modules and navigation components which should be designed in a way that they work properly. "Understandable" is about the design of a website with a friendly version. "Robust" refers to the capacity of the website must be interpreted by a

variety type of user agents. Each principle is divided into the success criteria which offer three conformance levels: A, AA, AAA. Three levels of conformance testing were defined as follows: A (lowest), AA, and AAA (highest).

A considerable number of the users of the web have various types of disabilities such as vision, hearing, motor and cognitive impairments (Lazar, 2004). The Studies show that presently most of the government websites are inaccessible for the impaired users (Baguma, 2007). However, more than one billion people in the world are disabled and this number is increasing day by day as the population increases (UN, 2011; WorldBank, 2010). Turkey has an estimated population of 77.7 million, out of which about 8.5 million are disabled (TUİK, 2014). Although the access to the information for the people with disabilities was stated as a critical, the web accessibility of both the government level and the local government level is a problem.

The accessibility of these web sites, especially by the people with disabilities, has not been evaluated to date. This has motivated me to assess the accessibility of the metropolitan municipal web sites for the people with disabilities employing the automatic testing tools for checking of target websites. The purpose of this study is limited to the accessibility assessment of the metropolitan municipal web sites and to find out whether the web based public services are provided in equitable manner to all the citizens.

The rest of the paper is organized in five sections: In Section 2 presents the relevant works. Section 3 describes the adopted methodology to make the complete analysis of selected websites of government. Section 4 presents the results and their detailed description. Section 5 presents limitations, future work and concludes the paper with recommendation.

2. Prior studies of the municipality web sites accessibility

A sample of 30 a preliminary review of the municipality web sites in Romania was evaluated in 2010 for conformance with WCAG 2.0 level A requirements (lowest level of conformance) (Pribeanu and Fogarassy-Neszly, 2011). Pribeanu et al. (2012) presented the results of a second study carried on in 2011 based on a larger sample of municipalities. The purpose of this work is twofold. Firstly, the larger view on the accessibility of this category of the public web sites will be obtained. Secondly, the progress in the web accessibility / the degree to which the web accessibility is maintained in time will be analysed (Pribeanu et al., 2012). The other studies have been carried out to evaluate the conformance of Romanian municipal web sites with WCAG 2.0 accessibility guidelines (Iordache et al., 2010; Marinescu, 2012; Pribeanu et al., 2014).

Evans-Cowley (2006) presented the results of an evaluation of the level of accessibility of the 100 largest municipalities' websites. The results of this study showed that while a number of cities have accessibility statements, overall compliance with Section 508 is low (Evans-Cowley, 2006).

Freire et al. (2008) presented a metric based on the approach for evaluating the municipalities Web pages using the automatic accessibility evaluation tools. The Results exhibited that much work should be done to improve the accessibility of the Brazilian municipalities' web sites (Freire et al., 2008).

Kumar and Sareen (2012) examined the relationship between the income levels of the city and the quality of the municipal website (Kumar and Sareen, 2012).

Youngblood and Mackiewicz (2011) employed a heuristics-based content analysis to determine the extent to which municipal government websites comply with the basic usability and accessibility best practices. The Authors applied this technique to 129 official websites for Alabama cities (Youngblood and Mackiewicz, 2011). The other studies have been carried out to evaluate the conformance of the American municipal web sites with the usability and accessibility guidelines (Youngblood and Mackiewicz, 2012). Youngblood and Youngblood (2013) found that the portal adoption is associated with each of the demographics above and that accessibility has a weak inverse relationship to the per-capita income.

Miranda et al. (2009) evaluated 84 European municipal web sites using a model that focused on four categories of factors: accessibility, speed, navigability and content to access the quality of web pages (Miranda et al., 2009).

Abdelgawad et al. (2011) presented a demonstrator simulation model, built employing System Dynamics methodology. The model focused on the accessibility of the Norwegian Municipal websites, and was intended to be used as a decision support tool, mainly for the managers responsible for the website development and maintenance. Nietzio et al. (2010) evaluated the accessibility of a group of the Norwegian municipalities desiring to improve the accessibility of their websites. The approach undertaken by them in the eGovMon (eGovernment Monitoring Project) national project integrates the benchmarking and related services with the goal at supporting a community of the practice (Abdelgawad et al., 2011).

Kopackova et al. (2010) focused on the accessibility of local e-government web pages in the Czech Republic. The web pages were analysed both from a citizen's point of view (with disadvantage due to the disability or to the technical equipment) and from the point of view of fulltext search engines (Kopackova et al.,2010).

Shi (2007) tried to provide an overview of the accessibility of Chinese local government Web sites. Research results indicated that all the surveyed Chinese e-government Web sites failed one or more W3C's accessibility measures and thus many disabled the Chinese people may have substantial problems to access them (Shi, 2007).

Sun and Chen (2010) tried to find out how accessible they are by means of almost all the examined websites of the provincial and municipal government (Sun and Chen, 2010).

A global evaluation has been carried on by Olsen et al. (2011) on the national government portals and the ministry web sites. The most commonly accessibility barriers detected are invalid use of the HTML-standard and missing alternative descriptions for the images (Olsen et al., 2011).

To some extent, the accessibility research is a new field in Turkey and there is no accessibility data related to the local public web sites. The Accessibility and usability for the disabled people is the main concern in this area (Çağıltay and Kubuş, 2006; Şat, 2010; Kurt, 2011; Durmuş, 2012; Akgül and Vatansever, 2014). According to the auhor's knowledge, there is no one reported who had done such kind of case study of testing a public web site for the accessibility with the disabled users.

3. Methodology

There are several approaches to the accessibility evaluation and, consequently, many accessibility evaluation methods. Brajnik (2008) mentioned the following five categories: conformance review, subjective assessment, screening techniques, barrier walkthrough, and user testing (Brajnik, 2008). This study is reviewing the metropolitan municipality web sites for the accessibility. The sample consists of the first 30 Turkish towns ranked upon the population, according to the 2014 census.

The Conformance review is an analytical method based on the standards and/or the guidelines and includes the computer-aided testing with the accessibility checking tools. As such, it depends on the chosen checklist. After the web accessibility evaluation tools are the software programs or online services that are employed to check your website's accessibility level under the web accessibility guidelines. There is a huge number of the accessibility tools for the commercial purposes or freely available on the web such as Watch Fire Bobby, AChecker, Cynthia Says, EvalAccess, Accessibility Valet Demonstrator (WebThing), AccMonitor Online (HiSoftware), Torquemada (WebxTutti), Wave 3.5 (WebAIM) and Tawdis etc. Some good free web-based website accessibility evaluation tools are linked in (3pillarglobal, 2013; Indiana, 2015; Usabilitygeek, 2011; Whdb, 2012). The whole list of the accessibility evaluation tools is in W3C (W3C, 2014). These tools are very beneficial for the programmers and designers to determine whether or not their sites follow WCAG. During the design, implementation, and maintenance phases of the web development if these tools are employed carefully, it can assist the targeted users to prevent the accessibility barriers, repair the encountered barriers and improve the overall quality of the web sites (W3C, 2014). This study will employ TAW automatic evaluation tool which is considered as the web accessibility test tool which is capable of providing the complete analysis of the website accessibility and have been the pioneers and are the most well-known, due to their usability, the ease of use and its quick results. TAW is a limited online free service to check the web accessibility against WCAG 1.0 and 2.0 (Tawdis, 2015). In this study, the sampled the web pages were evaluated against WCAG 2.0 guidelines (conformance level A). The home page of each one of the websites has been analysed from the accessibility point of view. The home page of a website is the first contact a user has with the website. If the home page displays problems or is not accessible, it would be very difficult that a disabled user can access other pages of

the website. Therefore, it is essential to ensure the accessibility of the home page of a website. All the tests of a web page were conducted during the same day in order to avoid alterations in its content. The evaluation was conducted in December 2014-January 2015.

4. Results

Thirty metropolitan municipalities were evaluated for compliance with the WCAG 2.0 accessibility criteria. Figure 1 illustrates the overall violation results per guideline for each principle. Due to the lack of space, the author cannot include the whole outcomes of the web accessibility analysis. Therefore, Figure 3 summarizes the number of the problems detected with the automatic evaluation tools and some information has to be discarded. Unfortunately, the home pages of all the websites have the accessibility issues. The study targeted the metropolitan municipality web sites and revealed several accessibility problems: graphical items that are not accessible to the screen readers, difficult navigation due to the lack of empty links, the lack of text alternatives for the graphical elements, the lack of textual description.
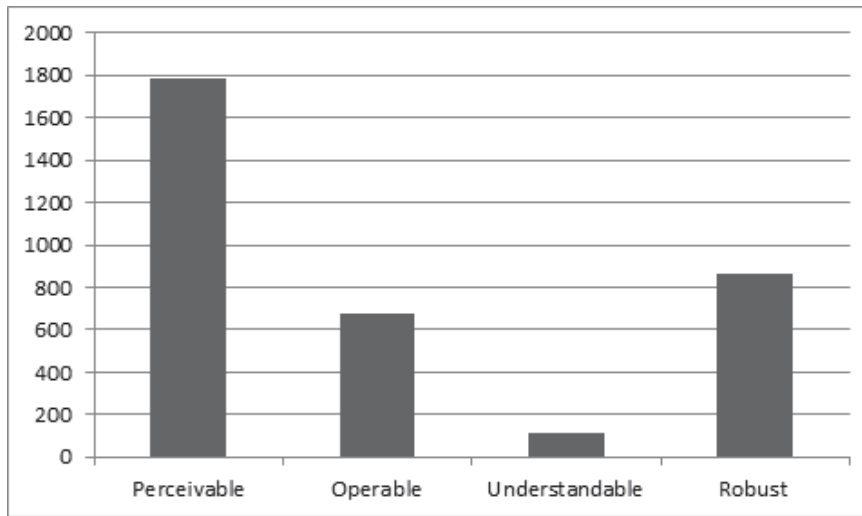
Figure 1: Overall violation of accessibility guidelines for each principle

In general, the worst results regarding the web accessibility were obtained with the websites of Konya metropolitan municipality, Antalya metropolitan municipality and Gazi Antep metropolitan municipality. On the other side, the best results were obtained with the websites of Van metropolitan municipality, Şanlı Urfa metropolitan municipality and Muğla metropolitan municipality. Overall, 3440 WCAG 2 errors were detected on the home pages with a minimum of 4 (one metropolitan municipality) and a maximum of 275 errors (See Figure 2).
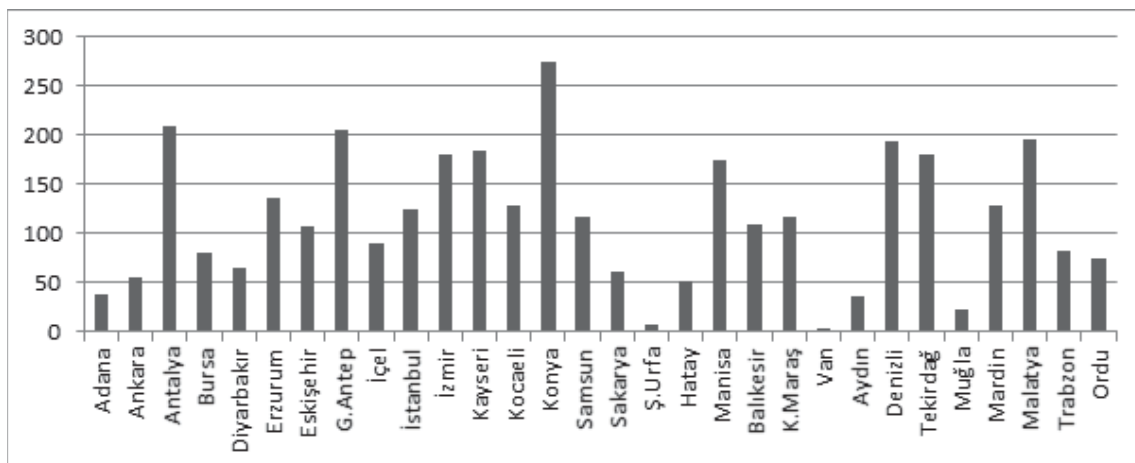
Figure 2: Overall violation of accessibility guidelines for each metropolitan municipality

A more detailed analysis of results reveals several aspects regarding the conformance to WCAG 2.0 accessibility level A. In Figure 3 a grouping of web sites following the WCAG 2.0 principle and the error type is presented. In the following section each accessibility principle is analysed and described in depth.
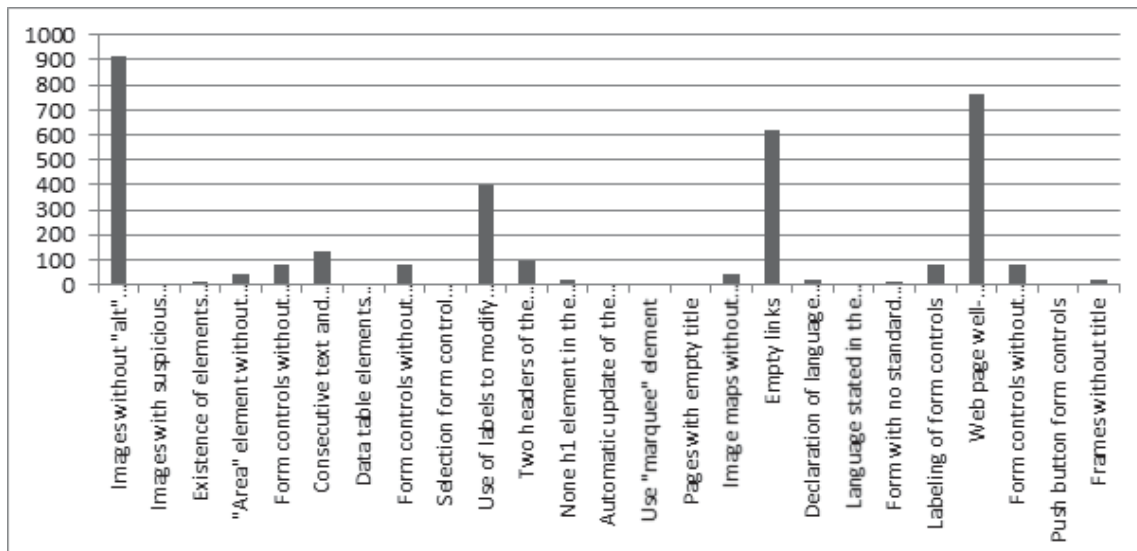
Figure 3: Main types of accessibility errors

4.1 Principle 1: Perceivable

The perceivable accessibility principle is the highest violated principle across all metropolitan municipalities. Most errors are related to the first WCAG 2.0 principle (perceivable) 52% with a minimum of 1 (one metropolitan municipality) and a maximum of 154 errors. From these, two error types are more frequent: the lack of text alternatives for the nontext content (26.62% from total) and the use of labels to modify the presentation (11.71% from total). These two error types account for 38.33% the total number of errors.

The highest violated success criteria in this guideline is the lack of text alternatives for non-text content. The purpose of alt attribute is to read the text associated with an image that serves the same purpose and conveys the same essential information as the image. It is read out loud by the screen readers for those with visual impairment.

Two home pages had no error. 17 home pages had 1-20 errors. At the other side, 4 web sites with 21-50 errors and 7 web sites with more than 50 errors.

4.2 Principle 2: Operable

In regard to the operable accessibility principle, which is concerned with ensuring the operability of User interface components and navigation. Other frequent accessibility errors that are related to the perception are: consecutive text and image links to the same resource (3.92%), two headers of the same level with no content in between 2.73%, form controls without associated label 2.29% and form controls without label 2.26%.

Regarding the second WCAG 2.0 principle (operable), the total number of errors is 676 (19.65% from total). Two error types are more frequent: empty links (18%) and image maps without alternative (1.25%).

The highest violated success criteria in this guideline is the the empty links. This failure condition occurs when a link contains only a non-text content, such as an image, and the non-text content has been implemented in a way that it can be ignored by the assistive technology. Since there is no text content within the link to be used as the name, assistive technology employs a variety of the repair techniques to find some name to use for the link. The Conclusion is that the most accessible link is the one that contains the link text.

Five home pages had no error. 14 home pages had 1-20 errors. At the other side, 7 web sites with 21-50 errors and 4 web sites with more than 50 errors.

4.3 Principle 3: Understandable

In regard to the understandable principle; which sets guidelines to ensure that information and the operation of user interface are understandable. Regarding the third WCAG 2.0 principle (Understandable), the total

number of the errors is 113 (3.28% from total). Two error types are more frequent: Labeling of form controls (2.29%) and the declaration of language of the document (0.67%).

The highest violated success criteria in this guideline is the providing labels for form controls, or usage the attribute 'title' to indicate the control functionality.

The second highest neglected criterion is the language of page, where every web page is required to have a correct language declaration, this criterion is very important for screen readers. For example, if German is not indicated for a German-language website, the screen reader will read the site in English.

4.4 Principle 4: Robust

The robust accessibility principle is the second highest violated principle across all metropolitan municipalities. The last WCAG 2.0 principle (robust) account for a total of 867 errors (25.20%) respectively the web page well-formedness 762 errors are more frequent (22.15%). Two error types are more frequent: Form controls without label (2.29%) and frames without title (0.64%).

The objective of this technique is to avoid the ambiguities in the web pages that often result from the code that does not validate against the formal specifications.

Only one home page had no error. 15 home pages had 1-20 errors. At the other side, 8 web sites with 21-50 errors and 6 web sites with more than 50 errors.

The highest violated success criteria in this guideline is the the use of labels to modify the presentation. The objective of this technique is to facilitate the interaction of the assistive technology with the content via separating the content's structural encoding logically from the presentational encoding. The Structural encoding is the indication of the elements such as headings, paragraphs, lists, tables, etc., and is done through using the technology features reserved for the purpose.

Sixteen home pages had no error. 8 home pages had 1-20 errors. At the other side, 3 web sites with 21-50 errors and 3 web sites with more than 50 errors.

5. Conclusion

This paper endeavors to discover the significance of the website content accessibility focusing the disabled people. The study further investigates that most of the metropolitan municipality web sites of Turkey are failed to follow W3C WCAG 2.0 guidelines. There are two types of errors that are frequently encountered in most web sites: the lack of alternate text for non-text content and the use of tags purely to create the visual presentations (instead of using CSS). These issues mainly affect the people with visual disabilities. This can cause an accessibility barrier to the screen reader users. This paper is also an eye opening study for all the website developers which will hopefully assist them to identify the key problems of the website accessibility that should be taken into account during development.

Like any other study of this kind, the analysis presented above suffers from number limitations. The first limitation is related to the exclusive reliance of our accessibility analysis on the automated testing results. The Web accessibility evaluation tools and expert inspections cannot substitute user testing, because the difficulties of comprehending all the interactions between the web content and the assistive technology. Vigo and Brajnik (2011) mentioned the automated accessibility evaluation has several inherent limitations (Vigo and Brajnik, 2011; Vigo et al., 2013).

Hackett and Parmento (2008) another limitation is the restriction of our automated accessibility testing on the home page of each tested website. Hackett and Parmanto indicate that home page is not enough when evaluating the web site accessibility (Hackett and Parmento, 2008).

Moreover, researcher mainly focused on the conformance with WCAG 2.0 without using all features provided by the tool, such as: parsing errors, HTML errors, CSS errors, Browser compatibility, HTML 5 and ARIA usage and broken link errors. Second, the sample size is small since only 30 metropolitan municipal web sites were evaluated. Turkey has 1397 municipalities nevertheless in this study, 30 metropolitan municipal web sites were

evaluated. However, some degrees of the representativeness exist since these municipalities have a total population of 58.999.801million people (77%).

Throughout the whole investigation to determine the conformance level of the accessibility, the researcher adopted the TAW evaluation tool which was open source application. However, which is widely used and to ensure the scalability of the result researcher followed W3C Evaluating Accessibility (W3C, 2014). Although the commercial tools (e.g. Bobby) are not freely available and expensive, I will try to apply both the commercial evaluation tools and also open source and commercial assistive Technologies (NVDA, JAWS, etc) them in my next study. In addition to, in order to obtain more conclusive results, I plan to compare the results across countries and across different municipal websites. Finally, another future work I plan to address is to detect the most common problems that recur in the same site and between different sites. And also, I intend to carry on a future evaluation after one year with a larger sample as a second evaluation. In this way I could measure the progress of the web sites already evaluated and better describe the accessibility of the municipal web sites.

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Uplifting Citizens' Participation: A Gov 2.0 Conceptual Framework

Mohammed Aladalah, Yen Cheung and Vincent Lee
Faculty of Information Technology, Clayton, Monash University, Melbourne, Australia
Mohammed.aladalah@monash.edu
Yen.cheung@monash.edu
Vincent.CS.Lee@monash.edu

Abstract: The rise of digital citizens is no longer a speculation; therefore, governments' use of Web 2.0 tools (hereafter Gov 2.0) should be a part of all current and future e-government plans. Recent literature has emphasised Gov 2.0 as a possibility for greater communication, participation, and collaboration with citizens. However, citizens' participation levels in Gov 2.0 have not met to the hype. Despite their importance and potential, our understanding of the value of Gov 2.0 is limited. Systematic studies addressing citizens' participation in Gov 2.0 are sparse. In the absence of prior work, this paper uses empowerment theory in a new context (Gov2.0) and investigates the role of citizens' empowerment in increasing citizens' participation in Gov 2.0. We conducted an extensive review of e-government and empowerment literature, in order to form a sound theoretical explanation of this phenomenon. This paper seeks to identify factors derived from empowerment theory that influence citizens' participation in Gov 2.0 to develop a conceptual framework to enhance understanding of citizens' participation in Gov 2.0. Further, the paper extends the theory of empowerment by showing that higher levels of satisfaction and empowerment can increase citizens' participation in Gov 2.0. A further positive outcome of citizens' empowerment is higher levels of satisfaction with Gov 2.0. Three constructs have been found to influence citizens' participation in Gov 2.0, namely, citizens' empowerment process, citizens' empowerment outcomes, and citizens' satisfaction with Gov 2.0. Our conceptual framework indicates that these three constructs should feature and enhance trust, satisfaction, and commitment; and the outcomes lead to increased citizen loyalty, and higher participation levels in Gov 2.0. These suggestions make a strong case for citizens' empowerment in Gov 2.0 to enhance the public value. The framework is expected to benefit both citizens and government agencies that wish to enhance their Gov 2.0 activities. Citizens will enjoy a higher sense of control, including having an equal relationship with the government agency. Government agencies decision-makers can benefit from new insights into citizens' participation and enhanced citizen experiences. This paper is expected to make two significant contributions: (1) extension of empowerment theory and its role in increasing citizens participation in Gov 2.0; and (2) provide a framework for better understanding of citizens' participation in Gov 2.0. Both, preliminary evidence for the framework and general implications for research are discussed.

Keywords: e-government, Gov 2.0, citizens, government agencies, participation, empowerment

1. Introduction

The advent of Web 2.0 technologies has socially changed the world; some examples are the Wikileaks dispute, Arab spring and the Occupy Wall Street phenomenon (McNutt 2012). These technologies are commonly referred to as Social Media (Bekkers et al. 2013; Bertot et al. 2010); the two are used interchangeably in the literature and considered to be "umbrella terms" (U.S. General Services Administration 2009, p .1). Bryer and Zavattaro (2011) differentiate them through means-versus-ends analysis by considering Web 2.0 technologies as the latest means by which people can achieve social ends. Web 2.0 technologies differ from other information and communication technologies (ICT) by the socially user-driven nature (Bryer and Zavattaro 2011). They are collaborative, interactive social networking, and value co- creation (Criado et al. 2013), and that is what transforms Web 2.0 into social media. Moreover, Web 2.0 technologies have transferred information sharing and communication, introducing the Gov 2.0 concept (Bonsón et al. 2012). Gov 2.0 refers to the use of Web 2.0 tools, within governments (G2G), or with private sector (G2B) or citizens (G2C)" as defined by Bryer and Zavattaro (2011).

Citizens' use of social media does not automatically lead to greater citizen participation in Gov 2.0, especially with the lack of orientation towards creation of value for citizens, and the consequent low levels of participation. The gap between the actual citizens' participation and Gov 2.0 online availability put forward the need to move from the old-fashioned model of government one-way communication to an integrated approach focusing on the use of Gov 2.0 to involve citizens and allow them to create their own value to increase their participation. Vigoda (2002) argued that citizens have largely favoured the "easy chair of customer over the seat of participatory involvement". However, when citizens see the benefits of public value they will be willing to participate more. After all, low participation does not only limit the quantity of citizens' contribution, but also undermine the quality (Nyiri et al. 2007). Furthermore, many participants in the process reduce the effect unconstructive participants (Noveck 2008).

In spite of the rapid growth in e-government research and practice, issues of low-level of citizens' participation in Gov 2.0 have not been systematically studied. Although extensive work has been done on related issues, including the relationship between citizens' empowerment and use of e-government systems, not much research has been conducted from an empirical perspective in the Gov 2.0 context (Joseph 2013). The motivation for this research arose from reports on Web 2.0 tools currently in general use in the public sector. The public sector is an ideal filed for studying Web 2.0 tools, as governments have recognised that these tools can be more efficient, more effective and more useful to reach their citizens, many of whom have complex and diverse needs (e.g. minority groups and welfare recipients) than current practices. The problem context is well illustrated by examining current citizens' participations levels of many public sector web 2.0 tools and applications, which has low levels of participation than predictions (Bertot et al. 2012; Panagiotopoulos et al. 2011). This research paper tackles this issue by proposing a conceptual framework based on citizens empowerment theory.

2. Literature review

2.1 Gov 2.0

Used firstly in the private sector, Web 2.0 technologies (e.g. blogs, wikis, and social networking platforms etc.) have reached all parts of the public sector, regardless of the level governance or types of activities. Some researchers define Gov 2.0 or Government 2.0 as a set of producers and policies, principles, functions and technological enablers to lead to a transformative, participatory model of e-government (Chun et al. 2010). Others simply define it as the government use of Web 2.0 tools and applications (Criado et al. 2013), which will be adopted for this paper. Web 2.0 is a set of technologies (e.g. RSS, XML), applications (e.g. blogs, wikis, social networks) and concepts (e.g. collective intelligence, produsage (a merging of "production" and "usage"), perpetual beta (continue to release new features that might not be fully tested). Web 2.0 includes social networking services (Facebook, MySpace), social media or multimedia sharing (YouTube, Flickr), wikis, blogs, micro blogs (Twitter), and mash-ups (Bertot et al., 2010). Web 2.0 technologies have changed the Internet from a place for publishing information into a place where the knowledge, and resources come together to form an enormous collective force (Tapscott et al. 2007). Gov 2.0 is already a part of most governments' current and future plans (Larsson and Grönlund 2014). Many benefits are expected, such as a better match between public services and citizens' expectations, greater adoption of online services by citizens, or better control of costs and delays in the roll out of new services (Janssen and Estevez 2013). However, Government agencies that appear to be socially active by using Web 2.0 tools are often unwilling to really interact fearing that they will give up power (Brainard and Derrick-Mills 2011).

As citizens share more of their private lives on public forums such as Facebook and Twitter, they expect the same from the government. Web 2.0 tools can create the perfect ground where citizens can participate, engage and collaborate. These platforms can more easily facilitate the interaction compared with traditional methods. However, citizens' participation should not be taken for granted. Social media has the potential to provide engagement processes that have established criteria ensuring that fairness, mutually respectful discussions, social learning and most importantly, public opinion are valued and considered. One of the most promising aspects of Gov 2.0 is its participatory and interactive nature, which allows for two-way communication (Linders 2012). The digital future is moving forward with the increasing pervasiveness of social media tools, and governments need to respond and take a stand.

Government is a system usually defined by its goals and objectives and the types of tools used to achieve them. There is disagreement about the degree and impact of Gov 2.0 on government-citizen relationship and the level of citizens' participation. In many cases, Gov 2.0 is intended to reach citizens on platforms that are already being utilized in society such as Facebook, Twitter, YouTube, blogs, Flickr, and LinkedIn. Research from the U.S. (Kavanaugh et al. 2012), the European Union (Bonsón et al. 2012); Mexico (Sandoval-Almazan et al. 2011) and Australia (Omar et al. 2012) has confirmed this conclusion. Mergel (2013) when investigating the reasons of Gov 2.0 adoption in the U.S. found that it was mainly market-driven: agencies were trying to be where the citizens are, to reach most of the growing population and to cover the potential communication channels with the public to get feedback, and disseminate information. Moreover, another reason for the diffusion of these technologies is their high popularity among public administrations when addressing the capabilities of social media (Ngafeeson and Merhi 2013). However, the e-government use of social media tools and applications is not limited to these. Expectations that Government 2.0 will improve transparency, collaboration, participation and openness are partially realized in some areas, but are non-existent in others (Nam 2011). On the other hand,

Government 2.0 faces some doubts or as Millard (2010) labels it as government 1.5. Government 2.0 needs to be evaluated from citizens' views, along with continuous advancement in e-government functions. In doing so, citizens' satisfaction with and trust in government performance could be boosted by involving them in the public value creation.

2.2 Citizens' participation

To understand if and how government agencies are using Gov 2.0 tools to empower and involve citizens, it is worthwhile to begin with a broad study of citizens' participation. Citizenship can be defined as belonging to a society via the entitlements linked to rights and obligations (Isin and Turner 2007). Others have extended the definition to include active participation (Leydet 2014). Researchers have predicted the impact of Information and communications technology (ICT) tools on citizenship highlighting universal connectivity. Hauben et al. (1997) described it as Future "netizens" (Internet citizens) or "citizens of the world". Recent improvements in three-dimensional: processing, bandwidth and network connectivity may herald signal or indicate the evolution for digital citizenship. Hence, digital citizenship can be defined as online participation in society (Tolbert et al. 2008). The notion of governance can be outlined as a social arrangement, where collective resources are to be used to meet collective needs (Molinari and Ferro 2009). Thus, it could be expressed that in order to manage and organise the social interaction of citizens and as a consequences of it the public sector was founded. Nonetheless, governments in general have mislaid the collective needs of the society and transformed into closed systems. Hence, the public sector that focused on the government needs and not the citizens have therefore lost their trust and interest. In order to engage citizens, governments need to begin with citizens daily needs rather than the needs of the government. A good way to do this is to reach citizens where they already are, via web 2.0 tools or social media. Government overlooked its biggest asset, citizens.

Arnstein (1969), in a seminal paper, introduced a "ladder" of citizen participation consisting of eight rungs, and describes citizen participation as citizens' power. At the lowest rung of the ladder are "manipulation" and "therapy" and described as nonparticipation, where the main objective is to give citizens the feeling of participants without real participation. On the contrary, at the top of the ladder are "citizen control" and "delegated power" and described as the highest level of citizen power. The assumption here, that power is a zero-sum game: citizens gain power, whenever government let go of it. As the ladder symbolizes, to ensure effective participation, upper levels cannot be reached without crossing over the previous. It shows that appropriate preparation is crucial to achieve high level of participation that might otherwise result in failure.

Ten years later, Glass (1979) proposed a framework that matches different objectives of citizen participation programs to specific participatory techniques. The general objectives of citizen participation include: information exchange, education and support building, decision-making supplement, and input probing. Generally used offline participatory techniques include drop-in centers, public hearings, citizen advisory committees, citizen panels, nominal group processes, value analysis, and citizen surveys. Each of these techniques offers different advantages and limitations and can help achieve specific participation objectives. Several scholars (Islam 2008; Phang and Kankanhalli 2008) adapted Glass' work in the e-government context. They examined the offline participatory techniques that best support each of these objectives. They identified different ICT tools that can be used to support the techniques, and help to achieve the e-participation objectives. Furthermore, they indicated which objectives and ICT tools are important in different stages of government policy-making. However, previous work focused more on the political aspect of the government systems (Peristeras et al. 2009).

Fung (2006), a couple of decades later, introduced the "Democracy Cube" (Figure 1) with three dimensions: "the scope of participation", "the mode of communication and decision" among participants, and "the extent of the participants' authority". In the first dimension, participants may be inclusively or exclusively chosen to participate. In the second dimension, six types of communication in citizen participation were identified: listening as a spectator, expressing preferences, developing preferences, aggregating and bargaining, deliberating and negotiating, and deploying expertise. The third dimension "measures the impact of public participation" and ranges from New England town meetings (where participant decisions become town policy) to venues where participants have little or no expectation of influence but benefit personally from receiving information or fulfilling a civic obligation. The study showed that citizens' participation are not an alternative to political representation or expertise but rather complementary.
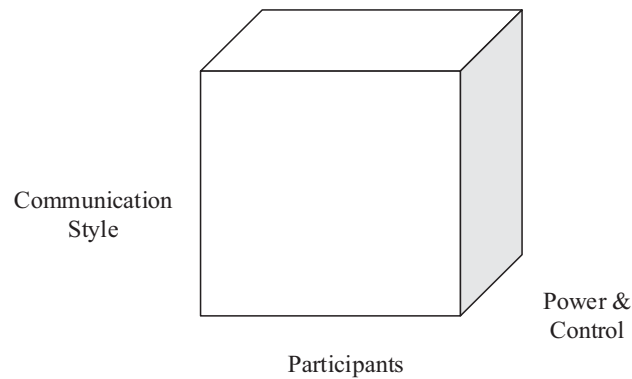
Figure 1: Democracy cube (Fung 2006)

Feeney and Welch (2012) defined participation simply as opportunities for external stakeholders and the public to offer input and feedback to government policies, programs, and services. However, the literature on citizen engagement (both traditional and online) describes a broad range of depth and type of interaction between citizens and governments. According to Carpini et al. (2004) civic engagement can be defined as the integration of civic awareness (i.e., knowledge and involvement in society) and civic participation (i.e., attention and actions, in both forms individual and collective). Others argued that civic engagement has been used as a catchphrase, to cover everything from voting to donating money to charity, to participate in political marches (Berger 2009). Putnam (2000) when highlighting the importance of social capital for a democratic society identified civic engagement as a critical concept. However, his focus was more on "civic" or the "political" aspects of participation rather than on the "participation" process and outcomes. When investigating citizens' levels of engagement, everything from reading newspapers, political participation, social networks and interpersonal trust to associational involvement was labelled as civic participation. He concluded that such civic participation was inclined to correlate with democracy and market economy (Putnam 2000).

Civic practices can be explained as the active demonstration of being a citizen, and includes formal activities such as voting; and less formal activities such as participating in a demonstration (Dalhgren 2012). Civic participation can be aimed at solving problems of the community (Zukin et al. 2006), while political participation aims to influence government policymaking and actions (Verba et al. 1995). According to Dalhgren (2012) civic participation can attempt to achieve instrumental actions such as influencing public opinion, or communication actions such as collective sense of identity. Both actions seek to enable individual voices to participate in administrative or/and political discourses (Dalhgren 2012). Today, civic practices, such as voting, are generally declining, for instance, in the United States (U.S.) Presidential election votes dropped from around 80% in mid-1800, to just fewer than 60% in 2008 (Woolley and Peters 2014 cited in Raizen-Miller 2014). Putnam (2000) relates a decline in activities such as attending public meetings and political marches, with a decline in religious organizations, unions, and community organizations such as the Red Cross. He suggested that the increase of mass-membership organisations (such as the Big Sisters) is a new form of social ties and civic participation. However, for Gov 2.0, that was not the case.

Reddick (2011) considered different forms of participation in government ranging from the one-way interaction (managerial), two-way interaction directed from government (consultative), and finally the highest form of e-participation of the two-way interaction directed from citizens to government and vice versa (participatory). Similarly, OECD (2014) presented three forms of citizens participation: one-way information dissemination, two-way interaction initiated from the government side and two-way interaction initiated from both sides (citizens and government), which allows equal citizens-government relationship, hence, will be adopted in this paper. In an attempt to apply the ladder metaphor to Web 2.0 participants, Forrester research presented six different participant levels in the U.S based on their activities. These were: creators, critics, collectors, joiners, spectators, and inactives, and called it "Social Technographics" (Forrester research 2007). Interestingly, more than half were in the inactive category, and similar results were found in the EU as reported by Osimo (2008). The two ladders (i.e. Arnstein 1969 and Forrester research 2007) show the importance and interdependence of the institutional and social structure of citizens' participation. It is evident from these characteristics that it is inadequate to express citizen participation as either an objective or a public good. Instead, it covers a broad spectrum of types of engagement and participants. In the context of Gov 2.0, it is necessary to consider if and how citizen participation fits into these frameworks. Currently, Gov 2.0 seems to be in the lower rungs of Arnstein's Ladder

of Participation (1969), in which government informs, and consults, rather than the upper rungs, in which citizens and government are partners, sharing responsibility for planning and decision-making. Thus, engaged citizens via Gov 2.0 activities, may only exist in rhetoric.

Investigating citizens' participation theoretical background could provide means to improve Gov 2.0 initiaves and programs. Technology here is perceived as a stimulator to participatory actions, boosting citizens' participation not only in local communities but in government initiatives, too. Furthermore, the collaborative dialogue between government and citizens can increase citizens' satisfaction (Edelmann et al. 2012). Moreover, Gov 2.0 can leverage and generate participatory actions from the citizens' side. As Web 2.0 tools have changed static information to a more user-driven interaction, Gov 2.0 should change citizens right to access government information (Lathrop and Ruma 2010) and focus more on real public participation in government: as (Meijer et al. 2012) puts it " interactive openness ". In addition to citizens' participation, the study also focuses on citizens' empowerment, which is discussed next.

2.3 Citizen empowerment

Empowerment refers to the processes of gaining superiority over issues of concern, whether individuals, organisations or communities (Zimmerman and Warschausky 1998) and outcomes relating to issues of control, knowledge, and participation (Zimmerman and Rappaport 1988). Control and participation are essential elements of empowerment theory and apply at any level of analysis, whether individual, organizational, or community. The empowerment notion has been commonly used in psychology (e.g. psychological empowerment) (Spreitzer 1995), management (e.g. employee empowerment) (Ugboro and Obeng 2000), and education (e.g. student empowerment)(Warschauer et al. 1996).

 Nevertheless, in the field of e-government, this concept is still in its infancy (Li and Gregor 2011). Often, scholars have presumed that empowerment is a synonym of sharing power and, therefore, empowerment, as a construct, has not been analysed beyond the power concept. Before critically analysing the empowerment construct, it is important to examine the root constructs which empowerment is derived from, i.e. power and control. Control and power can be viewed in two different ways and, hence, empowerment can be viewed in the same manner. Firstly, as a relational concept used to describe the perceived power or control that an individual or organisation has over others (Farrell and Petersen 1982; Pfeffer 1993). According to this stream of literature, power arises because of the dependence and/or interdependence of actors. The relative power of one actor over another is a product of the net dependence of the one on the other (Pfeffer 1993). Therefore, if Actor X depends more on Actor Y than Y depends on X, then Y has power over X. When considering empowerment in terms of this relational dynamic, it becomes the process by which power is shared highlighting the idea of sharing authority. The Oxford English Dictionary defined the verb to empower as "to give (someone) the authority or power to do something." In the management literature, most of the notation of empowerment deals with participative management approaches such as management by objectives, and goal setting by employees as a way of delegating authority or sharing power.

The second view of empowerment is, as a motivational concept. Power and control, in the psychology literature, are used as motivational that are core to individuals. For instance, McClelland et al. (1989) argued that individuals have a need to influence and control other people. Other psychologists proposed the urge to control and handle life events (Rothbaum et al. 1982). Therefore, individuals' needs for power are met when they perceive or believe that they have the power to cope with situations, or people. In this sense, power refers to an inherent need for self-determination (Ryan and Deci 2000) or self-efficacy (Bandura 1993). Any managerial approach strengthens this self-determination need or self-efficacy belief of employees will make them feel more powerful. In fact, the Merriam Webster's Dictionary defined the verb empower as "to enable", which implies encouraging through enhancing personal efficacy.

In the public administration literature, power and empowerment have been used interchangeably (Cameron and Whetten 1983; Neilsen 1986). However, Burke (1986) differentiated the two meanings, but used empowerment in the context of delegation rather than in the context of enabling. Zimmerman and Warschausky (1998) proposed three dimensions of empowerment theory: values, processes, and outcomes. The values refer to a belief system that determines how professionals and clients work together, with attention focused on competence. The process refers to the procedures that provide opportunities to develop necessary skills to gain control and learn to analyze their socio-political environment. Empowerment outcomes refer to the

consequences of the empowering processes or the interventions and the measurement issues. Empowerment outcomes refer to the consequences of the empowering processes or the interventions and the measurement issues. Empowerment outcomes are the main concern because they provide the foundation for analyzing the consequences of citizens' empowerment. Generally speaking, when discussing citizens' empowerment in the literature, it is referring to the outcomes. However, empowerment outcomes vary across levels of analysis.

Thomas and Velthouse (1990), in the organisational literature, put forward four dimensions of empowerment: sense of impact, competence, meaningfulness and choice. Impact refers to "performance-outcome expectancy", and competence refers to "effort-performance expectancy". The distinct between the first two dimensions is the belief that one's behaviour could have an impact (sense of impact) and the belief that one is able to do the relevant behaviour competently. Others used the concept self-efficacy or personal mastery for competence (Berry and West 1993). Meaningfulness refers to the value of the task or its purpose, compared to one's standards. Higher levels of meaningfulness are expected to result in commitment, and involvement (Sjoberg et al. 1983). Choice refers to whether the behaviour is perceived as self-determined and the responsibility for one's actions. We argue that these four dimensions, i.e. sense of impact, competence, meaningfulness and choice are relevant to the research context and the Gov 2.0 concept, where citizens could influence the decision making and experience the sense of control over citizen-government matters.

3. Proposed conceptual framework

Figure 2 shows the research conceptual framework for citizens' empowerment vis-à-vis citizens' participation, which is the focus of this paper. An overview of the framework will clarify its elements. The framework incorporates both the empowerment process and outcomes. Furthermore, it shows the direct impact of empowerment on the citizens' participation levels as well as the indirect impact on the citizens' satisfaction. Each component of the framework is discussed in detail below. In general form, the model resembles the empowerment theory, however, its focus is on the participation as the end process. Thus, empowerment process and outcome are separated into two constructs and participation is simplified into a single construct. Citizens' participation is seen here as the impact of the two constructs, i.e. citizens' empowerment process and outcomes, whereas citizens' satisfaction is direct cause of citizens' participation and indirect effect of empowerment outcomes. The framework's primary aim is the positive influence of empowerment on participation (empowerment composed process and outcomes in Figure 2). Empowerment process leads to empowerment outcomes, which in turn, leverage citizens' behavior and as a consequence (impact) on the participation levels. At the same time, empowerment behaviour impacts on citizens' satisfaction, increasing citizens' participation.
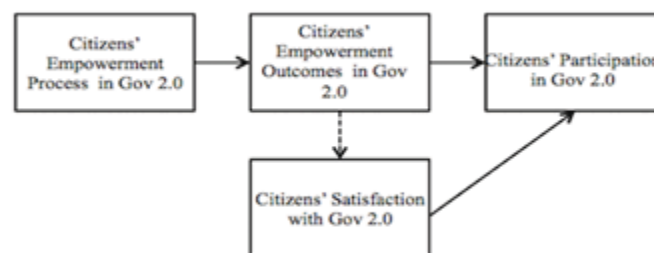
Figure 2: Research conceptual framework

This is consistent with Bhattacherjee (2001) expectation-confirmation model, where the results suggest that users' continuance intention is determined by their satisfaction. The framework constructs are depicted in Table 1.

Table 1: Framework constructs

Construct	Definition	Reference
Empowerment process	Helping others or receiving help from others to gain control	Conger and Kanungo 1988;Thomas and Velthouse 1990; Zimmerman and Warschausky 1998
Empowerment outcomes	Sense of control, critical awareness, and participatory behaviors	Conger and Kanungo 1988;Li and Gregor 2011 ; Zimmerman and Warschausky 1998

Construct	Definition	Reference
Participation	One-way interaction (managerial), two-way interaction directed from government (consultative), and two-way interaction directed from citizens to government and vice versa (participatory)	Reddick (2011); OCED (2014)
Satisfaction	Positive feeling about relationship with the government	Li and Gregor 2011;

4. Conclusion and future directions

To successfully implement Gov 2.0 initiatives, it is crucial to understand the elements that enable and empower citizens to participate in Gov 2.0. At the same time, it is important to investigate the process, outcome and impact of the empowerment and how it makes Gov 2.0 more popular or otherwise to citizens. This paper extends the empowerment theory by applying it to the Gov 2.0 context. One main independent construct, i.e., citizens' empowerment (process and outcome) and one main dependent construct, i.e., citizens' participation have been proposed. This paper presents a conceptual framework to tackle citizens' unwillingness to engage in Gov 2.0 activities by applying the empowerment concept to achieve the desired outcomes. E-government research needs to extend and enhance theory to increase understanding of this field, further complicated by the rapid growth and spread of social media. This paper contributes to both theory and practice; from the theoretical viewpoint, it takes into account the multi-disciplinary aspects of e-government research by introducing a new theoretical lens, which is empowerment theory. From a practical viewpoint, the framework's constructs can be used as a stepping-stone for governments to appraise when planning Gov 2.0 programs. We argue that the proposed conceptual framework and the findings from its examination and verification (to be undertaken next) could be applied to our comprehensive investigation on citizens' engagement with Gov 2.0 activities.

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Public Service Integration in Jordan

Mohammed Alhusban and Carl Adams
University of Portsmouth, Portsmouth, UK
Mohammed.Al-husban@solent.ac.uk
Carl.adams@port.ac.uk

Abstract Jordanian government is now challenged to deliver an expanding set of services to a growing number of constituents whose expectations are in increase. Recent political, economic, health and social conditions are increasingly changing on the landscape, and have been impacted by the surrounding political unrest, resulting in Jordanian government having to overstretch its capabilities and cope. In this paper, the practicality of integrating online public services is investigated from government employee's views, in specific ministries for certain services. Licensing services have been considered in this paper, and that because those services have been flagged as the most commonly used online services by the study participants, and currently offered through several dispersed portals and service providers. The study aimed at answering questions related to the practicality of integrating public services in Jordan. Five areas have emerged as major themes in the context of this paper: The misconception of the definition of public service integration with electronic Government, Drivers and Barriers from intraorganisational view, the readiness and willingness towards integration, and potential services where integration may occur. The preliminary results emerged from this paper show that there is a necessity to push further in the public service integration process, especially for specific services that require the involvement of several service providers. Integrating health and social services have been highlighted through the data analysis, especially for the recently established Syrian refugee camps in Jordan. Overall data analysis has revealed that the level of support provided by the E-government program plays a vital role in eliminating possible barriers stand out against public service integration, and promotes a better understanding of e-government integration. Result of this study points at service integration as the key element to more cost-effective service delivery – by stripping out unnecessary or unhelpful duplication, such as different bodies collecting identical data about same citizen.

Keywords connected government, citizen-oriented government, public service integration, collaborative government

1. Introduction

Public service integration strategy has emerged as a result of the connected government model (Al-Husban et al, 2012). As an attempt to enhance and optimise public service provision, integrated public service provision has technically evolved over the past five years from the simple 'one-stop-shop' concept to much more formal organisational structures mandated at the highest levels (Hyde, 2008). Conventional e-government projects have genuinely contributed to transforming governments towards a leaner, more cost effective government and one way time based citizen service provision as indicated in the first generation of e-government initiatives Gov 1.0. (Misuraca, 2009). However, this has become more complicated and challenging as economic conditions have increased demand for services. Jordanian public service providers are now facing their most serious challenges since the earliest inception of e-government program. The demand for public services is dramatically increasing due to a number of reasons such as demographic changes, harsh economic conditions and Syrian refugee camps resulted from the political unrest in surrounding countries. The Jordanian national concerns over a wide-scale flow of Syrian refugees into Jordan have forced the government to declare north of the country as a disaster area (Omari, 2013). Consequently, an unprecedented rising demand for public services has taken place in an environment whereas public expenditures are sought to be further constrained. In the absence of a willingness to raise new revenue, public services will have to 'achieve more with less'. Public services in Jordan are unstructured and not based on any national, regional or local public service models. This fragmented view of the public service concept and the absence of integration model of public service will impact the quality and the efficiency of public service provision, increases administrative burdens and makes public service provision more costly. Therefore, before integrating public services, Jordanian government should investigate the practicalities of this joining up shift, and measure the current state of integration.

2. What is online public service integration?

Enhance collaboration and integration across government departments is a priority for governments around the world. Conventionally, governments have been planned and organised with vertical structures (Noreng, 1980), aligned to delivery of particular services to citizen like health and education services and to businesses such as investment facilities and legal regulations. This structural separation and seclusion provides efficiency, clear lines of accountability and concentration of specific range of related service (Hyde, 2008). However, vertical governmental structures are not well equipped to deal with many recent public delivery issues, especially those

require cross portfolio like in social security and safe net programs such as unemployment insurance, food assistance and healthcare. (Stegarescu, 2006) Public Service integration, in its simplest form, refers to joining up services for the benefit of service users or providers. A more detailed definition can be drawn from the other literature: "integration is a coherent set of methods and models on the funding, administrative, organisational, service delivery levels designed to create connectivity" (Lipsky, 2010). Public service integration is also a collaborative model of service delivery achieved by moving to multichannel service delivery and a better use of back-end processes and systems, which can be perceived as an approach for government agencies to move from being system-oriented to chain-oriented with respect to their structure, functioning, skills and capabilities, and culture and management (Agranoff, 2012). Integration in this paper is defined through coordination, collaboration, and cooperation perspectives. Each defines integration at different levels. Moreover, Public service Integration in the context of this paper is broadly defined as the provision of an integrated cluster of public services, joint up and connected in ways that suit customer requirements, sourced from a range of partner organisations and service providers. The services being integrated may be separate service areas from within the government agency, or alternatively, the partners may include other government agencies, private business and voluntary sector.

3. Methodology

3.1 Research approach (define the purpose, i.e. objectives of the focus group)

In order to achieve the objectives of this study, which is primarily to investigate the practicality of integrating public services, a qualitative and interpretive based approached has been used. Consequently, this approach will position the meaning-making practices of human actors, in this case public servants, at the centre of this study, and therefore, five interactive focus groups were conducted. A focus group is always created with a specific purpose; a knowledge gap that the focus group is supposed to fulfil. Focus groups are a feasible method to gather knowledge and enquiries from different individuals. Different participants possess pieces of knowledge about a certain matter and when these pieces are brought together, shared and discussed they should point at some potential findings. A facilitator guided the groups through discussing the predefined issues by posing questions, open ended questions and questions oriented towards public service integration. The groups were selected based in their level of involvement in the service chain, where integration was more realistically achieved, as mentioned in the theoretical background, tourism agency licensing was potentially a target for the initial integration, thus groups were formed from the ministries and agencies involved in this service chain.

Table 1: Ministries involved in the study

Group No.	Group
1.	Ministry of Tourism and Antiquities
2.	Ministry of Interior
3.	Ministry of Information Technology (Electronic Government Program)
4.	Ministry of Trade and Finance
5.	Ministry of Justice

One focus group with six participants from Ministry of Tourism and Antiquities (**MTA**), as this study is looking at the practicalities of joining up and integrating some of the online services offered by this Ministry. Another focus group with four participants from Ministry of Interior (**MoI**), and one focus group with five participants from E-government Program in the Ministry of Communication and Information Technology (**MOCIT**), and one focus group from the Ministry of Industry and Trade (**MoIT**), and the last focus group was from the Ministry of Justice **(MoJ)**. This variety of collaborative ministries is captured in the overlap in Figure 2. The focus groups differed regarding roles and number of years of employment.

Table 2: Focus groups

Focus Group	Respondent	Years of Employment	Role
Ministry of Tourism and Antiquities (MTA)	MTA_1	12	Senior
	MTA _2	15	Director
	MTA _3	6	Senior
	MTA _4	7	Junior
	MTA _5	10	Senior
	MTA _6	2	Junior
Ministry of Interior (MOI)	MoI_1	18	Director
	MoI_2	12	Director

Focus Group	Respondent	Years of Employment	Role
	MoI_3	9	Senior
	MoI_4	10	Senior
Ministry of Communications and Information Technology (Electronic Government Program)	EG_1	8	Director
	EG_2	4	Senior
	EG_3	5	Senior
	EG_4	1	Junior
	EG_5	2	Junior
Ministry of Industry and Trade (MoIT)	MoTF_1	12	Senior
	MoTF_2	14	Director
	MoTF_3	6	Junior
	MoTF_4	9	Junior
Ministry of Justice (MoJ)	MoJ_1	15	Senior
	MoJ_2	10	Director
	MoJ_3	2	Junior
	MoJ_4	5	Junior

3.2 Generate the questions

Because a focus group can only last for little more than one or two hours, time will only allow for four to seven questions. The session started with an introductory and warm-up questions and then get to the more serious questions that get at the heart of the purpose. The introductory session started with 10 minutes introduction about how government works and issues of public service delivery, then the facilitator had to guide participants through the discussion narrowly into the context, and how the procedural and organisational crossover between the involved agencies providing TAL service implies a great potential of integration, as indicated in Fig2. NCRC and VL can be either horizontally or vertically integrated with TAL, and also the possibility to integrate all three services along the service delivery chain is high, hence the public employee selection for the focus groups. The mapping and the coordination in the service delivery was explained to the selected groups, and accordingly, questions were formed based on the perceived benefits and barriers of integrating this particular service in this context. The potential integration pointed out in TAL also entails joining up efforts in sharing information and procedures across the concerned government entities and agencies. The facilitator of the focus group explained the integration scenario (Context based integration) to the groups, and how licensing services are inherently coordinated, which, from technical perspective, is pointing at service dependency in the service delivery chain.
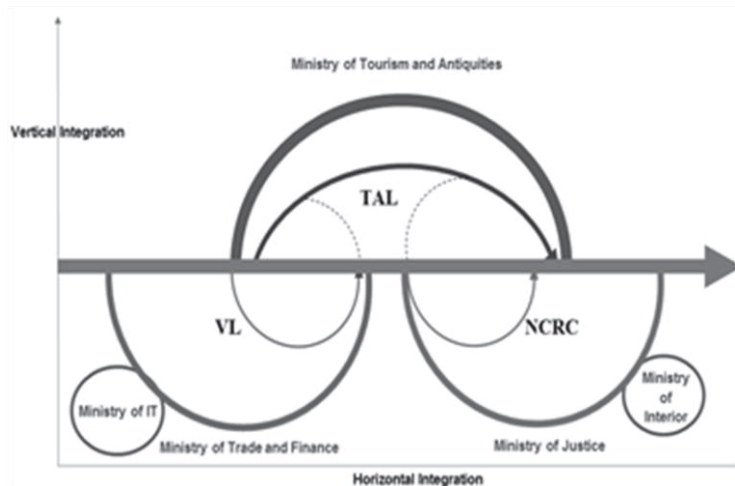
Figure 2: Public service integration styles

Questions were formed to measure the practicality from public sector employees. As demonstrated in the table No., facilitator started with a question about the general understanding of public service integration amongst public employees. This opening question, where participants get acquainted and warmed up, will help to understand some of the insights of how e-government program is perceived. Asking about the definition of PSI will also help in identifying any possibly misconceptions of the required level of collaboration between government agencies to achieve a common goal or a service. The second question is an open type question and

transition based question as well, as it aims to move the dialog into key areas of the discussion, mainly to the integration context service. It is aimed at identifying the drivers and motivations to integrate public services across the different involved ministries in TAL service. On the other hand, this will help to measure the potentiality to collaborate between the ministries. The selected service (TAL) is primarily provided by the Ministry of Tourism and Antiquates, but as mentioned above (Figure 2), other ministries are already involved in the delivery chain; therefore, question 2 is also an endeavour to highlight areas of existing collaboration.

Table 3: Summary of questions of focus groups

Theme No.	Question
1.	The definition of Public Service Integration
2.	Drivers of Public Service Integration
3.	Barriers of Public Service Integration
4.	Readiness of Public Service Integration / Push factors of Integration
5.	Where Integration occurs?

The third question is asking clearly about the barriers that hinder the process of integration, as previously identified, this study assumes that technology is not the main barrier for partial or initial public service integration. Consequently, this question will help identify some of the existing issues in terms of governmental collaboration, communication and coordination level on service provision. The fourth question will investigate the public views on the readiness and the push factors of integration. This question attempts to identify some of the integration priorities as perceived by the public views of the public employees. This question will support question 2 that is asking about the drivers of public services integration. This question will also help in the realisation process of public service integration. Question five will help identify where integration could potentially occur, in attempt to highlight existing areas of integration, or take the integration model to the next level, where building technology is possible.

3.3 Analyses of focus groups statements

After reviewing several qualitative data analysis approaches such as content analysis, interpretive approaches, social anthropological approach and collaborative social research approach, this study decided to adopt the collaborative social research approach. Using this approach, researchers work with their subjects in a given setting in order to accomplish some sort of change or action. The analysis of data gathered in such collaborative approach is accomplished with the participants of the study, who are seen as stakeholders.

Table 4: Question 1: The definition of public service integration

Question No.	Answer No.	Answer
1.	1.	Online Service Provision through Electronic Portal (One-Window Access)
1.	2.	Sharing services across government agencies
1.	3.	Central service provider
1.	4.	Merging structures and sharing budgets,
1.	5.	Partnership Working and Coordination (Vertical and Horizontal)
1.	6.	Working along with the Electronic Government Program
1.	7.	Data sharing and associated protocols
1.	8.	Public Service Integration is Electronic Government
1.	9.	Including citizen engagement and participation in governance
1.	10.	Outsource governmental services

The answers in the previous table were covered by all the participated groups. When the facilitator asked the question about the definition of public service integration, each group started to answer according to their knowledge, the government ministry they employed by and the level of expertise in the specialised area they work for. After a thorough scan of the transcript and the translated materials, common patterns started to appear in the transcript, and a set of categorical labels and themes begun to emerge, the themes were collected and presented in table 1.4. The identified themes were circled and then later moved into cards, so the most frequently repeated answers can be grouped together within the specific theme.

The next phase in the content analysis was to categorise the group answers into the identified themes, this will help identify potential patterns, relationships, commonalities or disparities. A matric represents focus group number distributed across the given answers was produced, organising the answers in a table view has significantly helped in recognising commonalities across the answers of the focus group. As a result, table 1.4

was generated, it can be clearly seen that there is a variation in the answers given, depending on the focus group level of involvement in the e-government program, this is explicitly reflected on G1 answers. G1, Ministry of Tourism and Antiquates, and due to the nature of the internal processes and operation, has had the minimum number of answers. G1 viewed integration as merging structure and sharing budgets. This gives an indication that integration is perceived from organisational point of view, and as stressed by this particular group, cannot be achieved without the participation of other government departments. One interesting insight has also emerged from this group; they viewed integration from citizen inclusion perspective as in A9. In theme 1, G3 Ministry of Communication and Information Technology has covered most of the answers in table 1.4, and this is due to the fact they are considered the e-government leaders in the context of this study, and those who manage and administer the overall program.

Table 5: Perception of public service integration

T1	Perception of Public Service Integration				
Q1	G1	G2	G3	G4	G5
A1			X	X	
A2		X	X		
A3				X	X
A4	X	X			X
A5		X	X		
A6	X				
A7			X	X	
A8	**X**	**X**	**X**	**X**	**X**
A9	X		X		X
A10		X		X	X

The most important finding in this analysis is A8, all groups have agreed that public service integration is e-government, and it should be managed by e-government program and the ministry of communication and IT. Despite the different definitions presented by different groups, there seems to be a misconception what is public service integration is. This misconception is streamed from the misunderstanding what e-government is in its broader term, as it is perceived as a specific government department than a strategy to use information and communication technologies (ICTs) to improve the activities of public sector organisations, and enhance the interaction between government and its citizen. Consequently, it can be noted, during the focus group sessions, that different focus groups have blamed specific government departments for the failure and the deceleration in the implementation of the first inception strategic objectives.

Table 6: Question 2: Drivers of public service integration

Answer No.	Question No.	Answer
1.	2.	Make it easier for businesses and individuals to deal with government
2.	2.	Offer services and information through new media like the Internet
3.	2.	Improve communications between different parts of government
4.	2.	Make it much easier for different parts of government to work in partnership
5.	2.	Improve Cross departmental Coordination (Vertical and Horizontal)
6.	2.	Improve Transparency, accountability and Participation
7.	2.	The necessity resulted from regional conflicts (Refugee Camps)
8.	2.	Kings Abdullah II vision towards more collaborative government
9.	2.	Current EGov activities in terms of policies, technologies and implementation
10.	2.	Impact of Arabic Spring on the government

Answers in the second theme were evolved around public employees understanding of the drivers of public service integration. Some novel insights were pointed at by the answers presented by the groups, as in improving communication between different parts of the government. This has received special emphasis from all the groups apart from G5, which put other socioeconomic issues on the top, this appears in their concern of how technologies and IT used in government can cope with the new Arabic spring impact on the country. Another remark to make through this analysis is that all answers were given by e-government program group G3; this group has informed all the answers in the second theme, they seemed to have solid practical knowledge of the drivers of the current e-government implementation, see table 1.6. This has been clearly noted in A4, as G3 the only group who have perceived PSI as collaborative and communication prerequisite.

Table 7: Drivers of public service integration

T2	Drivers of Public Service Integration				
Q2	G1	G2	G3	G4	G5
A1	X	X	X		
A2	X		X		
A3	X	X	X	X	
A4			X		
A5	X	X	X		
A6		X	X		X
A7	X	X	X		X
A8	**X**	**X**	**X**	**X**	**X**
A9			X	X	
A10		X	X	X	X

One significant observation outcome of theme 2 is A8, all groups have mentioned the strategic vision of his majesty King Abdullah II towards more collaborative government. His majesty's initiative of streamlining government procedures and make them more responsive to the needs of the citizens, government, and businesses has been very well received by the public employees, this is evidenced by the common agreement between the groups to improving traditional government performance in terms of services provided, level of performance, accuracy, reducing the time and cost required to finalise governmental procedures, achieving a high degree of customer satisfaction and reaching full coordination between the governmental institutions where they fully complement each other. Groups have also emphasized the general aim of e-government and PSI as working together to achieve a more capable, more transparent, better performing government and government employee and to change the persistent, dominant stereotype. Integration has been implicitly underlined in this theme, by using the terms such as working together or working collaboratively, public employees are touching some of the integration aspects this study is aiming to examine. The word integration is translated to (التكامل), which can be ambiguous and vague if it was out of context, it could be used to express merge, synthesis or even combination. Consequently, the frequent use of similar words, relevant in nature, scale and scope to public service integration indicates the willingness and readiness of groups to embrace the concept of integration Terms such as (الاتحاد) which literally means union, points at a prior requirement to integration, therefore, when participants where asked what do they mean about union, they responded by working together beyond organisational boundaries or sharing resources.

Table 8: Question 3: Barriers of public service integration

Answer No.	Question No.	Answer
1.	3.	Funding Issues
2.	3.	Current Technical Infrastructure
3.	3.	Organisational Culture (Resistance to change)
4.	3.	Support level provided by E-government Program
5.	3.	Partnership Working and Coordination (Vertical and Horizontal)
6.	3.	Different rules regarding Licensing and Taxation procedures get in the way of integrating public services
7.	3.	Middle and high -level officials' views and attitudes towards e-government
8.	3.	Changing governments officials, procedures and rules
9.	3.	Corruption Index
10.	3.	Pooled budgets are the only way to provide integrated public services

Question 3 is asking about the barriers that hinder the process of integration, as previously identified, this study assumes that technology is not the main barrier for partial or holistic public service integration. Public employees have shared the vast majority of the answers in this theme. From the number of answers given by different groups, it can be noted that there are far more barriers to integration than drivers, as in the case of G5, where the Ministry of Justice seemed to have had a very negative outlook on the integration, this was expressed by some of the participants of this group, as they mentioned some sort of communication issues when working collaboratively with other ministries, participants expressed this by saying "Horrible Experience" when translated from Arabic, the same expression was used by the G1 and G2 in the context of level of support provided by e-government, this leads us to think that there an issue in the communication between government parts.

Table 9: Barriers of public service integration

T3	Barriers of Public Service Integration					
Q3	G1	G2	G3	G4	G5	**Highlights**
A1	X	X	X	X	X	Funding Issues
A2		X				
A3	**X**	**X**	**X**	**X**	**X**	Organisational Culture (Resistance to change)
A4	**X**	**X**	**X**	**X**	**X**	Support level provided by E-government Program
A5			X		X	
A6		X	X	X	X	
A7	**X**	**X**	**X**	**X**	**X**	Middle and high -level officials' views and attitudes towards e-government
A8	**X**	**X**	**X**	**X**	**X**	Changing governments officials, procedures and rules
A9			X	X	X	
A10				X	X	

As it can be seen in table 1.9, there are four commonalities shared by the groups. A3 has been strongly highlighted by all the groups, which reflects the current rigid organisational culture and management style of the government agencies participated in this research. On the other hand, A4 was shared across all groups; the support level provided by the e-government program has been also identified as an area of concern to all participants. Participants demanded more support from the e-government program. Participants stressed the point that this should be the responsibility of e-government program, as they should be held accountable for helping various government departments use information technology to increase efficiency and improve electronic access to government services. Support can also be widely delivered on a form of ongoing short courses, workshops, seminars, lectures in order to promote best practices across government. Some of the subjects of this study suggested an internal help desk purposefully designed to service government entities rather citizen. This was another issue complementing the communication problems mentioned in theme 2, employees didn't know where to call or what to do if information is required about a service or a transaction. Middle and high level officials views towards e-government has also brought by participants as a barrier, some of the government officials view e-government as using computers in ministries. This point along with the instability of appointed governments in Jordan has impacted on the implementation strategy, on both financial and technical domains.

Table 10: Question 4: Readiness of public service integration / push factors of integration

Answer No.	Question No.	Answer
1.	4.	Service Return on Investment
2.	4.	National awareness of what Public service integration
3.	4.	Support level provided by E-government Program
4.	4.	Kings Vision towards enforcing E-government activities
5.	4.	Level of Service Integration. The extent to which a service is automated and ready to integrate
6.	4.	The humanitarian crises in Jordan (Syrian Refugee Camps)
7.	4.	Increasing demands on certain services such as health care, social and educational services.
8.	4.	Newly established Immigrants services (Syrian, Iraqis, Palestinian and Libyan)
9.	4.	Internet accessibility, penetration and prices
10.	4.	Economic, political and social reforms

This theme was designed to investigate the readiness of Public Service Integration and Push factors of Integration. The theme will inform the process of identifying integration factors, as in A1 Service Return on investment, this answer stood out as a common answer, all groups have agreed that services with financial return should have the priority to be integrated. Groups have also emphasised that the level of support received from e-government program determines if the service has to be integrated. From the answers given from different groups, there seems to be a variation in the coordination and support provided by e-government program to some government agencies, this is apparent in the case of Ministry of Tourism and Antiquities, employees from this ministry felt that they are left outside the strong circle as described by the employee, strong circle includes three ministries (Ministry of Interior, Ministry of Trade and Finance and Ministry of Information Technology). Involvement in e-government program strategies and Implementation planning varies between

ministries, this is due to the government agendas of working collaboratively with major ministries such as MoI and MoTF. Employees from the previously mentioned ministries stated clearly that the government is undergoing a critical challenge in terms of public service provision, and therefore, attention and focus will remain in security and social safe net services, which are provided mainly by MoI and MoTF. Level of service integration (A3), which is defined as the extent to which a service is automated and ready to integrate has been flagged as a major push factor towards integration. Some services as Vocational License by the Greater Municipality of Amman has been automated since 2008, and has gone online since 2012. As a collaborative joined up effort, e-government program has been working alongside Ministry of Trade and Finance to improve this service, and this evident the concern raised by other ministry about the level of support provided by the e-government program. Other employees mentioned that some services are currently in automated state, and can be joined up or integrated with less financial and technical efforts, however, coordination and serious intention to integrate them has always been a subject of discussion at high level government meetings, but little has been done in the ground.

Table 11: Readiness of public service integration / push factors of integration

T4						Readiness of Public Service Integration / Push factors of Integration
Q4	G1	G2	G3	G4	G5	
A1	X	X	X	X	X	Service Return on Investment
A2	X		X		X	
A3	X	X	X	X	X	Support level provided by E-government Program
A4	X	X	X	X	X	Kings Vision towards enforcing E-government activities
A5	X	X	X	X	X	Level of Service Integration. The extent to which a service is automated and ready to integrate
A6	X	X	X	X	X	The humanitarian crises in Jordan (Syrian Refugee Camps)
A7	X	X	X			
A8	X	X	X	X	X	Newly established Immigrants services (Syrian, Iraqis, Palestinian and Libyan)
A9		X	X	X		
A10		X	X	X		

The humanitarian crisis and the newly established refugee camps (A6 and A8) have been the focal point of all discussions in the focus group, there are serious concerns raised by all groups that health, security and social services should not only be considered for integration, but it is crucial to start with the integration now. Jordan continues to provide asylum for a large number of Syrians, Iraqis and other refugees, despite the substantial strain on national systems and infrastructure. This pressure has become even more acute over the past two years, as the global financial crisis has had an impact on Jordan's economic situation and infrastructure for water, electricity, waste management, education and health care. Syrian refugees has put a strain on Jordanian economy, government services and scarce water supplies. But a different threat keeps officials up at night. The refugee crisis "is turning into a security situation," says Abdallah Abu Romman, a former minister of information.

Table 12: Question 5: Where integration occurs?

Answer No.	Question No.	Answer
1.	5.	Health and Social Services
2.	5.	Educational Services
3.	5.	Police forces
4.	5.	Holistic Integration
5.	5.	Licensing Service Integration
6.	5.	Financial Services / Fees based services
7.	5.	Services that require data sharing
8.	5.	Commonly used services
9.	5.	Automated ready services
10.	5.	Only shared services should be integrated

This theme was designed to investigate public employees' perception on what should be integrated, and where integration occurs. Despite the fact that answers of this theme have emerged as a combination of different themes, employees kept on mentioning what should be integrated first and how integration in specific services could ease and inform further integration, which in the long run, if successfully achieved, will open the door to

other services for partial or complete integration. Employees shared the view that health and social service for newly established services is paramount at this point of service integration. They all agreed that the integration manoeuvre, as specifically described, should be pushed forward not only for refugees in camps, but also to citizen who have been negatively impacted by this unprecedented vast pressure on public services. The increasing number of Syrian refugee women using reproductive health services in Jordan is putting additional pressure on the Kingdom's health system, a UN official said on Sunday

Table 13: Where Integration occurs?

T5	Where Integration occurs?					
Q5	G1	G2	G3	G4	G5	
A1	X	X	X	X	X	Health and Social Services
A2		X	X		X	
A3	X	X	X	X	X	Police forces
A4		X				
A5	X	X	X	X	X	Licensing Service Integration
A6	X	X	X	X	X	Financial Services / Fees based services
A7			X		X	Services that require data sharing
A8		X	X		X	Commonly used services
A9	X	X	X	X	X	Automated ready services
A10			X			Only shared services should be integrated

The humanitarian crisis and the newly established refugee camps have also been frequently mentioned in this theme, as security issues started to take place in some of the refugee camps, in a scale that requires police force to interfere and resolve the conflict. The refugee crisis is turning into a security situation, and employees worry that armed fighters, regime intelligence agents and smugglers hide among the refugees. Licensing and financial services have also been highlighted by the employees, this goes hand in hand with the service return on investment priority mentioned before. All employees agreed that services with financial return such as licensing services should be integrated.

4. Conclusions and further research

In this paper, the practicality of integrating online public services is investigated from government employee's views, in specific ministries for certain services. Licensing services have been considered in this paper, and that because of they have been flagged as the most commonly used online services, and currently offered through several dispersed portals and service providers. The study aimed at answering questions related to the practicality of integrating public services in Jordan. Five areas have emerged as major themes in the context of this paper: The misconception of the definition of public service integration with electronic Government, Drivers and Barriers from intraorganisational view, the readiness and willingness towards integration, and potential services where integration may occur.

Achieving an integrated Public Service will require targeted actions in a number of areas. It should be noted that these action areas are interdependent: this is not a suite of options where only a few need to be advanced. Improved dialogue is needed to address fragmentation and disconnects between departments, their Offices and agencies, and other Public Service actors; the use of networks to bring together relevant players from across the Public Service needs to be expanded; performance measures need to look at outcomes rather than inputs and processes, and increased flexibility is needed to allow managers to achieve those outcomes; budget frameworks are needed to facilitate prioritisation and reallocation of spending; a renewed emphasis is needed on the role of ICT and e-government in strengthening in formation sharing and integrated service delivery; and greater mobility is needed to help develop and broaden the skills and competency base of generalist staff. In support of all these, a stronger role is needed to lead and support the renewed change, both through the creation of a Senior Public Service, and the development of a more strategic role for the Centre.

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Credible Elections and the Role of Social Media: The Case of Nairaland in the 2014 Osun Gubernatorial Election

Charles Ayo, Jonathan Oluranti , Moses Duruji and Nicholas Omoregbe
Covenant University, Ota, Nigeria
charles.ayo@covenantuniversity.edu.ng
jonathan.oluranti@covenantuniversity.edu.ng
moses.duruji@covenantuniversity.edu.ng
nicholas.omoregbe@covenantuniversity.edu.ng

Abstract: The use of social media in elections appears to be gathering momentum that is altering the traditional practice of electioneering. This phenomenon is premised on the rapidly expanding access to internet, increased availability of internet-ready smartphones and other communication devices, which enable individuals to simultaneously share information with any number of peers or even the public. The electorates across many countries around the world are now taking advantage of the various web-based media platforms like personal websites, social networking sites, blogs, and newsletters for political communication. In Nigeria, the situation is not different from the general trend around the world. For instance, the turnout of events in the recently conducted gubernatorial elections in some states points to the important role social media can play in ensuring credible elections. It appears the electorates including those in Nigeria have abandoned traditional news break, thus making it difficult for politicians and their unscrupulous collaborators in the electoral commission to manipulate the electoral process or spin events to favour particular parties or candidates which is the prevalent practice that have characterized the electoral process in Nigeria. This paper attempts to gain a better understanding of the impact of political information diffusion among the Nigerian electorates. The paper also attempts to investigate the extent of electorates' interactions in the course of the elections using social media platforms particularly Nairaland to which many Nigerians have subscribed and its impact in the 2014 Osun state gubernatorial election. The paper adopts qualitative approach in the gathering and analysis of data and based on our findings, the paper proposes ways in which the social media can effectively support free, fair and transparent elections in Nigeria especially as the country approaches the 2015 general elections. The paper concludes that the use of various social media channels in not only transmitting real-time information but also in removing censorship by gatekeepers went a long way to prove to the Osun state electorate the transparency of the election result in the midst of the highly competitive tension soaked election.

Keywords: social media political communication, Nairaland, social networks, elections

1. Introduction

The application of social media in elections appears to be significantly altering the traditional practice of electioneering. This phenomenon which is fast gaining momentum is founded on the rapidly expanding access to Internet, increased availability of Internet-ready Smart phones and other communication devices that are fast penetrating into most societies. This access enables individuals to simultaneously share information with their peers, which in turn spreads information faster than the traditional media channels would otherwise have done. The wider diffusion of ICT devices has created the environment for the electorates to take advantage of the various web-based media platforms like personal websites, social networking sites, blogs, and newsletters for political communication. In Nigeria, and just like most other parts of the world, social media is playing vital role in the mobilization of people to participate actively in political events. For instance, turnout of events such as the occupy Nigeria movement that challenged the government over the hike in prices of petroleum products, and the recently conducted 2014 gubernatorial elections in some states point to the important role social media real-time reporting of the events can play in ensuring that the process turns out to be credible. The implication of all this, shows that the electorates have abandoned traditional news channels and adopted social media to express themselves real-time as the news break, thus making it difficult for those bent on manipulating the electoral process or spinning events to favour particular parties or candidates. This paper attempts to examine the impact of social media in political communication and the effects of such political information diffusion among the electorates in shaping perception and attitude that in turn affect the behavior and actions of the electorate and the outcome of the election. The paper also investigates the extent of electorates' interactions in the course of the elections using social media platforms particularly Nairaland to which many Nigerians have subscribed and its impact in the Osun state gubernatorial election.

2. Review of related literature

Nigeria has embraced and maintained democratic governance in the last decade especially with the dwindling fortune of other non-democratic systems in some other parts of Africa. Military rule is almost becoming alien and considered an aberration wherever it still holds sway (Duruji, 2010).In recent times especially with the advances in Information technology, there has been an increase in the use of ICT in healthcare (Omoregbe,2008), media, business, education and governance (Azeta et al., 2009).Studies exist that report the use ofsocial media in politics. Social media can be defined as a suite of Internet enabled interaction tools such as Facebook, Twitter and Youtube.It is a known fact that President Barak Obama used the social media a lot in his campaign during the 2008 and 2012 elections. The use of social media is fast becoming popular in politics. It does not only empower people but also could democratize human relations. Olabamiji (2014) explored the use of media in political communication in Nigeria's 4ᵗʰRepublic and revealed that though the media have enhanced political awareness and interaction, there are cases where it is has been used to intimidate opponent and trigger conflicts. Research efforts on the influence of social media on electoral campaigns and voters behavior have shown that the number of online followers or likes a candidate has does not necessarily translate to an electoral success. Studies of the impact of social media for general election in Sweden 2010 and the midterm elections in the US are cited in the work of James Gomez (2014) affirm this fact.

2.1 Web based platform and political communication

A web based platform can be defined as ''a group of internet-based applications that build on the ideological and technological foundations of Web 2.0 that allow the creation and exchange of user-generated content'' (Kaplan and Haenlein, 2010). It is also referred to as "social media" and includes web-based and mobile based technologies that are used to turn communication into interactive dialogue among individuals, organizations, and communities. Typical examples of social media platforms include websites such as Facebook, Twitter, Flickr, Youtube and the interactive options on these websites, such as the "re-tweeting" option on Twitter. These instruments are referred to as media because they are tools which can also be used for the storage and dissemination of information, however unlike the traditional media like Television and Radio, most of the social media tools allow their users to interact as "re–twitting" on Twitter and "comment" options on Facebook illustrate.

Sweetser and Lariscy (2008), also defined web based platform as a "read-write Web, where the users do not only view web contents but also have the privilege of contributing to it. The common denominator from all most definitions of social media is fact that it is based on user-generated participation. With social media, users enjoy user-to-user interaction, a clear difference from what obtains in the traditional media where users only receive what they fed with (Clark and Aufderheide, 2009). Another advantage of social media over traditional media is that users can make their choice of the information they want to access and share. This makes it possible for individuals with similar interests to form a network.

Political Communication according to Wikipedia,is a sub-field of political science and communication that deals with the production, dissemination, procession and effects of information, both through media and interpersonally, within a political context. This includes the study of the media, the analysis of speeches by politicians and those that are trying to influence the political process, and formal and informal conversations among members of the public, among other aspects.

2.2 Forms of social media

Social media technologies take on different forms including magazines, Internet forums, weblogs, social blogs, podcasts, pictures, and video. Considering that social media come in diverse forms, Kaplan and Haenlein (2010) tried to classify social media into six distinct categories:

- Collaborative projects (e.g. Wikipedia)
- Blogs and microblogs (e.g. Twitter)
- Content communities (e.g. YouTube)
- Social networking sites (e.g. Facebook)
- Virtual game worlds (e.g. World of Warcraft)

▪ Virtual social worlds (e.g. Second Life)

Out of these six categories of social media tools, three categories (blogs and microblogs, content communities, and social networking sites) are the ones that are most relevant to the application of social media in the electoral process. In the process of political communication, there has been strong intermediation between the traditional media and the three categories of social media mentioned above.

2.3 Impact of social media on political communication

Social media has transformed political communication in a number of ways. These are discussed below.

Segmentation of Audience

Social media has deepened the segmentation of audience triggered by the rise of network of television channels, specialized magazines, and websites. According to Stroud (2008), segmentation of audience derives from two main elements of the social media: diversification of coverage and selective exposure (that is, finding information that aligns with the predispositions of individuals). Social media makes it possible for its users to read and discuss specific issues and then connect with other individuals who share their beliefs. This has the possibility of creating individual voters who agree on specific issues and who may not be able to relate with the wider issues that are part of a general election. With the social media different segments can address the same issues from varying perspectives.

Social Media Has Weakened Gatekeeping Capacity of Traditional Media

Before the emergence of social media, the traditional media could determine to a large extent, what information should be aired to the public and set the agenda for public discourse. McCombs and Shaw (1972) asserted that "the mass media force attention to certain issues. They build up public images of political figures. They are constantly presenting objects suggesting what individuals in the public should think about, know about, and have feelings about". They insisted that a small number of mass media news producers dominate the market, and therefore, audiences' only get information about what the media decides is important enough to be covered. By presenting politicians with a platform to speak directly to their constituents and potential voters without the traditional media intermediary, the social media has largely curtailed the agenda setting role of the traditional media (Gillin, 2008).

Social Media Now Releases Most Recent News

Although this is related to the last point, it is becoming the order of the day in recent times.In all, the use of social media limits the control of traditional press secretaries over the outflow of information, and also decreases the dependence on traditional media for up-to-date content. Although the lack of control over the content of social media may be positive in the sense that it allows for greater freedom of information, there are also some disadvantages of this trend. The social media has been misused in many ways including using social media platforms to spread false information, abuse political opponents, and incite violence. There is therefore the need to balance this individual freedom and responsibility in the use of social media. Social media outlets have a responsibility to develop and implement social networking guidelines for their users.

Social Media Influences Socio-Economic and Political Settings

The fourth point is that social media is now the new influencer in socio-economic and political settings. Research has shown that increasing use of social media for political communication has led to declining newspaper readership and television viewership in many countries (Australian Media and Communication Authority, 2007). Under this circumstance, the social media may likely continue to dominate political communication, and serve as a tool for gathering and disseminating political messages.

Traditional media channels, particularly television and newspapers, try to expand their reach by using social media platforms for news broadcast. In Nigeria for example, many newspapers like Guardian, Vanguard, Daily Trust, and ThisDay as well as television stations like Channels, have Facebook and Twitter accounts. A common trend among traditional media houses, especially the television stations, is to have i-reporters. I-reporters are individuals without professional experience of journalism, but who can utilize their dexterity in the use of social

media tools to broadcast messages about events taking place around them through the traditional media. I-reporters share pictures and videos of events with the public through the television. In this way, the traditional media rely on users of social media for news, information and leads, the same way that social media utilize news and information emanating from newspapers, radio and television channels.

2.4   Social media in Nigeria

The social media in Nigeria is now being used as a political communication tool. This became clear during the 2011 general elections and the trend is increasing as witnessed in the recent elections held last year, 2014 in some states. The social media in Nigeria is used in so many ways and for different purposes. However, for the purpose of our discourse we focus more on on the role of social media in elections in Nigeria.

Factors that Influence the use of Social Media in Nigeria

Three major factors are responsible for the use of social media in Nigeria. They are discussed in the sections that follow.

2.4.1   Social media is a global trend

The use of social media for elections in Nigeria reflects a global trend towards "internet elections" or "e-electioneering" (Macnamara 2008). Most people all over the world now have access to internet using their internet ready smartphones and other communication devices. The evolution of web-based new media such as personal websites, social networking sites, blogs, e-newsletters, have also redefined methods of political communication, leading to a significant shift towards the use of social media in the electoral process. Before now, traditional media dominated and provided election-related information. But today, the social media has become a major election information sharing platform globally. The social media has the advantage of ease of use, speed, and reach, and guarantee efficient election administration, coverage and reporting.

Social Media Adoption by Nigerian Politicians

Nigerian politicians have now recognized the importance of social media and have adopted it as a major means of reaching the electorate via on-line campaigning. For instance, during the 2011 general elections, many politicians, particularly the presidential aspirants, used social media tools to connect with voters and constituents. Facebook and Twitter appear to be the most widely used social media platforms by the politicians. For example, in December 2010, it was estimated that Goodluck Jonathan had nearly 300,000 fans on his Facebook page (Ekine 2010). Other presidential aspirants like Dele Momodu, Ibrahim Shekarau, NuhuRibadu, AtikuAbubakar, and Ibrahim Babangida,all had Twitter and other social media accounts. Political parties like the Peoples Democratic Party (PDP), Action Congress of Nigeria (ACN), and Congress for Progressive Change (CPC) were also not left out. Social media offered politicians and their parties the opportunity to broadcast messages and recruit a huge number of volunteers to support their campaign.

Social Media Improves Election Monitoring

The Nigerian Civil Society and voters now use the social media as a tool for efficient election monitoring and reporting.Pre-2011 elections like those held in 2003 and 2007 were largely marked by rigging and other electoral misconducts, most candidates expressed their displeasure and likewise voters and observers. The malpractices included complains of disenfranchisement of prospective voters, snatching of ballot boxes from election officials and stuffing of the boxes with invalid ballot papers, as well as allegations of collusion between election officials and politicians to alter election results and twist popular mandate (Ibrahim and Ibeanu 2009). The flaws that characterized the conduct of the 2007 elections severely dented the integrity of elections in Nigeria's, and triggered demands for freer, fairer, and more transparent elections.

Nairaland Social Media Platform

Nairaland is a social forum founded in 2005 by MrSeunOsewa with registered membership of 1, 229,600 as at April 2014. This site is rated the seventh most visited site by Nigerians and the most visited indigenous site (Alexa.com, 2014). The site sends out about 39,700 tweets and has a followership on tweeter of 134,000. It records over 300,000 daily visitors. Figures 1 and 2 below show the Homepage and Politics page of Nairaland.

Figure 1: A typical Nairaland frontpage

Figure 2: Nairaland politics page

3. Objectives of the study

- What is the degree of use of social media in Nigerian electoral system?

- What specific roles did Nairaland media platform play towards the success of Osun Gubernatorial election?

- What is the impact of Nairaland postings on the outcome of the 2014 Osun gubernatorial election?

4. Methodology

The paper adopts qualitative approach in gathering and analyzing data. The data for the research were basically from secondary materials sourced from books, journals, periodicals and largely internet materials. Data gathered through these sources were analyzed using descriptive analysis that includes the use of tables and statistical figures to drive the points. The data gathered and the analysis carried out enable us to address the question of the extent of use of social media in Nigeria as well as the impact of Nairaland postings and political conversations on the Osun Gubernatorial election. All these are captured in the sections that follow.

5. Internet penetration in Nigeria

The increased penetration of Computer, Telephone, Internet and Mobile Technology has made politicians as well as the electorates embrace social media platforms such as Twitter, Facebook, Youtube sites to solicit votes and communicate political issues. Nigeria currently records the highest number of Internet users in Africa. The country is reported to have 70,300,000 Internet users out of the 297,885,898 Internet users in Africa as of June 2014 while Facebook which is the leading social media site has 6,630,200 active users in Nigeria as at June 2012(Alexia, com 2014). The number of active lines in the country as at September 2014 is 134,507,329(ncc.gov.ng). The increase in mobile Internet traffic is expected to double between 2014 and 2015 and should see a 20-folds increase by the end the decade across the Africa region (Internet World stat 2014). Figure 3 below shows Nigeria's position as leading in Africa interms of number of internet users.
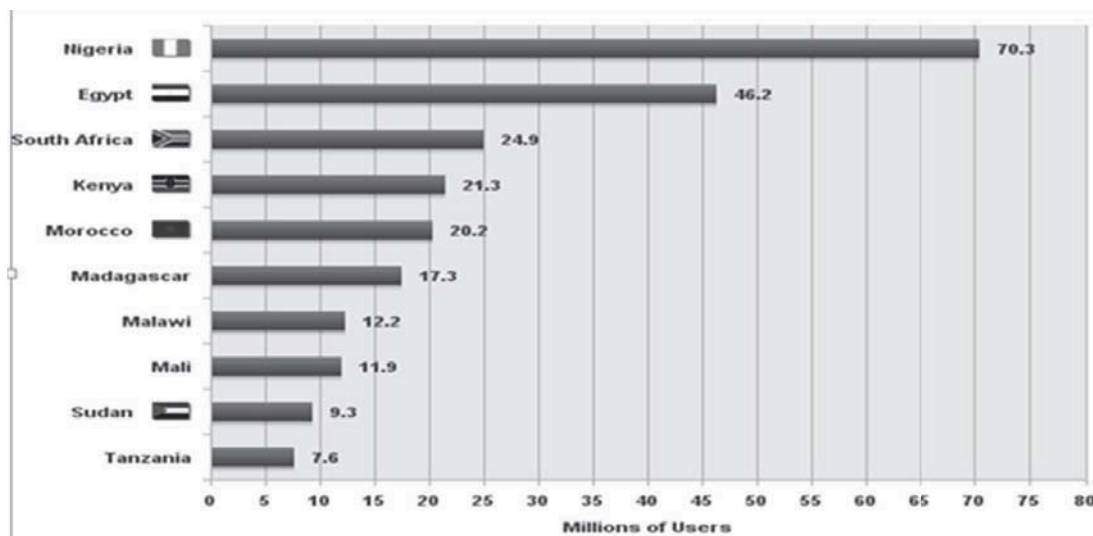
Figure 3: Top ten internet users in AfricaSource: (www.internetworldstat.com)

6. Nairaland and outcome of Osun election

The Nairaland social media forum is a general interest site that covers diversity of issues including politics. The membership of Nairaland media forum cuts across the entire length and breadth of the Nigerian society and has become a source of first hand real-time information about Nigeria around the world. In Nairaland members put up front page on any issue and other quicklyresponds on that topic. The response to a particular topic can run into many pages depending on the trend line of such front page topic. Naira land forum pages on politics are very active during election season as Nigerians both within and outside the constituencies where the election or political related event is happening get their information.Infact the site becomes more active during political season as people within and outside, floods the site for fresh and update information on ongoing event.

Nairaland site was very busy throughout the build up to 2014 Osun gubernatorial elections particularly on Election Day when several front pages on the election were competing for post by members and visitors. This

was the case on 9th of August 2014 which is the day of Osun gubernatorial election where the major contenders were the sitting governor RaufAregbesola of the All Progressive Congress(APC) and IyiolaOmisore of the Peoples Democratic Party (PDP). From the various post live updates on voting, ideas of turn out in the various local government and other developments concerning the election were streaming in on the site just like the national media that also beamed their searchlight on the election.

Osun State's population is estimated to be about4million, haven recorded 3,416,959 in the 2006 GeneralCensus. According to the Independent ElectoralCommission (INEC), the eligible voting population is1, 411,373 and a total of 1,256,569 Permanent VotersCard (PVC) was produced with provisions for continuous voters registration exercise. In March 2014, INEC started the distribution of PVCs in the State andup till election week, only about 900,000 PVCs had been collected with the remaining awaiting collectionin INEC's offices at various Local Government areas in the State. INEC, the UNDP, Civil SocietyOrganizations and other development partners conducted voter education campaigns and awarenessprogrammes. The gubernatorial election was held on the 9th of August 2014. In this section we discuss the role played by the social media and the outcome of the election.

In a post-election speech delivered by the governor-elect, Aregbesola, he commended the social media for her role toward the success of the gubernatorial election in the state. It appeared that all stakeholders including the Independent National Electoral commission (INEC), politicians/political parties, the electorate, and Civil SocietyOrganizations made extensive use of social media during the gubernatorial election. We monitored election activities on one of the social media sites named "nairaland". This site is used mostly by Nigerians to disseminate information and discuss important national issues. Indigenes of Osun state from our observation, took advantage of the medium to effectively monitor the election. They did this by sending reports happenings in the various polling units. They also uploaded results as they were being announced from each polling units. Below is a sample of such conversation and results uploaded real-time (as counting was going on) and later in the evening but the same day of election as shown below in figures 4 and 5 respectively.

No doubt, each of thestakeholders used the social media to achieve a number of interrelated objectives. For INEC, social media was basically deployed to share information on the elections and receivefeedbacks from the public on the performance of election officials. Politicians/politicalparties used social media primarily to reach out to the voters and canvass for support. Thevoters used social media to report their experiences and receive election related information including uploaded results while the Civil Society Organizations (CSOs) used social media tools to mobilize and educate theelectorate as well as to cover and report the outcome of their monitoring of the electoralprocess.

Figure 4: Osun election results being uploaded real-time

Figure 5: Election results of polling units uploaded evening of same day

7. Conclusion

The outcome of elections in Nigeria has always ended up in dispute over the final result owing to the flagrant manipulation that makes nonsense of the voters' preference in an election. The frequency and rampant nature of this outcome has in the long run made many Nigerian to lose confidence in the electoral process and some have become disinterested because they hold this view that no matter what happened queuing up in harsh whether to cast vote does not make any meaning if the winners are already pre-determined even before the votes are casted. However the influx and diffusion of ICT has made monitoring of election by the voters much easier, making it much more difficult for desperate politicians and compromised electoral officials to manipulate outcomes of election as clearly indicated in the 2014 Osun gubernatorial election. Following the tension in the built up to Osun gubernatorial election, the widespread use of social media went a longway in making the process open and transparent even in the declaration of results which was out in the public shortly aftewe the close of poll, making people to know the outcome even before the official results were made public. Consequent upon this, the paper propose that social media can effectively ensure free, fair and transparent elections in Nigeria especially as we approach the 2015 general elections if the Nigeria electorate are further advised to use these devises in their various polling booths.

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The use of Information and Communication Technologies for Promoting and Sustaining National Integration in Africa

Cecil Blake, Oluyemi Fayomi and Charles Ayo
Covenant University Ota, Ogun State, Nigeria
cecil.blake@covenantuniverity.edu.ng
nike.fayomi@covenantuniversity.edu.ng
charles.ayo@covenantuniversity.edu.ng

Abstract: The major argument advanced in this paper is that African governments should make use of information and communication technologies within their governing structures in seeking ways and means of promoting national social cohesion. We present a heuristic by developing a model – e-Cultural Synchronization -- for national integration in African nations, with a central focus on the synchronization of indigenous cultures as fulcrum. The rationale is grounded in the need for African states to pay more attention to the cultural fabric of their respective societies in efforts to reduce cultural tensions by demonstrating that there are indeed many aspects of African culture that are not antithetical, for instance, to democratic governance or other governing prescriptions that have been tried by some African leaders. The model utilizes the application of information and communication technologies as means of achieving cultural synchronization for stable governance. National integration continues to be a major challenge for several African states. Internecine warfare, pervasive poverty, weak infrastructure in several sectors poses problems for smooth governance. Conflicts at the level witnessed during elections in Kenya and the Ivory Coast have resulted in charges of crimes against humanity (approximating ethnic cleansing) by African heads of State. A former head of state of Ivory Coast – President Laurent Gbagbo, is presently facing charges of crimes against humanity at the International Criminal Court at The Hague, Netherlands. Even though the majority of African states achieved independence since the late 1950s and during the 1960s there are still problems in fashioning and sustaining nationally integrated nation states resulting in conflicts. Countries such as Zimbabwe and South Africa pose different problems for national integration after independence. Their problems centre mainly on race and economics. Insurgencies are taking place in countries such as the Federal Republic of Nigeria, Mali, Uganda, Zaire, Somalia and Rwanda to name a few. The emergence of major non-state actors such Al Shabab, Boko Haram, and Al Qaeda in the Maghreb continue to challenge the "State." The major sources for the preceding are religion and politics. Among other sources of conflict exacerbating the challenges for national integration are disputes over natural resources, socio-economic disparities and ethnicity. Several attempts made at national integration have centered on ideological choices, with a focus on democratic governance, with very little emphasis on indigenous cultural synchronization as a means of promoting national cohesion.

Keywords: e-cultural synchronization, national integration, ICT, conflict resolution, cultural synchronization

1. Introduction

In order to get a handle on the argument supporting the inclusion of cultural synchronization as a significant element among the constituent elements at play for the successful use and application of it in e-governance platforms, we present a discussion and analysis on the following: (a) establishing the context for a case for cultural synchronization as a component in e-governance platforms in African nations; (b) the national integration problematic in African nations within the context of the role of cultural synchronization, as an integral part of efforts at achieving national integration; (c) a conceptual analysis of e-governance, and (d) fashioning an e-cultural synchronization model as a constituent element within e-government platforms in Africa, with the aim of promoting social cohesion, as well as serving as a tool among others, for conflict resolution required for national integration efforts by African nations.

Protracted ethnic and religious conflicts in several African nations such as the Federal Republic of Nigeria, the Democratic Republic of Congo, South Sudan, Uganda, Central African Republic and Rwanda, to name a few have resulted in wanton deaths of millions of Africans. In addition to the loss of lives, infrastructural damages, and pillaging of rural communities have led to the displacement of untold numbers of Africans. Refugee camps for displaced Africans escaping internecine wars in their respective countries serve as breeding grounds for dislocated ethnic groups who organize themselves to wage war against their detractors. A glaring example is the protracted war between the Government of Rwanda and Hutu rebels who escaped to the Democratic Republic of Congo and have been involved in armed excursions into Rwanda. The situation in Rwanda is striking not just because of the horrible genocide of 1996, but mainly because the nation is not as culturally, linguistically and religiously diverse as, for example, the Federal Republic of Nigeria where Boko Haram has caused mayhem and extending the war front into Cameroon and Niger. The two major ethnic groups in Rwanda, for example, use the same language, unlike a country like Nigeria with over two hundred languages and dialects.

Central to an understanding of the concept of cultural synchronization is the need to find ways and means of aggregating, codifying, synchronizing and disseminating information on similarities as well as differences in cultural beliefs and practices of warring factions, as well as the public at large by use of information and communication technologies (ICT). There appears to be a major knowledge deficit, or simply a refusal to appreciate similar aspects of cultural and other belief systems that should bond rather than serve as factors of disintegration, and differences that represent exigencies which require peaceful resolution (Bitzer, 1968).

2. Cultural synchronization construct

Blake (1988) proposed that African nations should use the new information and communication technologies for "cultural synchronization of Africa and its people" (p.17). Cultural synchronization is defined as a process of aggregating and codifying information on similarities that exist among co-cultural groups in diverse African nations by using information and communication technologies, with the objective of bringing to the attention of the public, that co-cultural groups may share more in common than they realize, hence serving as a means of promoting social cohesion. The focus on similarities does not preclude as well data on differences that require peaceful resolution.

The argument was advanced "against the background of ethnic and cultural conflicts in various regions of the world" (p. 17). Furthermore, "as a continent, Africa is struggling to get a handle on the complex role and position of culture in efforts to forge ahead with its various development projects" (p.3, 1989). He argued that"research on software development in particular has resulted in the possibility of miniaturizing knowledge without the loss of content and substance….Miniaturized knowledge is rapidly disseminated by computer and related technologies with a wider scope than the traditional methods, with the possibility of reaching more people simultaneously" (p. 2). The use of ICT to capture essential elements, namely, those aspects of culture comprising customs, beliefs, stereotypes, values, prejudices, worldview, etc., would augment access to such content. It would involve, however, the following steps for ascertaining access: robust research endeavors; formulation and processing, followed by packaging of research data, storage and distribution of content. The distribution would be in the form of e-cultural synchronization as a component of the overall e-governance platforms of African nations.

We start with the above because attempts at developing a cultural synchronization component in e-governance platforms in Africa should take into consideration the significance of miniaturizing knowledge about similarities and differences in many aspects of cultural beliefs and practices among co-cultural groups in nations that are ethnically, linguistically and religiously diverse. It should be done in a manner that would assist in retaining the essential bits of knowledge about shared cultural beliefs and practices, worldview, values, etc., among co-cultural groups so as to come up with manageable and operational content within the platform. The possibility of citizens accessing information on synchronized cultures augurs well for a more informed citizenry on issues regarding mutually shared beliefs, customs, tradition, mores etc, as well as differences that require peaceful resolution. As discussed later, there are certain limitations that would have to be addressed regarding issues of access to e-governance platforms in African nations by ordinary citizens. Meanwhile, recent advances in ICT have helped to create a "new culture" (for Africa) for information generation, aggregation, codification, storage, dissemination and retrieval, and beneficial for cultural synchronization.

Cultural synchronization is an imperative when a critical examination is made of the overall African scene with division getting more and more entrenched. For instance, democracy is spreading rapidly in the continent, evidenced by the emergence and growth of a multi-party system. An inherent factor, however, in such an ideological choice is a heavy baggage that accompanies democracy as the ideological choice particularly for diverse African nations. That baggage is division along ethnic lines – characterized by the strong adversarial nature of democracy. Division goes even beyond ethnic demarcations. It triggers xenophobic tensions on issues of citizenship of contenders for national offices in some African countries as were the cases in Zambia and the Ivory Coast (Whitaker, 2005; Oduro, 2009).

3. National integration

National integration has long been an important focus of attention by scholars, policy makers and the United Nations system (APPER, 1986) for postcolonial African governments. At the onset of decolonization in most of the African countries, there was a heated debate and concern among social scientists about the need for national integration in African societies with diverse populations (Binder, 1964; Coleman & Rosberg, 1966; Zolberg, 1967;

Davis and Kalu-Nwiwu, 2001). This concern has been also been re-emphasized by Bandyopadhyay & Green (2009) Onifade & Imhonopi, (2013), advocates of national integration as a policy to promote state building in a continent beleaguered by socio- political instability. The socio-political matrix in most of the African States is characterized by inter and intra-ethnic conflicts, and religious tensions. There are also contending views on efforts at national integration initiatives in Nigeria, for example, a very diverse nation (Enegwea and Umoden 1993; Ihonvbere et.al.; 2003; Alapiki, 2000; 2005; Attah, 2013).

Some aspects of national integration historiography demonstrate an approach to African national integration that privileges what could be referred to as a "de-ethnicized" national unity, at the expense of celebrating cultural diversity. The Federal Republic of Nigeria, for example, is made of about 250 ethnic groups (Enegwea &Umoden, 1993). The plurality of groups, the arguments goes, many times throw up centrifugal forces that tend to tear countries apart. This reality imposes the need to integrate the distinct ethnic groups to become a monolithic whole that shares a common identity and destiny. Essentially therefore, national integration is a process that attempts to erode the presence of micro-nationalities in place of a spirit of nationhood (Alapiki, 2000). This is achieved through the breakdown of ethnic barriers, the elimination of primordial ethnic loyalties, and the development of a sense of common identity. A functionalist approach, suggests, however that distinct ethnic groups operate as a system that requires each unit for the good of all. Thus, the different ethnic groups are the interrelated and interdependent sub-units that must function in unity (Anele, 1999).

For purposes of addressing the cultural synchronization construct as a key process among others in working towards the achievement of national integration in African nations with diverse populations, we define national integration as a process of working towards the achievement of a stable national entity, with an increased knowledge and understanding among co-cultural groups, with similar and shared beliefs, values, customs, traditions, worldview, etc., that form a nexus around which national identity, consciousness and interests are fashioned and grounded. Cultural synchronization as a process of facilitating national integration recognizes as well, differences manifested in unshared values, beliefs, traditions, customs and worldviews among co-cultural groups, but focuses on, and elevates similar and shared elements, while learning more about differences and how to solve them peacefully, in order for co-cultural groups to work on the basis of peaceful co-existence. Sectoral and other factors that would form the rubrics of national development plans in this regard are warranted in part, on a culturally synchronized national vision. E-Cultural synchronization provides one ICT-based mechanism through which such learning could be obtained within the wider context of e-Government.

It must be emphasized at this juncture that in the absence of a credible, trustworthy and respected national leadership structure committed to the development and enhancement of the quality of life of all citizens, national integration efforts would continue to be futile irrespective of processes such as cultural synchronization in e-Government platforms of African nations.

4. Information and communication technologies within the context of e-governance for African states

There are various definitions of e-government. Olowu (2004) defines e-governance as "all the information and communication technology platforms and applications in use in the public sector of the use of the internet for delivering government information and services to citizens". e-Government is referred to as the process of transformation of the relationships between government, its stakeholders - citizens, businesses and employees – using Information and Communications Technology (ICT) to improve efficiency, effectiveness, transparency, accountability, responsibility and service delivery of public governments (Kraemer & King, 2003).

Studies have shown that e-government has numerous benefits to offer to citizens, businesses and governments which include improved service delivery, increased democratization, reduced corruption, and an increase in national business, and competitiveness (Pudjiantoand Hangjung, 2009; Srivastava and Teo, 2006; Moynihan, 2004).Hafkin (2009) describes e-Government implementation in Africa as comprising of various approaches, ranging from the technologically and internally oriented (introducing ICTs into all aspects of government activity), the more external Internet government service delivery, the customer-centered and development oriented approach advocated by the United Nations Public Administration Network (UNPAN), to harnessing the power of technology to transform public administration through the use of ICTs.

The general approach to e-Government is through the Internet deployed through Wide Area Networks or mobile computing. E-government can be delivered using both Internet Protocol (IP) devices such as PCs, and PDA and non-Internet Protocol (IP) devices such as telephone, fax, PDA, SMS, MMS, GPRS, RFID, biometric identification and smart identity cards as well as community radio (Hafkin, 2009).

E-government services can be classified into four categories: (1) a secure government intranet for more efficient interaction among governmental agencies; (2) Web-based service delivery; (3) e-Commerce for more efficient government transaction activities; and (4) digital democracy for more transparent accountability of government (Moon, 2002). These are further described as Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Employee (G2E), and Government-to-Government (G2G) (Graafland-Essers and Ettedgui, 2003; Carrizales, 2008;Ayo, 2009).

Stemming from the above, cultural synchronization as an added component in the e-government platform of African nations would be useful for all functions with the objectives of: forging and achieving national identity, consciousness and integration(G2C); ascertaining fairness in employment practices and employee welfare in both the public and private sectors (G2B); designing public affairs and public relations strategies and tactics for government information dissemination (G2E), and finally, enhancing the quality of communication and other forms of interaction among federal, state, local and rural administrations.

4.1 e-Government models

There are various models that have been developed to describe the stages of e-government. These models have some stages in common but also have some differences as well. Among such models are: the World Bank's three stage model, the Gartner's four stage model, Layne and Lee's four-stage model, United Nations' five stage model and the Jayashree and Marthandan Model (Jayashree and Marthandan, 2010; Layne and Lee, 2001; UNASPA, 2001; Baum and Di Maio, 2000). The United Nationsmodel is the most popular and used in various e-government (Haveez, 2004; Hafeez & Sher, 2006; Unies, 2008). The stages in the model are:

Stage 1 - Emerging presence: Here, a government makes its online presence with a web page which might include an official website, and links to ministries or departments. Information is majorly inactive and there is little or no interaction with citizens.
Stage 2 - Enhanced presence: More information is provided by government on public policy and governance and makes them easily accessible to citizens. Links are made to recorded information such as newsletters, documents, reports, laws etc.
Stage 3 - Interactive presence: Governments provide online services like downloadable forms for applications and an interactive portal with services to ease its use by citizens is being put in place.
Stage 4 - Transactional presence: Here, there is now two-way contact between 'citizen and government'. It includes options for paying taxes, applying for ID cards or passports and other functions similar to G2C interactions.
Stage 5 - Networked (or fully integrated) presence: This is the most sophisticated level of e-government implementation. It integrates all e-government service dimensions G2G, G2C and G2B. At this stage, government through technology becomes proactive in connecting with and answering to citizens' needs.

4.2 e-Cultural Synchronization (e-CS) model

There are four stages in the development of an e-CS model. They are:

(1). Robust research on disparate cultural universes in diverse African nations, requiring an interpretive methodology.
(2). Organization and formulation of data derived from step one above.
(3). Processing of disparate data
(4). Formatting for e-Government platforms
(5). Launching for G2C; G2B; G2E and G2G dissemination

The first stage mentioned above requires collaboration with cultural anthropologists, sociologists, historians, scholars/experts in religious studies, intercultural communication, and rhetorical communication, all with research competence in African societies. The pertinent methodology for such an endeavor is interpretive. The research results would yield data on disparate values, religious and secular beliefs, traditions, customs,

worldview, rites, philosophies, histories, warrants used to justify actions, and other socio-psychological variables. The firststage of the research process, therefore, requires a high degree of open-mindedness, in the sense that value judgments on the part of the researchers on beliefs, customs rites etc., of co-cultural groups should be avoided, because such judgments could have a negative impact --in terms of biases and potential misrepresentations -- on the organization and formulation of data.

In the stage two, the same team of researchers would be involved in the organization and formulation of data emanating from research endeavors. It is at this stage that discrete categories are identified and formulated resulting in a breakdown and organization of similarities and differences among disparate ethnic, linguistic and religious groups in the given nations. Overlaps in similarities and differences among the diverse population are identified and systematized for synchronization, with particular emphasis on overlaps in similarities.

Stages three and four involving processing of disparate data, and formatting for e-governance platforms respectively, are handled mainly by ICT experts. These experts would have access to researchers involved in stages one and two for clarification if necessary, and to authenticate the integrity of the data being processed electronically for formatting consistent with e-Government platforms. The process of authenticating generated data is required to ascertain that there is no evidence of falsification, before the data are synthesized and formatted for uploading on the e-government platform. Synchronization is not restricted to similarities as mentioned earlier. Overlaps in differences should be aggregated as well, and organized to show them as stumbling blocks towards the achievement of a national identity, and representing exigencies that should be gradually resolved in a peaceful manner.

The final stage is the launching of e-CS on the e-government platform. A well-written guide and explanation of the function and purpose of e-CS would need to be prepared, to inform citizens, businesses, government officials and staff at alllevels of governance about the richness evident in the synchronized content showcasing similarities around which a national cultural heritage is seen and celebrated, as a means of forging a collective national consciousness and identity. Educational institutions at the primary, secondary and tertiary levels would benefit from the use of e-CS data. It must be pointed out however, that e-CS is not a substitute for textbooks, scholarly reference works in the forms of peer-reviewed published articles or books. It provides an added and specialized source of information on similarities and differences among co-cultural groups with a focus on values, beliefs, customs, traditions, worldview, etc.

Stemming from the above, there must be as well, security considerations in the management of e-CS. Hackers could possibly access it with a potential to distort content to an extent that e-CS could contain false and inflammatory content about diverse co-cultural groups triggering conflict. There should be no effort spared to ensure full protection.

5. Limitations

There are limitations that require attention. For instance, the level of literacy in Africa remains high, not to mention literacy in the use of ICT applications such as e-CS and e-governance as a whole. In addition to the above, for e-governance to function effectively and efficiently, some fundamental aspects of national, regional, state, and local infrastructure have to be in place: energy; telecommunications and related technologies, committed political leadership, given the history of the recent past in several African nations beguiled by corruption, graft, nepotism that create lack of trust in governments. If the source of e-governance is not trusted, access and use of e-governance platforms would be negligible or useful only to elite groups in society that can afford what is takes to make use of ICT. Furthermore, deep-seated prejudices among diverse ethnic, linguistic and religious groups are not going to be easily eradicated by the E-CS in the short run. Human and fiscal resources to carry out all the activities in the five stages mentioned above are resource intensive.

6. Conclusion

The prevailing environment in African countries with diverse conditions remains tenuous in political and socio-economic terms, as well as several aspects of belief systems, cultural practices, and worldview. The strain on national integration efforts are evident in countries that are combating insurgencies such as the Federal Republic Nigeria, Mali, Morocco, Democratic Republic of Congo, Uganda, Rwanda, Central African Republic, South Sudan, Kenya. Libya represents presently , the worst example of states that once enjoyed a significant degree of national integration, but now experiencing total disarray and the collapse of the country.

National integration is multifaceted in terms of the challenges for stability and the fashioning of a national consciousness and identity, and mechanisms necessary to deal with the challenges. e-CS is not advanced in this work as the panacea for solving the problems involved with achieving national integration in African nations, particularly in those with diverse populations. It is argued here that e-CS is a key element in national integration mechanisms and primarily fashioned to provide information on e-Government platforms about co-cultural entities in diverse African nations. The information provided would focus on similarities and differences in the constituent elements of co-cultural groups, through the use of ICT and e-government platforms. The information contained in e-CS could help to let co-cultural groups recognize, appreciate and act on the information which shows that there is lot of "us" in "them," even with differences. The administration in power in any given diverse state in Africa would need to show willingness to invest in e-governance platforms as a first step, and then to enrich the platform with the type and quality of information on several sectors such as e-Commerce and the proposed e-CS. The potential benefit derived from co-cultural groups finding out that there is a lot of "us" in "them" in a positive way would outweigh, indeed, the costs.

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COI: A Framework of Software Development to Reduce ICT Investment and Increase Acceptability

Choompol Boonmee
Thammasat University, Klong Luang Pathumthani, Thailand
choompol.boonmee@gmail.com

Abstract: E-Government is the use of information and communication technologies (ICT) by government agencies to ensure better delivery of government services. However despite many online benefits, after an initial trial of e-Government, many users revert to traditional ways. This failure to retain the interest of users contributes to the failure of e-Government in developing countries. In general, e-Government websites aim to transform service delivery and make it easier for citizens and businesses to interact with the government. The success of any service delivery depends largely upon its perception in the minds of users, which in turn determines users' retention and loyalty. Although online services have been deployed in parallel with the traditional ones, effective public services still tend to be the traditional face-to-face styled service not the electronic one. ICT as a facilitator for efficiency and effectiveness of old fashioned services must be one of the right answers for developing countries, instead of developing an online self-service. Previous researches show that technical development alone could not realize benefit from ICT. Many researchers attempt to address these issues from the human behaviour perspective instead of focusing on the technical aspects. Generally in order to develop an e-government system, a government unit needs to invest in ICT infrastructure. Especially for small scale government units the ICT investment becomes significant. The investment includes servers, data centre, storage, network, software, ICT staff. We propose the idea of an ICT development framework named COI to reduce the cost on ICT investment, to reduce dependency and to pay more attention to acceptability by using a simple, open and user-friendly data format rather than sophisticated database management systems which require skilled ICT staff. The framework includes three main concepts. The first concept is to use commonly and widely used technologies and products. Local storage or hard disk can be used to store information. Publicly available e-mail systems or drop box services can be candidates for an information management facility. The second concept is to use an open, simple, and user-friendly electronic data format to store information. Clear text based data files or Microsoft spreadsheet Excel files can be candidate formats for storing electronic information. This concept increases the transparency, acceptability and reusability of an information system. The third concept is to develop software which is less independent from external environment. This framework has been adopted in three projects for public service enhancement in small government units around Thailand. They include the ESmartBox project, the SmartMOL project and the Phitsanulok Employment Promotion project. The result indicates that this framework reduces ICT investment and increases acceptability, transparency and information reusability considerably.

Keywords: ICT cost, acceptability, reusability, open format, transparency

1. Introduction

E-government is the use of information and communication technologies (ICT) such as the Internet, wide area networks and mobile computing by government agencies to ensure better delivery of government services. Despite its benefits which are often stated in terms of increasing the convenience and accessibility of information and services for the public, the success and acceptance of e-Government initiatives are contingent upon citizens' willingness and intention to adopt these services. Many users revert to traditional ways after an initial trial of e-Government. This failure to retain the interest of users contributes to the failure of e-Government in developing countries.

The success of service delivery depends largely upon its perception in the minds of users, which in turn determines users' retention and loyalty. Human-Centred Design (HCD) has been an approach that aims to make IT systems usable and useful by focusing on the users, their needs and requirements, and is considered as complementary to the sociologists approaches (Reiter, 2014).

However, the implementation of such systems is often constrained by short term deadlines, large amounts of data that should be registered at once and misunderstandings in designing (Sourmelis, Christodoulakis and Xarcha, 2014). Insufficient involvement of users and stake-holders in the software development process introduces a bad perception which then affects the intention to use the system. Other failures include the lack of ownership and integration with locally existing systems, the largely technological approach with limited inputs from specialists and the lack of baseline (Andonovska, 2014).

Outcome software systems often rely on a limited number of very popular datasets which cannot serve the needs efficiently (Foulonneau and Martin, 2014). In many cases effective public services still tend to be a traditional styled service not an online service. ICT as a facilitator for efficiency and effectiveness of the old fashioned services must be one of the right answers for developing countries, instead of developing an online self-service (Boonmee, 2014).

Although much research has been conducted on eGovernment supply-side metrics (Helbig et al., 2009), citizen needs or perceived values have not been adequately accounted for (Streib et al., 2006). While engaging citizens online in a meaningful way remains difficult (Kolsaker et al., 2008), the goal of wider political participation is becoming a pressing challenge as governments seek the creation of public value (Grimsley et al., 2007a; Helbig et al., 2009).

Previous researches show that technical development alone could not realize benefits from ICT. Instead of focusing on the technical perspective, many researchers attempt to address these issues from the human behaviour perspective (Ward et al., 2007).

We propose a framework named COI to reduce the cost on ICT investment, to reduce dependency and to pay more attention to the human behaviour perspective.

This paper consists of five sections. In section two, the problems of service provision are illustrated. In section three, the proposed framework and techniques are introduced. In section four, the developments are described. The last section contains discussion and possibilities for future work.

2. Problems

Traditionally in order to access public services, a citizen fills out a service request form with other required documents. He/she submits the form based document to a servant of service provider. The staff member then performs one or more predefined processes to produce the output of the service. Each process may produce intermediate documents. Such services are for example, licensing, certification, registration, benefit claim process, and so on. Those processes include document verification process, basic requirement verification process, output document preparation process, permission, decision and signature process, payment process, and output document delivery process.

Figure 1: Typical Public Service Process and paper based document management

Figure 1 shows a typical service providing process. During each process paper documents are produced. Firstly, a request form is submitted by a citizen. The request is processed in order to produce the outcome of the service. Lastly, the final output document is delivered to the citizen or whom it concerns. Documents produced during the process are stored in the filing system for future use. Typically these documents are paper based documents specified by law, regulation, best practices and so on. The paper based document management becomes the foundation of the system.

Figure 2: Document management for electronic documents in e-government system

In general e-government is developed to support those processes. Software developed in e-government tends to transform the paper based document to electronic. Some digitize the paper to an electronic image file and store it in a shared file system. Others change the method of document submision from paper form filing to data entry via an electronic device, such as personal computer, notebook PC, tablet and so on. In order to do that, a software system has to be developed.

In order to support e-government deployment, computers, software, network and other ICT facilities need to be developed. This requires a significant investment especially for small scale government units such as local government units, municipalities and so on. However, some ICT infrastructure becomes more common and accessible throughout the country like other utilities at a reasonable price. Personal accessing devices include the personal computer, notebook PC, tablet and various kinds of smart mobile devices. For internet access, there are more than three big internet service providers. For communication a number of e-mail services are provided from both public and private providers. For online storage, there are a number of cloud based storage providers available. These ICT infrastructure providers become ready for all at an acceptable cost.

However, in e-government development specific software and data centre infrastructure are also required. The data centre infrastructure includes server computer, database management software, network connectivity and so on. In order to deploy/execute the software system significant investment is required. This includes the costs of software design, hardware design, server computer, storage system and network connectivity, and skilled ICT staff wages. Moreover human behaviour has to be taken into account in order to achieve success. This requires more investment. The significant investment in ICT development is an important factor in causing failure. It does not allow sufficient participation by staff and other stakeholders in the ICT development process. Thus user acceptance and realization of ICT benefits cannot be achieved. We can assume that to make an e-government project succeed, both technical and human factors have to be considered properly. The main idea of this paper is to reduce the cost of technical development while increasing acceptability which is the human behaviour issue.

Figure 3: Paper based documents are physically touchable, visible, self-contained and independent

So far paper based documents have been used in providing public services. Citizens, servants and other stake-holders have been familiar with and trust in these documents since they are physically touchable, visible, self-contained and independent as illustrated in fig.3. Service providers' members of staff, citizens and other stake-holders are able to access or view them directly with confidence. Thus they are confident when referring to and relying on these documents.

Figure 4: Document management for electronic document in e-government system is not familiar and less acceptable to service staff, citizens and most stake holders

On the other hand, in an e-government system all documents are virtualized and stored in data storage. Data is stored in various specific formats depending on the software in use. Some formats are open or well-known. Other formats are proprietary. Without specific software, one cannot access or manipulate the data nor physically view and touch the documents directly like paper based documents. Some documents are stored in a proprietary unknown format. Much data is stored in database management software which service staffs, citizen and others cannot access directly with confidence except by skilled IT staff. We assume that this is because e-government systems have too many dependencies and are too invisible. This factor largely influences its perception in the minds of users, which in turn determines users' retention and loyalty.

E-government development problems can be summarized as follows:

- Significant investment is required.

- Lack of consideration of human behaviour

- Bad perceptions in the minds of users.

- Electronic data is unfamiliar and daunting therefore hard to be trusted and reused.

- Software is too complicated without acceptable proof which in turn leads to unreliability.

- Too many dependencies including computers, network, skilled ICT staff, specific software, unknown data formats and so on.

- Shortage of skilled ICT staff.

3. COI framework and technique

In order to achieve successful e-government implementation, we propose a framework called COI. This is not a detailed methodology or technique. It is a guideline concept used to mitigate the problems mentioned above or to reduce the effect of them. The framework includes three main concepts; to use common widely used technologies and products (C), open, simple and user-friendly data format (O) and be more independent from external factors (I).

The first concept is to use common widely used technologies and products. It is about reducing the ICT costs and increasing the users' acceptance by utilizing common and widely used technology as much as possible on the service provider side. Instead of building its own data centre, ordinary desktop computers with a small uninterruptable power supply (UPS) can be used. Instead of an enterprise class storage system, a commonly used external hard disk can be used. Instead of using sophisticated web services which are complicated and costly, a normal stand-alone program with e-mail as a communication channel to send/receive data should be used. This approach often leads to less cost since commonly used products are spread widely in markets at a reasonable price. It also reduces the maintenance cost since more local support can be expected.

Under this concept we have to choose or design which technique or products should be used. Available techniques and products can vary and evolve depending on market needs. Figure 5 shows examples of common widely used technologies and products which can be used as foundation components to develop information systems for e-government. Ordinary storage of personal computers can be used to store data produced by the information systems. Physically attached or removable storage is familiar to users for carrying data with freedom

to increase data reusability which in turn leads to reliability and acceptability. At the present time they include USB flash drive, external hard drive, CD-ROM, and DVD-ROM.
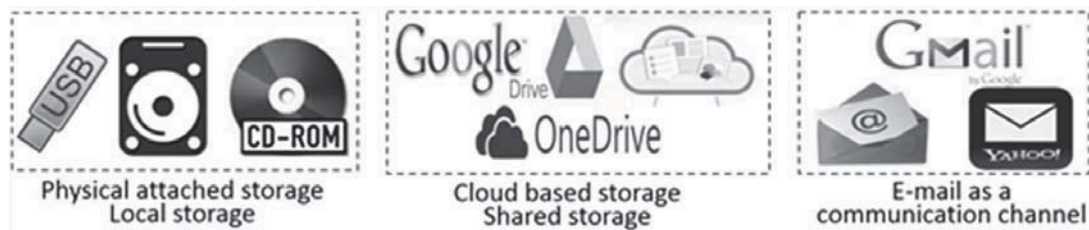
Figure 5: Examples of commonly used technologies and products which can be used to develop current information systems

This concept reduces the need to own expensive data centre and database facilities. Local storage or hard disk can be used to store information. Publicly available e-mail systems or drop box services can be candidates for the information management facility.

The second concept is to use open, simple or user friendly data formats (O) to store information. Clear text based data files or Microsoft spreadsheet excel files can be candidate formats for storing electronic information. This concept increases the transparency, acceptability and reusability of the information system.
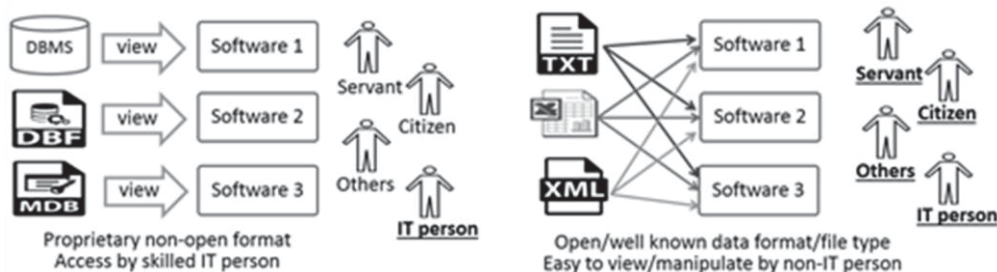
Figure 6: Data formats used in storing data; left) proprietary or non-open formats right) open, simple, well-known and user friendly data formats

Data format should be open and user friendly. Openness allows every software vender equally to develop software to access the data. Proprietary data format allows only a specific software to access because other software vendors do not understand the format. The data format should be user friendly to allow the user to view freely without limitation.

In order to apply this concept we need to determine the formats. Figure 6 shows some examples of open, simple and user-friendly data formats: clear text file, XML file and excel file. Other examples of proprietary non-open format have also been illustrated: database management system internal file format, DBF format, MDB format which can be accessed by only skilled IT persons.

The third concept is about being independent from the external environment. However, to develop an information system completely independent from external factors is difficult. This concept promotes less dependency on specific hardware devices, less dependency on operating systems, less dependency on specific software products, less dependency on network connectivity, less dependency on specific skilled ICT experts.

To achieve this, for examples: data in the storage should be in open and self-contained format to allow any software to be accessed, software should be designed to operate in both off-line and on-line situations, software should be available in most operating system and software platforms and so on. This concept allows users to be confident to own their electronic data which in turn affects users' acceptance and increases reusability of their data.

In order to apply the COI framework practical methodologies and techniques have to be developed. The degree of approach depends on a number of factors. For examples in the case of the 'C' concept we have to decide what the scope of commonly used products or technologies which depend on worthiness and users' acceptance is. In the case of the 'O' concept we have to decide what data format should be used. In the case of the 'I' concept we also have to decide what degree of independence should be used. These decisions should be made based on

suitability and stakeholders' perceptions. Therefore the proposed framework must more or less reduce ICT investment cost and increase users' acceptance.

4. COI technique development

In order to adapt the COI framework, let us first consider the process and documentation used in a software development life-cycle as illustrated in fig 7. The process typically starts from collection of requirements through software design, database design, software program development, hardware software installation and quality assurance, to real use or go-live. After the start of the software being used, data records according to the service provisions are accumulated in the data storage.
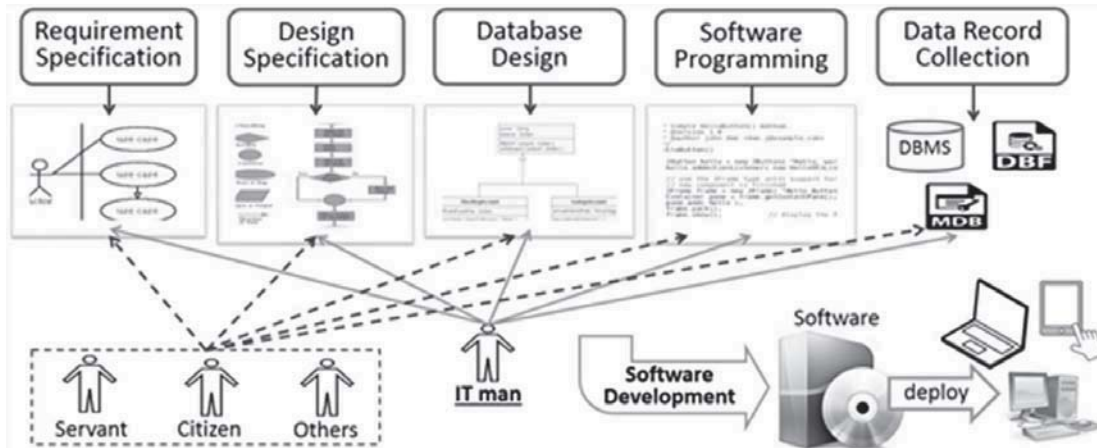
Figure 7: Documents produced in a software development life cycle: requirement specifications, software design specifications, database design documents, source program and data records produced by the software

Typically most of processes and documents during development are produced and managed by skilled ICT staff as shown in fig.7. Using well developed methodology with sophisticated tools, most documents are produced and can be viewed only by well-trained ICT people. The system analysts collect documents and interview users to produce requirement specifications using UML use case diagrams and/or activity diagrams. The software is designed by software designers using software tools like Rational Software Modeler from IBM, Visio from Microsoft, Eclipse UML2 tools an open-source, and so on. Data model and management is then designed using such specific tools. After that, the software is developed by software developers well trained in ICT expertise of specific platform products. All processes mentioned above require significant investment and produce documents which are not easy to understand for most stakeholders; this in turn affects their perceptions. Especially for the data records which are produced during software execution, they have less confidence and less freedom to test, to trust and to reuse.
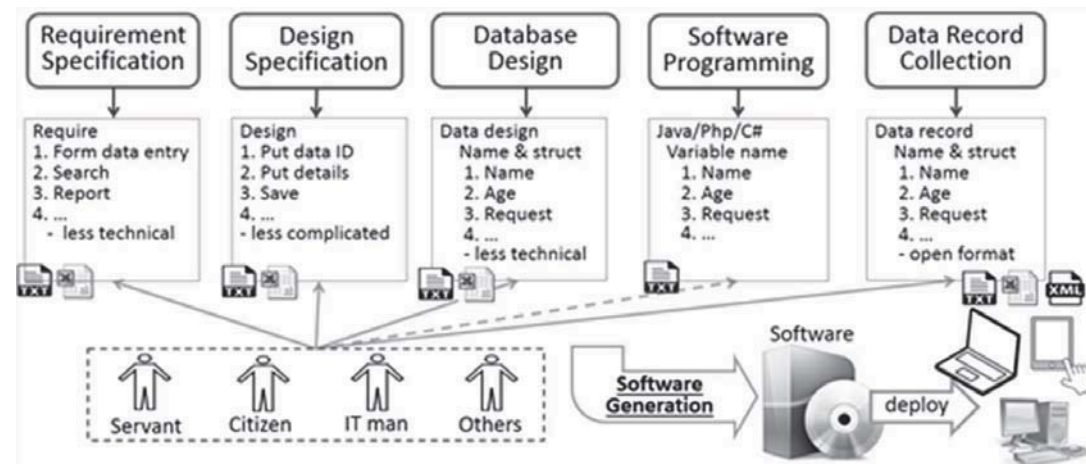
Figure 8: The technique introduces developmen process simplification, open document file type determination and software automatic-generation. The technique also introduces self-contained data record with open format

Let us first consider the requirement analysis and design process. The analyst and designer need to know the process and the flow of existing operations. The users and other stakeholders also need to know how the analyst understood and how the designer designed the software. This mutual understanding and perception largely influences the success of the development but this consumes time and requires a significant investment. Insufficient communication commonly leads to implementation failure. The proposed technique is to simplify the development process, to produce documents with a simple and user-friendly spread sheet and clear text file types and to automate development by source program and document generation as shown in fig.8. The spread sheet and clear text file types are commonly used and acceptable to most stakeholders so they are already familiar without a need for training. This allows most users and stakeholders to share documents not just skilled ICT staff. They can get involved in the process without technical difficulty. They can reconfirm the understanding of the analysts and designers and even correct or create the materials without document production redundancy. Moreover the generated software produces data records in an openly defined format. Each data record is independent of a specific software product. It is self-contained and can be accessed by any software product or even by clear text editor without limitation.
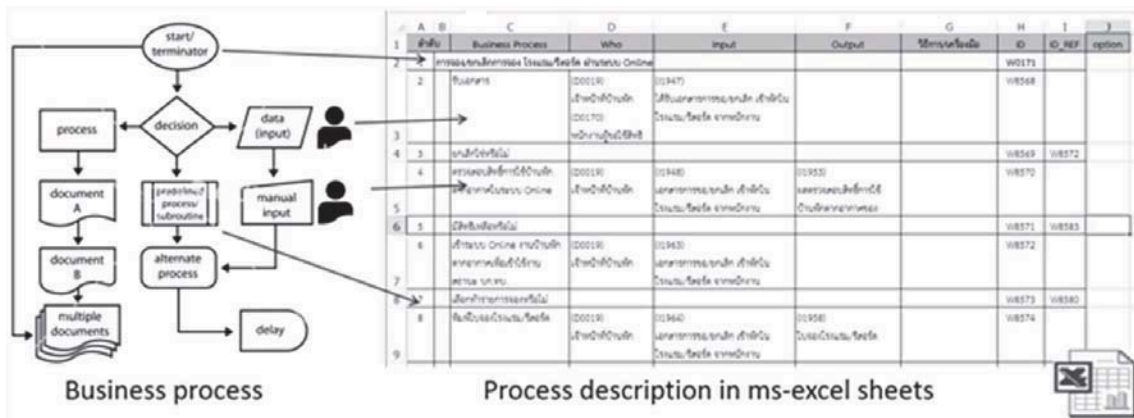
Figure 9: The process work flow is documented in a pre-defined format of spread sheet file type. it is shared and is used in source program generation

During requirement analysis and design, a document to describe the process flow is created in a pre-defined format spread sheet type file as shown in fig.9. This Microsoft excel file can be produced and shared among analysts, designers, users and other stakeholders without technical barrier. This helps not only good communication and largely influences perceptions among all, but also reduces redundancy of document production. Finally formal reports and a user manual can be partially generated in a user-friendly file format such as Microsoft word file (*.doc).
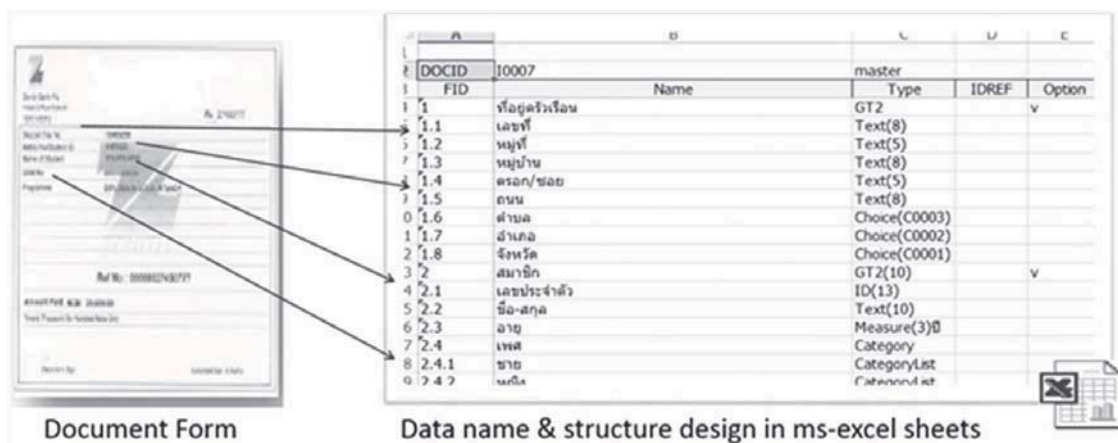
Figure 10: Data entry form and data model design is documented using a pre-defined format of spread sheet file type. It is shared and is used in source program generation

During data entry form design and data model design a pre-defined format spread sheet type file is used to describe the data model, structure and data fields as shown in fig.10. This excel file can be used to share among stakeholders. In order to do this a number of simplification and rules have to be developed for both communication and automatic generation. For examples of data type, instead of using 'char', 'varchar', 'int'

which are technical key words, we just use 'text', 'number', 'amount', and so on. Technical keywords such as 'primary key' or 'foreign key' are avoided.
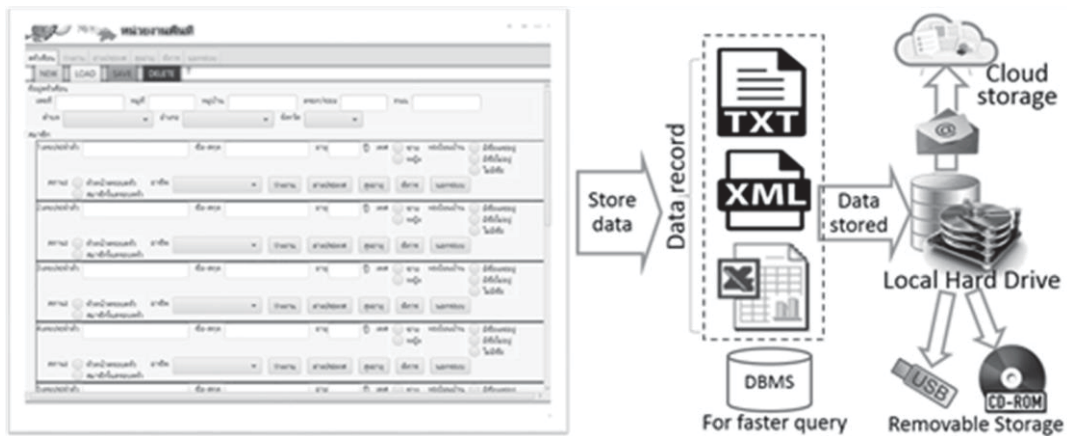
Figure 11: Software source program is automatically generated. It produces data records with an openly defined format for sharing and reuse

In this research we developed software to generate e-government software automatically. The software reads the excel files mentioned above together with other dependent files as input specifications then generates source programs in java language using JavaFx technique as a graphical user interface. It also generates reports and, partially, user manuals automatically in a user friendly format such as Microsoft word (*.doc). Figure 11 shows the screen shot of generated programs of data entry. The generated programs allow the users to enter the specified data and store in a well-defined open format such as clear text, XML and excel spread sheet. The data records can be shared with other software systems and stakeholders through e-mail as a communication channel and cloud services as an external shared storage.

This technique do not attempt to facilitate nor improve business process management. However it can assist communication the changes since stake-holders and software developers share the same simple predefined document mentioned above.

Moreover this COI framework and corresponding techniques still present problems. Security problems include data confidentiality, data integrity problems and availability problems. Simplification reduces communication problems while limiting the functionalities of the generated software. The security should be built in. A number of security solutions are off-the-shelf ready for enterprise class products and technologies. Most of them are designed in a firewall style which assumes two things; Everyone inside your organization is good, and everyone outside your organization is bad. Rather than building moats in the form of firewalls, organizations need to protect two things directly: the data and the identity of those using the data, regardless of where either resides which is planned to be considered in our future work.

5. Discussions and future work

Significant investment and users' acceptance are important obstacles in developing e-government. In this research we propose a framework called COI to reduce investment and increase the users' acceptance. The 'C' concept is about using common and widely used technologies and products. The 'O' concept is about using an open or user-familiar data format. The 'I' concept is about independence from external factors. This framework reduces investment cost and increases users' acceptance. To adapt the COI framework we introduced a technique which includes simplifying the development process, using open data format and automating programs generation. This framework and technique have been adopted in three projects for public services enhancement in small government units around Thailand. They include the ESmartBox project, the SmartMOL project and the Phitsanulok Employment Promotion project. The results indicate that this framework reduces ICT infrastructure investment and increases users' acceptability. Since the 'I' concept mandates using open and user-friendly data format, transparency and information reusability are also increased considerably. However, this framework and technique have a number of limitations and there remain problems to be considered and to be improved.

The techniques developed under the COI framework can be different depending on various factors: for example, what the scope of commonly used technologies and products is, what the scope of open and user-friendly format should be, what the degree of independence is, etc. These factors depend on users' perception and situations. In order to evaluate the use of the framework, key performance indicators and adapting criteria should be determined and assessed which is one of our future works. The perception of such words as 'commonly', 'user-friendly', 'independency' largely depends on stakeholders, environment and time being. This should be tested in future research.

In this research we propose a framework and a technique to solve the acceptability and benefits realization problems. To ensure the effectiveness of the approach more experiments and proofs are required to be executed. There should be a role model of using the proposed framework and techniques to inspire, instruct, and to set a good example for e-government development.

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A Decade of Studies Studied: Assessing Research Trends in e-Government

Michaelene Cox
Department of Political Science, Illinois State University, Normal, USA
mcox@ilstu.edu

Abstract: The purpose of this paper is to take stock of e-governmentstudies to demonstrate the extent to which the disciplinary field has developed sincebeing inaugurated, arguably, in the early twenty-first century.At least three challenges face researchers in gaining a holistic perspective of what we know about digital government. First, while a growing body of literature dissects peer-reviewed journals and conference papers for what they can tell us about what researchers are researching in the field, few of those meta-studies focus on more than one broad issue at a time. For instance, there are numerous papers examining the frequency of various research designs employed or tending to studies that deal with particular governance topics such as e-democracy. This study takes a tentative step toward enlarging our view of the field by examining matters related todelivery models, levels of governance, study designs, methodological approaches, and topics.Second, there is scant attention being paid totrends over time.Indeed, with no discernable exception, previous studies present findings in the aggregate; that is, they report on total observations at the end of a given timeframe and not changes from one period to the next. It is difficult, then, to gauge if development in the rigor and maturity of the field is on track. The paper herein similarly reports the current status of research matters, but also reports changes occurring over the course of a decade. Third, conclusions reached in the literature rest on small sample sizes.Assessment of all e-governmentstudiesis certainly an ambitious if not impossible task, as is reaching agreement on appropriate sampling methods. This challenge also explains the limited understanding that we have about current research. The paper herein examines585 articlespublished between 2004 and 2014 in two primarye-government journals, *Government Information Quarterly* and *Electronic Journal of e-Government*. The sample size is the largest to date. While there is certainly room to build upon this study, it opens the window to what we know about the field. The paper finds that the majority of peer-reviewed articles addresses government-to-citizen (G2C) issues at the federal level, and includes fairly even coverage of most e-governance issues. Contrary to previous literature, review of these articles suggests that most of them clearly articulate a research design, with few employing quantitative methods. The assessment does indeed support, however, a widely-held view that most research in digital government is atheoretical and on the whole lacks practical recommendations for the academic community and practitioners.Although necessarily limited in scope of coverage, and in piecemeal fashion, this review of research trends in e-government thus provides us with a unique perspective and a springboard from which to delve further into the matter.

Keywords: research trends, e-government research, topics of study, methodologies

1. Introduction

What have we learned about e-government thus far, and importantly, how reliable is that new knowledge? A start to synthesizing and assessingwhat we know and what we do notknow yet, is to consider exactly what it is that researchers have been studying. Growth in e-government research began snowballing in 2000, with the result that analyses now reflect a remarkable range in focus, methodology and findings. Of great concern is that some critics note a dearth of rigor in the field and argue that it is far from mature.Recent analyses about extant research suggest that most work to date in the field has concentrated on its practice, such as technology adoption and diffusion, policy agendas, impacts, and even a growing interest now in examining performance metrics. Further, meta-studies reveal that in addition to focusing primarily on application, there is concern that insufficient attention paid to formulating and justifying methodologies, including the relative lack of theory building and testing, will have deleterious effects on e-government policymaking and on our understanding about such processes.Severe indictments such as this prompt us to reconsider the current state of affairs in the study of e-government.

There is a voluminous array today of e-government specialised journals, information systems journals, and e-government themed conferences.Scholars have investigated a sampling of studies appearing in a variety of these venues, but there is scant attention paid to research trends or to multiple dimensions of e-government research. Some work, for instance, focuses on research either by topic, methodology, or even the author's country of origin. Those efforts, with no discernable exceptions, also present findings in the aggregate and not over time.Assessment now of all e-government studies is certainly an ambitious project, as is reaching agreement on appropriate sampling methods, but such limitations do not prevent opening the door a bit wider to better investigate the research community. Therefore, this paper aims to provide a relatively more comprehensive profile of e-government studies published over the last decade drawn from two premier specialised journals by

classifying each article according to its coverage of delivery models, levels of governance, study designs, methodological approaches, and topics. A brief review of notable literature illustrates some of the gaps in e-government research that the paper herein seeks to address.

2. Literature review

The evolution of e-government research is traceable to that of public administration but is arguably a more direct offshoot of Management Information Systems (MIS). MIS as a field of study surfaced primarilyduring the 1960s and subsequently came under close scrutiny by the 1990s, having been criticized for its rudimentary manners of evaluation.Within short shrift, assessment of MIS studies revealed a move in the field toward multidimensional themes and approaches. For instance, the contributions of Barki, Rivard and Barki (1993) proposed a model of MIS study be organized in clusters of broad categoriesincluding management, environment, technology/development, application, and research. Such literature was in place at the cusp of the twenty-first century when the Internet inspired the concept and application of electronic government, and national governments undertook cost-benefit analyses of subsequent developments.Thereupon, we find a diffusion of studies about e-government quickly emerging in the academic community.

Some scholars question the place for research about digital government, arguing that it appropriately falls under either public administration orinformation systems as a subfield.Others maintain it can properly be regarded as a discipline in itself. Perhaps consensus about its classification can ultimately guide critiques of e-government research, but the paper herein does not contribute to that debate. Instead, the focus here is on the nature of e-government studies themselves.What is most notable is that within less than two decades, those studies have taken a multi and interdisciplinary turn. Nevertheless, despite this steadily mounting body of research, criticsweigh in on the focus andquality or maturity of work.

Studying references cited in the literature of e-government research ten years ago, Lofstedt (2005) summarizes a prevalent sentiment by stating, "there is, as yet, no kernel of established e-Government researchers or concept creators and the field of research has in no way matured as yet"(p 39). In his own study, he constructs a listing or "map" of existing literature by research categories including management/organization, e-services, e-democracy, e-security and interactions. His assessmentrests on a collection of journal and conference papers located through several keyword searches from library databases and the Internet. Acknowledging his study is limited, he nevertheless fails to indicate the number of papers examined and leads us to wonder if the sample is haphazard as well. Among other conclusions, Lofstedt finds that the field is dominated by issues such as services and citizen participation at the expense of studies concerning organizational aspects of government, and agrees with other critics that most investigations are case studies and descriptive or philosophical treatments, with little theory generating and testing. Shortly thereafter, Norris and Lloyd (2006) examine 57 of the first known e-government articles published through to the end of 2004, and find little to contradict Lofstedt. The studies, they discover, include little of the literature available at the time in IT or e-government specialised journals, few create or test theories, and many do not provide data or analysis to support their conclusions. The two authorsconclude that the field of e-government has not yet acquired scholarly rigor. A few years later, observation from other scholars is equally unenthusiastic.After conducting content analysis of 84 refereedpapers from 2001 to 2005, 28 selected from each of two journals, *Information Polity* and *Government Information Quarterly*, and 28 from proceedings ofthe *European Conference on e-Government*, Heeks and Bailurargue that any optimism about e-government produced from the literature is unfounded.Reporting their findings in the aggregate, they note that three-fourths of the papers relied entirely on qualitative methods and most took atheoretical approaches. Further, fewer than half offered policy recommendations, with most of those providing a mere sentence or two on the matter. They conclude that e-government research "…does not add to the body of theory. Nor does it significantly help to improve practice…there was no link between theory and practice because there was neither theory nor any particular practical value" (2007, 243).

In many respects, published studies of lateappear not to deviate significantly from the dismal observations above. They do not indicate significant changes in the topics and approached adopted in e-government research. A fairly succinct overview of the literature addressing areas of study is provided by Irani et al. (2012). They observe that focus of much early e-government research was about implementation, with studies on e-participation and the digital divide becoming more prevalent only of late. The team aggregate observations from 114 articles in nine journals published 2000-2012 and find that citizen or user satisfaction had comparatively little coverage. Further, when examining methodologies employed in those same articles, they see few using

qualitative approaches such as case studies or interviews. Instead, they discern the most frequently used techniques are statistical analyses. The favored methodology would appear to be different than that observed by Lofstedt, but the lack of adequate attention to theory persists. One of the most recent published studies about e-government research, and the most comprehensive to date, is by Snead and Wright (2014). The authors examine 100 peer-reviewed articles from 19 journals, but again limitations of the study prevent generalizations. Nearly half of those articles come from *Government Information Quarterly*; key word searches specify only United States e-government based articles without satisfactory explanation of an appropriate sampling method. Years cover2007-2011, with findings aggregated by government level studied, research perspectives, and methodologies. Sneed and Wright discover gaps in coverage of various topics and among different levels of government. While a number ofdifferent methodological approaches used in the literaturesurface throughout the sample, Snead and Wright find few studies adopt a mixed-methods approach or present a clear explanation of methodology. Most used secondary data. Nearly a quarter of the studies sampled relied on surveys; the second most used method was policy analysis, closely followed by case studies and website reviews. The authors find that little of the research was theory-based or linked theory to application. All in all, we might surmise that a review of the literature suggests an immature body of e-government research still, and for purposes of this paper, there appears no study of those studies conducted that indicate change over time.

3. Research design

The sheer volume of articles in e-government journals and numerous disciplinary and specialized publications, necessarily limits the study at hand. Still, the goal of this paper is to provide a solid representation of the field. It will synthesize and adapt frameworks for studying e-government research, and apply the resulting typography toall papers published from 2004 to 2014 in two premier journals. The sample consists of all "regular" peer-reviewed research articles which specifically address e-government mattersand thuseditorials, essays, book reviews, and the like are discarded from analysis. The total sample size is 585, the largest number of articles in the field studied to date. Of these, 395come from *Government Information Quarterly* (GIQ)which primarily publishes work by U.S. researchers,and190from *Electronic Journal of e-Government* (EJEG) which publishes a larger share of studies by non-U.S. based researchers.

After identifying articles that meet the inclusion requirements, the author worked with two student assistants to conduct content analysis of the sample. She provided a coding key to each assistant who worked independently to compilethe data. In cases where there were inconsistencies between the two sets of codings, she evaluated the article in question and adjusted the data as she deemed appropriate.There are six broad categories with their subsets of features identified in each article: (1) delivery models addressed; (2) levels of e-government in question; (3) general design; (4) qualitative and qualitative approaches; (5) primary topic; and (6) if governance was the primary topic, then area of governance. This group of categories is a synthesis of those included in the literature or noted by previous studies as inadequately studied. The author aggregated features in thearticles by journal and by year, as well as those published at three points in time in order to illustrate trends:at the beginning (2004), midway (2009), and most recently (2014).

4. Findings and discussion

A series of graphs below depict variationsin subsets of four categories among all journal articles between 2004 and 2014. Eliminated to conserve space are graphs reporting delivery models and levels of e-government in question, although discussion will summarize those findings. The discussion will also include a summary of features for three years to illustrate changes over time.

Figure 1 shows that about three-fourths of all papers published during the past decade provide a clearly stated research design and discussion of methodology. This is inconsistent with much previous literature. However, the study here indicates that there is a significant lackof rigorous e-government research in terms of theory and recommendations, and this is indeed what earlier research has found. One-third of all articles fail to refer to or to employ particular theories, models, or frameworks for understanding the subject matter. The same proportion also fails to provide recommendations for researchers or practitioners. Together, these latter aspects may suggest shortcomingsin the application or meaningfulness of research conclusions in the field.To be fair, averages can mask significant variations between the two journals. For instance, the strongest performer in the category of general design is GIQ; just over 70 percent of articles in that journal include theoretical discussion and provide recommendations, whereas the share of articles in EJEG is considerably lower in both those features. While these discrepancies may tell us new stories, perhaps something about the journals themselves

or research orientation from different countries or disciplines, the purpose of this paper is to look broadly at the field and not to weigh in on individual publication outlets. Presentation and discussion of remaining findings, therefore, are confined to the sum of all articles.
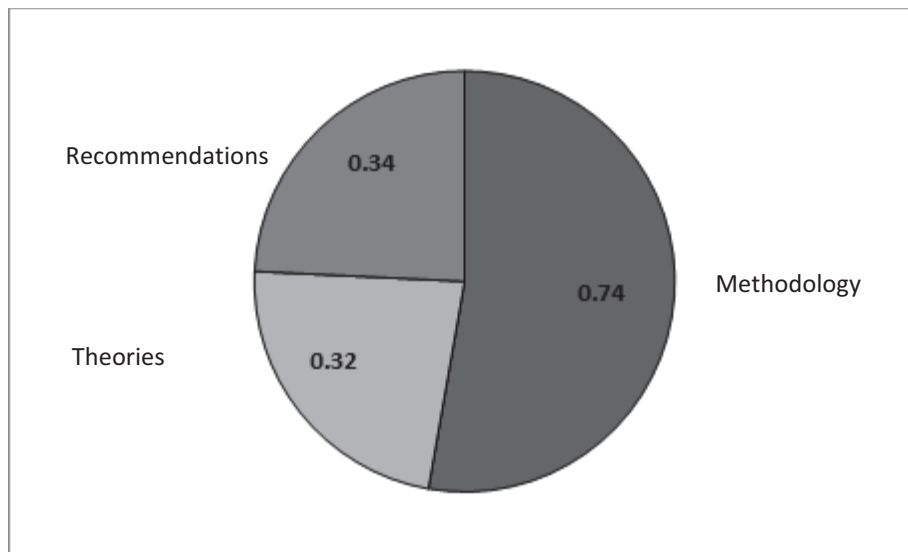
Figure 1: General design, 2004-2014
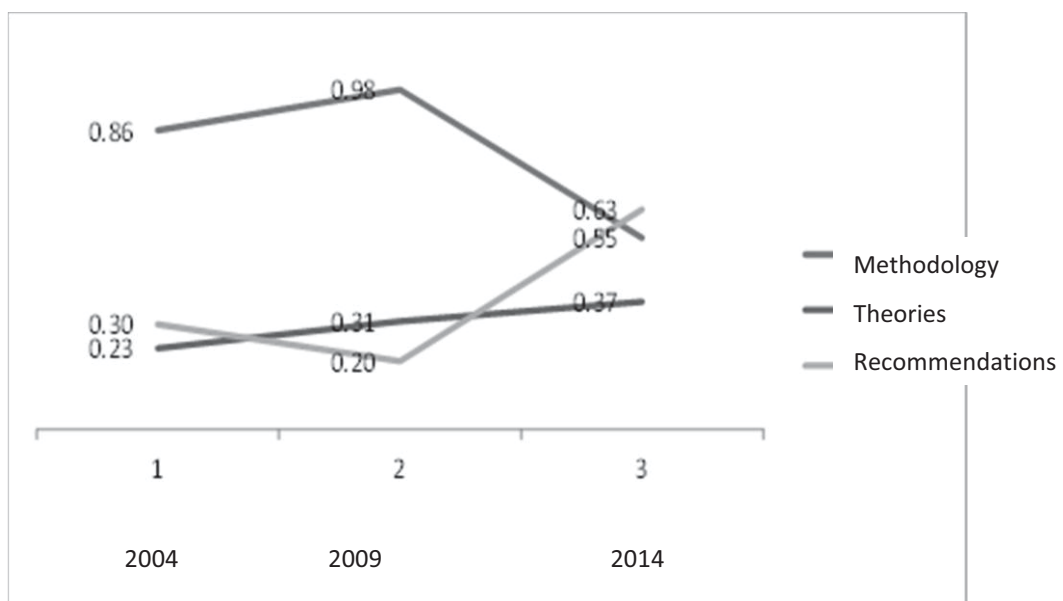
Figure 2: General design, trends over time

When we examine the general design category at three points in time, we do note changes. Figure 2 indicates that after a steady rise in discussion of methods from about 85 percent in 2004 to nearly all of articles in 2009, there is thena dramatic decrease, by about half, to 55 percent of articles in 2014. Conversely, while the proportion of articles that initially includes recommendations at 30 percent and then dips midway in our timeframe, there is an increase in that feature so that it has doubled over time. In respect to articles that use or reference theory, there is a steady trajectory from less than 25 percent in 2004 to nearly 40 percent ten years later. Nonetheless,this feature continues to remain relatively low, and is consistent with findings in the literature that note e-government studies are typically atheoretical.

In Figure 3, we next examine research approaches taken among sample articles. Articles are coded by a host of methodologies: content analysis (ex: documents, websites, and other material); case study (single or multiple cases); conceptual or review (ex: theory-building, creating frameworks, reviewing other studies); interview or focus group; survey or questionnaire; statistical analyses; or mixed methods.Since 2004, about one quarter of all articlesuse content analysis or employ a combination of methods. Among the least frequently utilized

methods is the interview and statistical analyses. Findings in the literature on this matter are somewhat varied. Most note that qualitative methods, particularly case studies and descriptive approaches, are more frequently employed. On the other hand, some observe that few articles use case studies or mixed methods; they claim most are statistical analyses and/or draw upon surveys. We might account for these differences in the literature by considering the variety of samples extracted for particular studies. This paper reports results that are consistent in some respects to most previous findings; that is, over time the primary methods are clearly qualitative or mixed in nature.
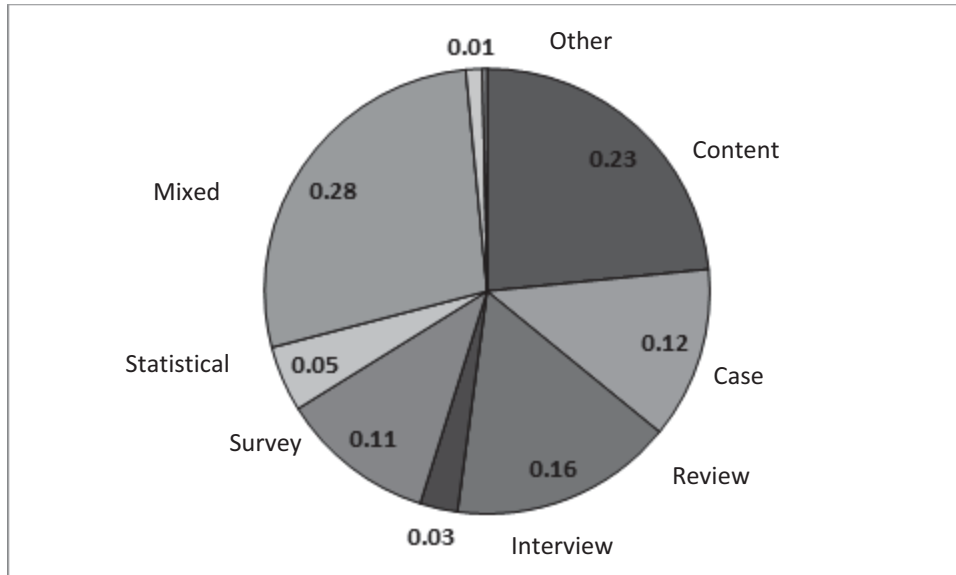
Figure 3: Methodological approaches, 2004-2014

Trends offer fundamental perspectives and may suggest directions that e-government may continue. As Figure 4 below demonstrates, there is a significant change over time in the use of some methodological approaches in e-government. For instance, the proportion of content analyses drops from about 25 percent to less than 1 percent in just the past five years, and in mixed methods from about 30 percent to less than 1 percent in the same period. There is also movement in publication trends in respect to a strong growth of concept-buildingor reviewing the field.We find that conceptual approaches more than double from about 10 percent to more than 25 percent during the last five years, as do statistic methods although the share of the latter continues to remain very small.Another notable change is in survey methods which show a spurt of growth from 5 percentin the first five years to about 15 percent and to where it remains today. Taking a bird's eye view of the trends research approaches reveals considerable peaks and drops in the variety of methods employed from 2004 and 2014.
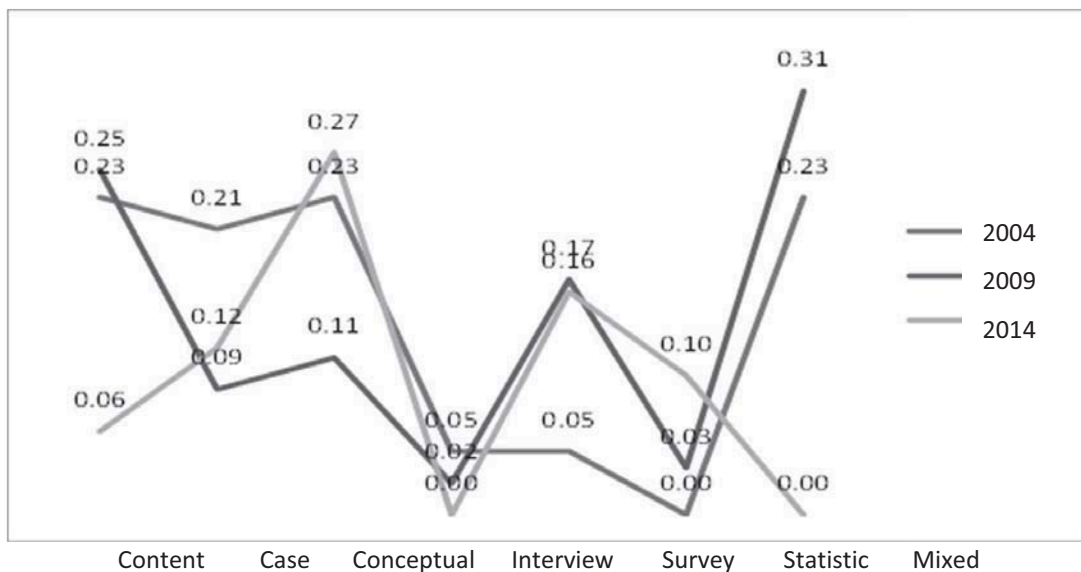
Figure 4: Methodological approaches over time

Below, Figure 5 demonstrates that slightly more than half of all articles address the broad topic of governance, with technology rarely an object of study. Articles that focus on e-government trends, history, or the field itself are placed in the research categories. Those that address interoperability, data processing, ICTs, systems, and such are considered belonging to the technology category. Previous studies do not categorize topics this broadly.Anecdotal accounts suggest that governance may dominate the body of literature and so an in-depth accounting of sub-topics within that category is subsequently conducted. The catch-all design presented here roughly portrays the focus of e-governmentat first, particularly since *GIQ* and *EJEG* are not exclusively IT-oriented.
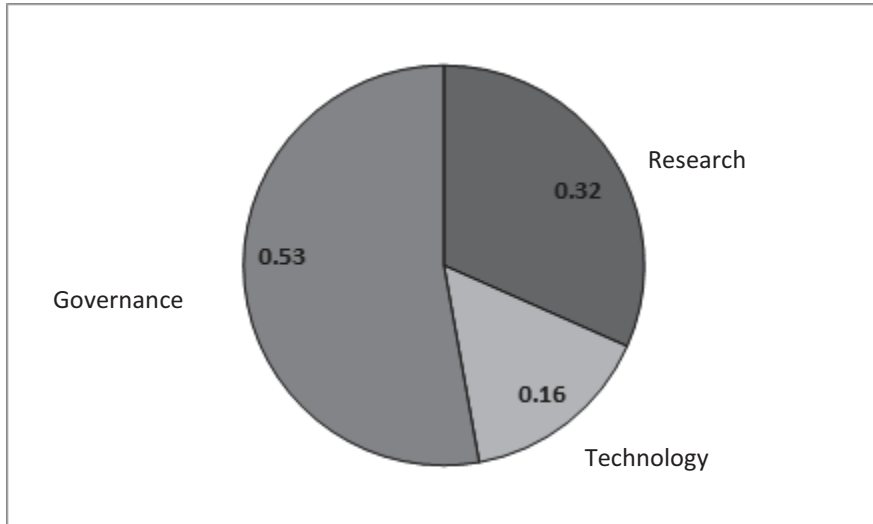
Figure 5: Primary topics, 2004-2014

Indeed, as Figure 6 illustrates, topics about governance consistently dominate the literature across time. Although there was a drop in that categorybymidway through our timeframe, from more than 55 percent to less than 40 percent, the topic rebounded in the past five years to exceed previous highs. Conversely, we find articles focusing on technological issues remain the least addressed topic and have even declined from just over 20 percent of the literature to now less than one percent.With its peak in 2009 at nearly 45 percent share of the literature, articles about e-governance trends and the like have since nearly dropped to formal levels.
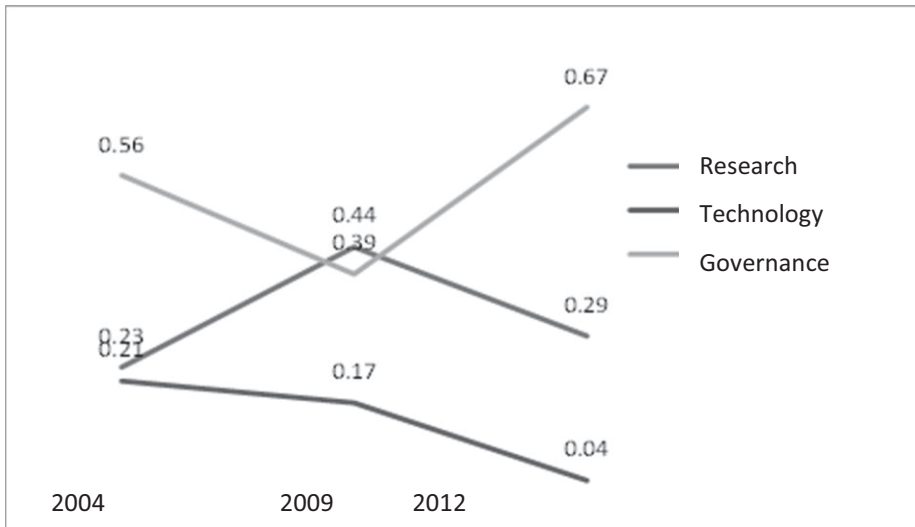
Figure 6: Primary topics over time

Because the proportion of articles addressing the broad category of governance remains persistently high over time, it is interesting to look more closely at six particular issues within that category. These subtopics, as it were, are the primary focus of the e-governance articles. Accessibility and usage deal with computer literacy, access to technology, mechanisms to overcome physical limitations of users, and the like.Other governance subtopics include those that focus on benchmarking or evaluation of governance, democracy issues such as citizen participation, government services, and public policy/law. The category of trust includes a varied list of

related notions such as security, privacy, transparency, and corruption.Figure 7 demonstrates that in the past decade, the governance topic least touched upon is benchmarking. Public policy/law is only slightly higher in frequency than the other subtopics, each of which hovers around 15 percent of research.
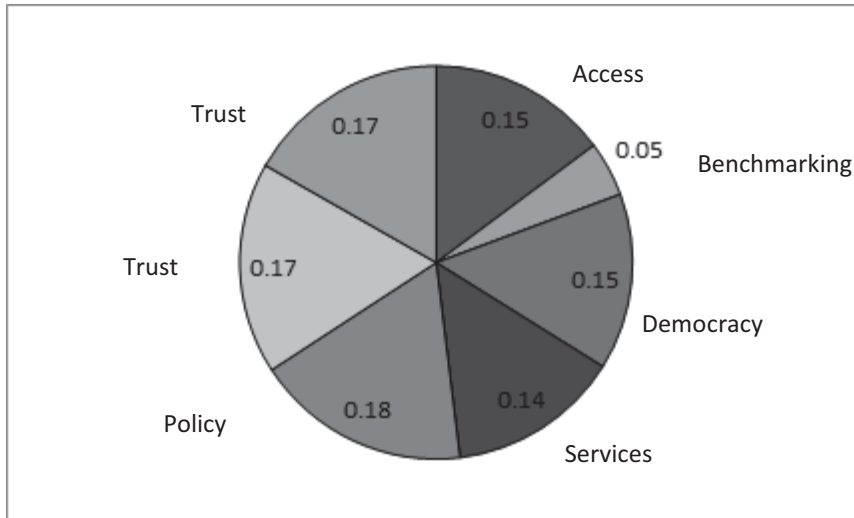
Figure 7: Governance subtopics, 2004-2014

Looking at trends over time in Figure 8, the share of governance subtopics in accessibility and benchmarkingremain at fairly consistent and low levels. There is a bit of growth in articles focusing on services and policy, although neither maintains a large share of the research. We find larger gaps in coverage among the remaining subtopics. Interest in public policy remains consistent for the first decade and then nearly quadruples by 2014, but again, overall share of research articles in this subtopic remains relatively low. The greatest change is in the category of trust. Research attention on matters relating to the quality of e-government such as security, privacy, transparency, and corruption plummeted from about 20 percent of publications in 2004 to less than 1 percent by 2009 and again by 2014. As noted above, a look at the literature does not reveal trends over time in all these subtopics. Some early studies indicate that focus on services and citizen participation is relatively higher than other issues; some recent work finds that e-participation is more frequently examined. The research presented here paints a different story.
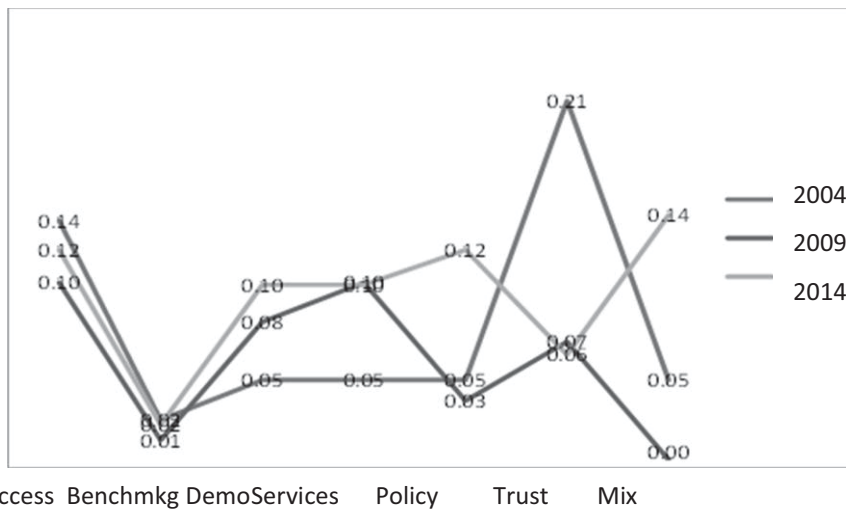
Figure 8: Governance subtopics over time

As noted earlier in this paper, trends focusing on e-government delivery models and levels of government can be briefly summarized. Articles were coded as to whether they primarily addressed G2C, G2G, G2E, G2B, or a mix of levels. More than half of all studies currently examine government-to-citizen models. Second most popular today are government-to-government models at just under 15 percent. The share of all other delivery models discussed is negligible. In respect to level of governance, we find a preponderance of articles focused on the federal level of government. Nearly 45 percent are of this nature, while just over a quarter deal with e-

government matters at the local level. The share of articles that examine international, regional, or multiple levels is negligible.

5. Conclusions

If we were to profile a typical journal article about e-government today based on findings in this paper, it would:

- Address G2C at the federal level;

- Clearly articulate research design;

- Eschew theory;

- Employ mixed methods, with content analysis a close second; and

- Focus on most any governance issue, except benchmarking.

The profile, of course, is constructed in a manner to highlight what is *not* typical—a mature body of literature. Too many features of such are still absent or deficient. What might we tend to for enhancing our understanding of the field? Findings in this paper should nudge us to provide more rigor and meaningfulness in our work. For instance, we should be sensitive to theoretical gaps in the literature, and todeficient links between conclusions and recommendations or implications.We should question the value and appropriateness of any single or mixed methods approach in order to adopt that whichadds reliability and generalizability to the matter at hand. A rich body of literature will not only include attention to previously neglected and significant topics, but that will anticipate long-term research needs. The value of this paper lies with presenting trends over time in e-government research based on content analysis of more published articles than previously examined. The frequency and change of issues and approaches adopted within the last decade will offer context for researchers to consider as they plan future studies.Lastly, this paper aims to encourage researchers to pursue more studies of studies in the field of e-government.

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How to Govern Smart Cities? Empirical Evidences From Italy

Renata Paola Dameri[1], Cecilia Rossignoli[2], and Sabrina Bonomi[2]
[1]Department of Economics and Business Studies, University of Genova, Italy
[2]Department of Business Administration, University of Verona, Italy
dameri@economia.unige.it
Cecilia.rossignoli@univr.it

Abstract: The aim of this paper is to understand which is the role of local political entities in designing the best government and governance mechanisms for implementing the Smart city and enhancing the best citizens' participation. The research method is based on both a deep literature analysis and a large empirical survey. Literature analysis examines more than 700 scientific papers looking for theoretical frameworks about the role of political local bodies in governing Smart cities. Empirical survey analyses more than 100 Italian cities, further selecting the ones implementing at least one smart initiative to individuate best practices in government and governance mechanisms. Findings show that there are no standards or best practices till now, even if some interesting governance models are emerging. These interesting cases are deepen analysing governance bodies settled to govern Smart cities in a participate way.

1. Introduction

Even if Smart City is an ever more spread research topic, it is still now an immature practice. Recently, several cities all around the world have been self-naming themselves as smart, starting to implement some smart initiatives regarding one or more aspects of the urban life (Hollands, 2008; Deakin et. al. 2011)). This trend has been producing a bottom-up smart wave, driven especially by private initiatives or by public initiatives focused on some topics, but often lacking of an integrated strategic urban plan about a comprehensive smart city program.

However, a Smart City vision requires a well conceived governance framework, able both to integrate all the political, social and economic aspects of a city, and to manage the required investments to produce the best returns in terms of public value and benefits. It is therefore crucial to govern the effective implementation of Smart City programs grounding the political and administrative activity on a well-conceived governance system (Dameri, 2012).

Even if the Smart City has been emerging like a bottom-up phenomenon, several local public bodies have been starting to organize themselves to formulate policies for developing Smart Cities in the best way (Lee and Hancock, 2012). The aim of this paper is to understand which is the role of local political entities in designing the best government and governance mechanisms for implementing the Smart city and enhancing the best citizens' participation. Through an empirical investigation, it aims also at tracing a map of the role of local government in Smart Cities and at individuating the best governance frameworks applied in large and medium cities in Italy.
The empirical investigation sample includes all the Italian cities that are Province seat, that is, 117 cities. Italy is recognised amongst the countries in Europe with both the highest number and the highest percentage of cities implementing at least one smart initiative (EU Parliament, 2014). It is therefore a good empirical case useful to extend findings also to other countries. The empirical investigation has been made to answer to the following research questions: How many Municipalities are formally political committed in Smart City governance? Who is engaged in formulating Smart City policies? Which governmental actors and social agents are involved in the Smart City governance? Is it possible to state a positive correlation between the intensity of political commitment and the rate of smartness of a city?

The research method is based on both a deep literature analysis (par. 2) and a large empirical survey (par. 3). Findings show that there are no standards or best practices till now, even if some interesting governance models are emerging, joining both public bodies and private firms, not-for-profit entities and actors representing the civil society. No positive correlation emerges between governance intensity and smartness of a city, however, cities applying a more integrated and multi-agent governance framework are committed on a larger set of smart topics and projects and it is possible to argue that they will be able to realize best synergies and returns in the future.

2. Smart City: A new trend in urban strategies

During the latest ten years, a new trend in city strategies has been taking root amongst both large and medium cities, named Smart City (Cocchia, 2014). It is rapidly spreading both to face urban problems and to enhance economic and social development in cities.

Indeed, cities are continuously increasing their dimension: two years ago, people living in cities exceeded people living in country and the trend is still continuing. ONU foresees that in 2050 environ 6 billions people will live in cities and to grant them quality of life will be very difficult (UN World Urbanization Prospects, Review 2011). Pollution, energy needs, quality of air and water, waste treatment, mobility are only some of the difficulties to be faced before they become insurmountable problems.

On the other side, cities are crucial places where economic, cultural and social development takes place. OECD shows how cities are driving innovation and entrepreneurship and the role of cities in driving national economies is more and more pivotal (OECD, 2013). Cities are places where we can find the best cultural offer (theatres, cinemas, editors, universities, museums, …) and the worst social tensions, the highest richness and the worst poverty.

Smart city aims at solving urban problems enhancing city development in the meantime (Caragliu et.al., 2011). Indeed, Smart city is a urban strategy using the highest technologies to improve the quality of life of citizens but preserving the environment. It means to act in several dimensions (Giffinger et. al., 2007): economic, environmental, social, cultural… having mainly three goals in mind: economic innovation and entrepreneurship, especially using technologies such as ICT; environmental preservation thanks to green energy production and reduction of natural resources consumption; social development, thanks to culture enhancing and quality of daily life for everybody (Dameri, 2013). Even if Smart city is a recent topic, it has roots in more consolidated trends: digital city, green city, and knowledge city (Dameri and Cocchia, 2013; Hall, 2000; Ishida, 2002; Ergazakis et. al., 2004; Komninons, 2008). Smart city merges all these aspects in a sole vision, but changing the main goals of its action: indeed, the final aim of a smarter city is to grant a better quality of life to all its citizens, using all the technologies and applying a very large set of policies, impacting on all the dimensions of the daily life in city (Schuler, 2002; OECD, 2010) . For this reason, a Smart city couldn't be considered like the simple sum of digital, green and knowledge cities, but a new urban policy strongly based on the previous ones ((Yovanov and Hazapis, 2009; Qi and Shaofu, 2001).

Examining both the academic literature and the empirical implementation regarding smart cities, it clearly emerges that at present a unique idea of a smart city has not affirmed. The research framework applied considers a very large database, collecting more than 700 scientific papers from Scopus. The filters applied for selecting the papers includes the following keywords: "smart city", "smart cities", "digital city", "digital cities", searched in the title of the article. Further, the collected papers have been examined to extract only works regarding government and governance of Smart cities. The survey takes into consideration both theoretical papers and case studies. No paper have been found with the words "smart city/ies" AND "government" in the title, whereas two papers have been found with the words "smart city/ies" AND "governance" in the title. 72 papers have the words "smart city/ies" AND "government" OR "governance" in the abstract, but anyway no papers really face the topic of how local political bodies are formally involved in smart city government. A summary of the research framework applied to the literature review appears in Figure 1.
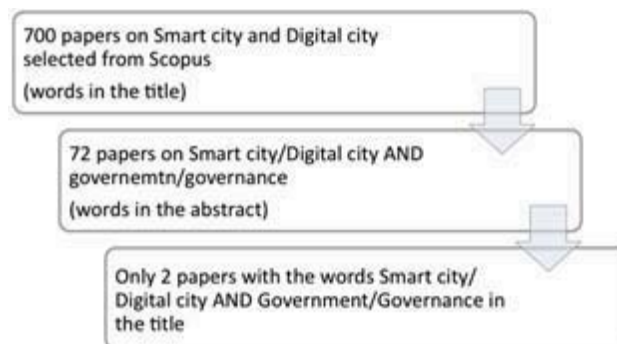
Figure 1: Literature survey: applied research method

The study of this topic in a such large database of knowledge outlines that smart city appears like a bottom-up process, driven by a plurality of actors – both public bodies and private citizens and enterprises. Till now it is nothing more than the sum of smart initiatives, regarding a heterogeneous set of topics: smart mobility, smart energy, smart building, smart public services, digital agenda, … The most distinguished studies about the smart city show this phenomenon like a portfolio of projects and not like a comprehensive strategic vision of a urban style.

For example, Giffinger et. al. (2007) one of the most cited scientific paper about the smart city, classify and rate European medium cities respect to their smartness counting their smart projects. Some years after, EU Parliament (2014) still classifies the maturity of a smart city depending on the number of smart projects implemented. It is evident that a smart city aiming at granting a high quality of life to its citizens in the long time should be something more that the simple collection of elementary projects (SETIS-EU, 2012; Falconer and Mitchell, 2012).

Indeed, considering a smart city like a sum of smart projects could be interesting in the pioneering phase, when cities are starting to define their own smart idea about themselves. However, when the smartness of a city becomes a mature idea, it requires a formal governance framework, able to sustain choices and strategic design of the smart city and to grant project management and social and financial returns in the long term (Fontana, 2014).

Smart cities all over the world need to overcome the pioneering phase to realize the best smart solutions for their specific needs, different from each other city; however, till now a well-conceived governance framework has not be defined, nor in the theoretical research, nor in the empirical implementation (Cavallari, 2010). In the further of this work, a very large set of smart cities will be examined, to discover government and governance practices applied in pioneer smart cities and to understand which best solution could be formalised, adapted and spread in smart cities to support their further development in the maturity phase.

3. The empirical survey

The importance to govern a smart city emerges from several sources: academic papers, professional reports and surveys, empirical observation of smart city programs. However, nor theoretical governance frameworks have been suggested till now, nor best practices are known in the international panorama.

Our work aims at scouting practices regarding smart city government and governance to understand if some best or common practices are emerging from the empirical implementation of smart city programs. To do that, it is necessary for the first to distinguish between government and governance, from the political concept of a city and its territorial meaning.

A city could be conceived like:

- a territorial area occupied by buildings, streets, infrastructures and facilities, inhabited by citizens living, studying, working in this area;
- the public, political body having in charge the governance of this area: it is a local government, generally the Municipality.

We can conceive the Municipality like the subjective aspect of a city, and the territory like the objective aspect of it. Therefore, the Municipality is the public body having the political power to decide and act about the public aspects of life in this urban area. However, not ever the administrative territory corresponds to the urban area and subjective and objective aspects could be not aligned.

In a similar way, we should distinguish between:

- government of a city;
- governance of a city.

A government is the system by which a state or community is governed (Oxford Dictionary). The word government is also used more narrowly to refer to the collective group of people that exercises executive authority in a state or region. The government of a city is the political role of deciding about the public life in city. It is entitled to a public body, a local govern with the formal role of governing the city.

Governance refers to "all processes of governing, whether undertaken by a government, market or network, whether over a family, tribe, formal or informal organization or territory and whether through laws, norms, power or language" (Fell, 2013).The governance of a city is therefore a larger set of activities than government, aiming at driving the public life towards shared goals, involving not only the local govern, but also other public and private subjects, for example: trade unions, trade associations, not-for-profit organizations, citizens' representatives, that is, the so-called civil society. These actors have no formal political powers, but influence and instruments to act at the urban level and to participate to the city governance (Hartley, 2005).

This concepts trace the boundaries of our research framework. The research regards cities conceived like political body, that is, the Municipalities. The research questions regard both the number of cities having formal authorities about smart programs, and the political or executive roles charged of this authority, that is, the government framework of a smart city. Moreover, it investigates also on the governance of a smart city, that is, it aims at discovering if and which formal organizations are settled for decision-making about the smart city different from a political entity; it means organizations involving different actors in the territory and also the local government (Komninos et. al., 2011). The research framework is summarised in Table 1.

Table 1: Research framework and scope

Research subjects	Cities conceived like political body, that is, Municipalities
Research perimeter	Large and medium city with the administrative role of Province seat
Research question: quantitative aspect	How many smart cities amongst the Province seat involve the Municipal political authorities
Research question: qualitative aspect	Which Municipal political authorities are involved in smart city governance Which and how many non-political bodies are settled to govern a smart city

The survey has been conducted in autumn 2014; it has been applied to all the Italian cities that are province seat, that is, 117 cities. No sampling plan has been defined, as all the 117 have been examined. We decided to examine all the city population, and not a subset of it, to prevent conclusions not supported by empirical evidences.

Italy is an interesting case to be examined, because – as evidenced in a recent EU Parliament report (2014) – it is amongst the EU countries with both the highest number and the highest percentage of smart cities. It is also the consequence of the Italian cultural tradition of ancient, independent cities. This diffusion of smart cities permits to collect a large number of empirical evidences and to produce a vision about smart city government and governance to be adapted also to other countries.

The research method has been conducted by content analysis of official web sites of the Municipalities. It permits to have affordable data and information and to trust on information contained in these web pages, as web sites of public bodies are ruled by a specific Act (Law 14.03.2003 n° 33). Content analysis has been applied searching the sequences: "smart AND city", "smart AND cities", "smart city", "smart cities", "smart + city", "smart + cities". Then, all the pages containing the searched keywords have been examined to extract all the information regarding smart projects and initiatives, and processes, roles and instruments charged to their government.

Moreover, when found, we examined also the web sites of private organizations who are involved in the Smart city governance, to verify the presence of governance bodies along with government authorities. Collected data and their interpretation are showed in the further paragraphs.

4. Smart city government

The examination of the official web sites of the 117 Italian Province seats reveals that 106 of them develop at least one smart initiative (90%). It confirms that smart strategies are spreading very fast and are considered like a promising way to improve the city (ANCI, 2013; CDP, 2013).

The survey investigates about the formal presence of government roles regarding the smart city inside the Municipality. It regards both political and administrative roles. The political roles include:

- the Mayor;

- the Deputy Mayor;

- one or more Aldermen.

The administrative roles include:

- managers;

- officials.

Only 22 cities out of 106 have at least one formal government role (both political and administrative). 18 of them attribute the smart city government to a political role, but only 1 to the Mayor and 2 to the Deputy mayor. The involvement of the Mayor (or Deputy Mayor) means that the city is strongly focused on the smart city program and that the political commitment is very high. Moreover, to charge the Mayor (or Deputy Mayor) of the smart city government means to have a comprehensive, integrated vision of the smart city, conceived like a cross-sectional strategy regarding the future of the city like a whole and not only some aspects of the urban living. The smart cities selection and sampling plan following our findings is showed in Figure 2.
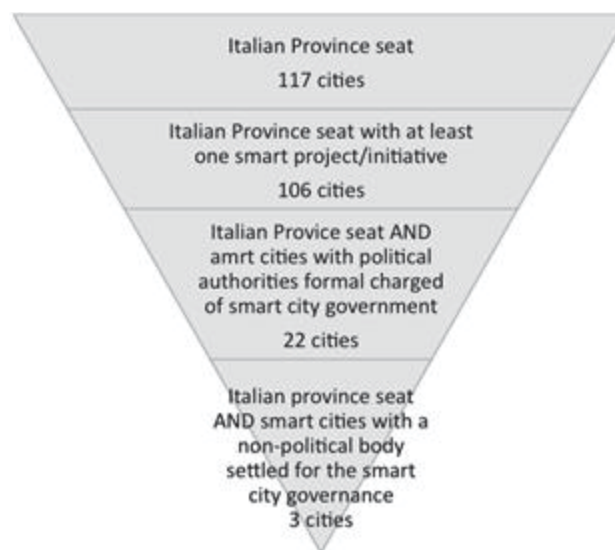
Figure 2: The progressive filter applied to examined cities

15 cities charge one Alderman of the smart city government. Alderman's mandate regards different topics; in our survey we mainly found these mandates:

- Environment;

- Innovation;

- Economic development;

- Culture.

It reflects that each city could have a different idea of how it want to become smart: sometimes it concentrates on the environment preservation, preferring the green component of a smart city; sometimes on the economic development and technological innovation driven by smart vendors and impacting on the economy of the entire metropolitan area; sometimes it focuses on the cultural aspects, preferring the knowledge city vision.

The results show that a smart city is a theoretical concept involving a plurality of aspects, and that each city needs to design its own specific smart city implementation path, considering both its own cultural and economic heritage and its future development vision. Smart city has a large set of standard components, but the concrete realization ever passes though a prioritization of choices about which components to implement for the first (Roitman et. al., 2012). This prioritization could not disregard the pivotal role of a political body.

Several cities have also one or more administrative positions supporting the political activity. Generally we find that when a city has more than one smart project it has also a complete set of political and administrative roles, that is: an Alderman having in charge urban policies about the smart strategy; one public manager having in charge the transfer of the policies in operational processes; and one or more officials, executing the management of one smart project or a subset of the smart project portfolio.

Results about government and governance structures in the 22 examined cities are summarised in Table 2.

Table 2: Government and Governance in 22 Italian Smart City (see also Figure 2)

Municipality	Political roles	Administrative roles	Governance structures
Alessandria	x		
Arezzo		x	
Bari			x
Barletta	x	x	
Bergamo	x		x
Brescia	x	x	x
Cosenza	x		
Firenze		x	
Genova	x	x	x
La Spezia		x	
L'Aquila	x	x	
Milano	x	x	
Modena	x	x	
Monza	x		
Napoli	x		
Palermo		x	
Piacenza	x	x	
Roma		x	
Torino	x	x	x
Treviso	x		x
Venezia		x	
Vicenza	x		

5. Smart city governance

A smart city is not only a technological project, but a larger urban strategy joining the technological innovation with the citizens' involvement in programs and initiative aiming at improving the quality of their lives. It requires not only the implementation of smart infrastructures and facilities, but also the commitment of people living, working or studying in the city and their availability to actively participate to the smart strategy adopting some innovative behaviour or device or sometimes changing their minds and habits (Treib et. al., 2007; van Winden, 2008).

A successful smart city couldn't be realized without the concurrent creation of a smart community of men and women directly acting for the smartness of their city. For this reason, theoretical studies about the smart city success factors point out a well-conceived smart city governance like a crucial instrument to realize the smart city goals (Schaffers et. al., 2011).

To well realize the smart city governance, a formal body is needed. For example, an association, a foundation or similar. It should involve a plurality of actors, and especially all the subjects forming the so-called quadruple helix, that is: public administration, enterprises, universities and research institutions, citizens' representatives. The quadruple helix has been suggested like the theoretical model able to support and explain the capability of a smart city strategy to produce better life conditions in the long term, generating in the meantime economic development and environment preservation.

Examining the 106 Italian smart cities of our sample, it emerges that only 6 of them have settled a formal body to realize a concrete smart city governance. Three of them are still not fully operative, the others are settled in Genova, Brescia and Torino.

▪ Genova is the first city in Italy having settled an association, called Genova Smart City Association; it involves all the main actors in the urban area interested in working together for improving the quality of life in city, especially aiming at reducing pollution and offering better public services.

▪ Also Brescia settled an Association in 2012 – Brescia Smart City Association, especially aiming at supporting the urban Digital Agenda, therefore it prefers the digital component of the smart city. It has less members than Genova Smart City Association and a more restricted set of smart projects to manage.

- Torino settled a Foundation, with the specific aims to collect, manage and distribute financial resources to support the smart city implementation. It address one of the more important challenges of smart city implementation, that is, to find money for the smart city and business models to create value investing this money in smart projects (CDP, 2013).

These cities, settling a smart city governance body, explicitly recognise the pivotal role of citizens and the civil society in realizing the smart city. They implicitly or explicitly assign a strong power to governance processes different from the formal, political instruments to govern a territory. Indeed, it is demonstrated that the socially and culturally legitimated values and rules play a central role in shaping the society behaviours and are generally more accepted than the institutional rules and laws (Luhmann, 1995; Tolbert and Zucker, 1999; Imperatori e De Marco, 2009).

The deep analysis of these three pilots shows that Genova is the best practice till now regarding the smart city governance and the creation of a large, heterogeneous association of different members working together to establish the basis for a further virtuous development of Genova smart city, able to produce quality of life and value returns in the long time. It sustains the political roles created in the Municipality, involving an Alderman, two Managers and several officials; Genova has at present the more complete government and governance framework amongst the Italian Smart City. Indeed, it has an Alderman charged of smart policies (with mandate for the Economic development); two Managers and several officers inside the Municipality explicitly charged of smart projects management; and the Genova Smart City Association playing the governance role (Nam and Pardo, 2011).

Genova Smart City Association has the following strengths:

- it has been settled from the beginning, that is, when the city of Genova for the first decided to develop a large urban strategy to become smarter; so that it has been involved in the whole life cycle of the smart city implementation;

- it involves a large number and types of civil institutions, that is: public bodes, research bodies and universities, large companies, SMEs, trade unions and associations, not-for-profit organizations; therefore, all the actors of the quadruple helix are represented;

- the Municipality has the leading role, therefore strictly connecting the smart policies with the operational aspect of the smart city;

- it is an open association, that is, everyone could become a member, simply accepting the association charter and joining its goals;

- it has a Scientific committee with the task to continuously support the best innovation and technological transfer from the research to the market and the public services.

Genova Smart City Association (GSCA) is therefore a best practice emerging from the Italian experience; at present it is early to understand if a formal governance body like GSCA is correlated with better results. It emerges though that Genova has one of the larger smart initiative portfolios in Italy; it is therefore possible to argue a bidirectional link between the portfolio and the government/governance activity:

- on one side, a larger portfolio of projects requires a formal, more structured governance framework to supervise all the initiatives;

- on the other side, a formal, more structured governance framework is the basis for the further development of the smart initiative portfolio, therefore the smart governance framework could trigger a virtuous life cycle of the smart city expanding more and more its scope.

6. Conclusions

The empirical survey about the government mechanisms and actors confirm the starting hypothesis, that is, smart cities are bottom-up phenomena emerging from the desire to implement at least one smart project, but without nor a comprehensive urban strategy nor a formal government to implement the smart city.

It could be explained also by the immaturity of smart projects: reading the Municipality web sites, it emerges that smart projects are mainly in their starting phase; most of them are only planned but are not operative. By the way, also the planning phase – especially this phase! – would require leading, strategic roles but it is not the case of emerging Italian smart cities.

These evidences are confirmed also by the limited direct involvement of the Mayors in the smart city policy: they generally delegate this task to one Alderman, focused on the preferred aspect of the smart city specifically choose by the city: environmental, economic, cultural, and so on.

The best practices emerging from the survey regard the settlement of a formal governance body, involving the civil society in the smart city strategy deployment and supporting the creation of a smart community of citizens. Evidences show that cities having settled such a body (an association or a foundation) have a larger smart initiative portfolio, a higher visibility amongst their citizens and a very large participation from private companies (large ones and SMESs) and not-for-profit organizations, succeeding in coupling both economic and public value creation.

Further studies will deep the relationship between the government and governance bodies implemented in smart cities – not only in Italy, but worldwide – and the successfulness of these urban strategies (Ricciardi et. al., 2013. At present smart cities are still too immature and governance experiences too embryonic to permit such a survey.

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Designing Engaging e-Government Services by Combining User-Centered Design and Gamification: A Use-Case

Tuhina Dargan[1] and Florian Evequoz[2]
[1]Department of Design, Indian Institute of Technology, Guwahati, India
[2]Institute of Business Informatics, University of Applied Sciences, Valais, Switzerland
florian.evequoz@hevs.ch

Abstract: In this case study, we combine the user centered design and the gamification design methodologies to design the eCH-BPM portal, a platform designed to enable public administration of Switzerland to publish and share their business process documentation in BPMN and discuss best practices in introducing Business Process Management (BPM) practices in the administration. The overall goal of the platform is to foster the development of a BPM mindset in the Swiss administration, in order to optimize and modernize the operations and deliver quality services. However, actively sharing process descriptions and template business processes, as well as actively participating in the community of practice for BPM in the public administration requires motivation and engagement on the part of public servants. A key factor in the success of the platform will be its ability to create, retain and expand a critical users' base. To address this issue, we designed the platform using user-centered design and gamification design, developing an original framework to combine both approaches that can be applied to the design of other e-government services. Both user centered design and gamification design, individually, are known to benefit various aspects and types of e-services and applications. Here, we present a unified methodology by combining both methodologies, for the design of e-government applications. We believe that User Centered Design and Gamification design can help improve e-government services, for example, by increasing participation and increasing interest in the service, and following the combined methodology will help us do so. The case study highlights the mistakes made, and the lessons learnt while designing the platform for researchers to further test and build on the proposed methodology. As an example we learnt that virtual rewards, which form the core of the gamification framework have to be meaningful in order to work effectively. Simply using a gamut of badges (virtual rewards) without keeping the user motivations and behavior in mind only leads to building an ineffective system.

Keywords: gamification, user centered design, BPM, process-sharing platform, Switzerland

1. Introduction

Effective e-governance is becoming increasingly important for governments across nations worldwide. The ever-growing use of Information and Communication Technologies (ICT's) in our daily lives has made it all the more feasible for them to make e-governance more effective. But, despite investing humungous amounts on web-based systems, governments often fail to meet user (citizens or government officials) requirements and needs (Baumgarten and Chui, 2009)In addition, the advent of social networking, micro-blogging, and user generated content has changed the way internet works. Users, even in government applications tend to achieve more than just the pragmatic functions that these applications provide, seeking both engagement and satisfaction. Thus two different aspects come into play here - one, the need for creating a usable application and second, an application which is both engaging and pleasurable to use.

Two different methodologies are known to help achieve this: User Centered Design (UCD), which is defined as "a philosophy based on the needs and interests of the user, with an emphasis on making products usable and understandable" (Norman, 2002). In a variety of studies with companies and other organizations, it was observed that user involvement at various steps of the design process had many benefits, like cost reduction, increased user satisfaction, increased user productivity, to cite a few (Kujala, 2003). In short, UCD aims at designing usable and understandable products. It does it by paying attention to human factors by research, and by involving the users at different stages in the design of solutions (user research, user testing, etc.)

The other methodology, known as Gamification is often understood as the "use of game-elements in non-game contexts" (Deterding et al., 2011). A relatively new area of research, Gamification, until now has had a positive influence in a number of non-game contexts, like education (Khan Academy, 2006), healthcare (Fitocracy.com, n.d.) employee engagement, e-commerce etc. by effective use of different game elements, like points and badges. Benefits include increased user participation and loyalty, sustained use of the application etc. However, it is also sometimes criticized, as gamification designers tend to give points for every aspect, focusing on extrinsic motivation, rather than paying attention to the actual user behavior and attitude. It therefore becomes necessary, here too, to make users an integral part of the process. In short, gamification is a persuasive strategy

disguised in game elements that helps people achieve particular tasks in their life (like personal growth) and organizations their business objectives (like engaging marketing experiences).

This article presents the combined methodology in the context of the Swiss Process Sharing platform. We start by presenting selected previous work done in these fields, and go on to describe the generic methodology in detail. We later present the use case, highlighting each step of the described methodology. This is followed by the conclusion section where we discuss the implications of use of such a methodology.

2. Related work

In this section, we separately present selected literature on e-governance and user centered design and e-governance and gamification, and reinforce the need to have a combined methodology.

2.1 User centered design and e-governance

In a research conducted in the Netherlands on an e-government service called PortNL, the authors highlight the tensions that arise between e-governance and user-centered design, like, contradiction in user and government vision, designing for the entire audience. But, despite these tensions, the authors reinforce the adoption of user-centric methods to design the e-government services (Kotamraju and van der Geest, 2012). This vision was also shared by an article published in the Government Information Quarterly, much before the above article, where the need to adopt a user-centered design methodology to meet user needs and requirements was emphasized, mainly identifying three factors while designing the services, namely functionality, usability and accessibility (Bertot and Jaegar, 2006). Another study by the Organization for Economic Co-operation and Development (OECD) provides an in-depth analysis of the current state of e-government and the challenges faced by countries belonging to the group. They highlight the paradigm shift seen in such countries, from adopting a government centric approach to a more user-centric approach, which focuses on social, organizational and institutional factors (Wang, 2009). All in all, even after the problems faced, trends show that the use of user centered approach in various contexts has been on a rise (Mao et al., 2005), and will continue to do so as more sophisticated methods come into existence.

2.2 Gamification and e-governance

One of the main challenges for government services that rely on user's participation is to retain their user base. Users, often, dissatisfied with the service provided, fail to sustain their interest in it. Gamification, here, can act as a key intervention to increase contribution and participation from the user's end. A number of examples, even in the domain of public services have taken inspiration from this newly popular area of research. In an example from Stockholm, the government encouraged safe driving by installing a speed camera where those who obeyed the speed limit, could benefit from a lottery pooled in by money collected from the violators. It was shown that in three days, the traffic speed decreased by 22 percent (Wood, 2013). Another initiative taken by the UK government (Work and Pensions Department) was called Idea Street. It was created as a marketplace where the employees would suggest changes in the workplace and others could trade stock for the ideas they liked. It was supported by game dynamics like points and leaderboards(Wood, 2013). Both ideas were a huge success, and they very vividly explain different human characteristics. While the first one suggests that fun and rewards could get people to change their behavior, the other one suggests that a platform where people are recognized for their ideas could increase user participation and eventual retention.

In a more traditional setting, a gamification model was applied to get a group of welfare recipients to change from one type of welfare payment to another. Based on the constraints identified, a unique process was designed and followed in order to achieve the task (Bista et al, 2014). However, it should be noted that these constraints and problems were identified from a designer's point of view, and no user study was involved. The use of gamification in a variety of public services like maintaining cleanliness, sharing information with others has also been explored, but at the same time it has been argued that not all services can be subjected to gamification (Asquer, 2013)

The most important lesson learnt from this state-of-the art is that a context needs to be established and the user's need identified before applying any gamification model. In view of this, we suggest that combining both methodologies would be very valuable while designing e-government services.

3. Combined methodology

As mentioned above, both methodologies have their respective merits and demerits. An important aspect to consider here is that the fact that these two different methodologies can benefit from each other. For example, one underlying concept behind gamification is the motivation that a user has behind performing a certain action. If the entire model is rewards driven, the internal motivation of the user can be seriously hampered, thus making the situation worse. In light of this, a theory called the Organismic Integration theory talks about creating a gamification model which is meaningful to the users and one which will help in achieving a sustained change in the user's behavior (Nicholson, 2012). The author also talks about two concepts called "Situational relevance" and "Situated Motivational affordance" where he argues that for meaningful gamification the involvement of users and a deep understanding of their background is a necessity.

Before proceeding to the presentation of our combined methodology, it is important to give an overview of a few terms. For example, it has been identified that human desires could fit in six categories, namely, rewards, status, achievement, self-expression, altruism and competition(Bunchball, 2011). These desires are very ubiquitous and can be used very effectively in driving a particular user behavior. Gamification also talks about 4 different types of players - namely killers (they typically like to rule others), achievers (they like the idea of achieving a particular target), socializer (they like to engage with others) and explorers (they typically love to find out new things) (Bartle, 1996).

The proposed methodology can be seen in Figure 1.
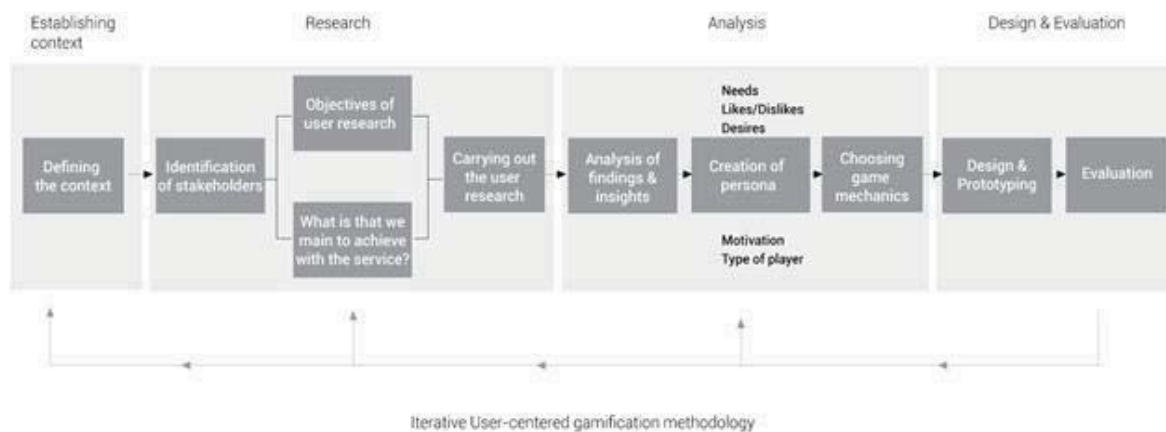
Figure 1: Iterative user-centered gamification methodology

The entire process is divided into four phases - a) establishing context, b) research phase, c) Analysis phase d) Design and Evaluation phase. A number of different research methods have been identified for each phase of any user centered design process (Rohrer, 2014) While, in our methodology, we keep most things open-ended (like choosing the type of user research), we particularly include the making of persona which represent a set of users who possess similar behavioral characteristics. These persona, as described later would be the basis of the choice of game mechanics and the design of the platform. The four phases are described below:

Defining the Context: In this phase, the main step is defining the problem statement.

Research Phase: This typically consists of stakeholder identification, defining the objective of user research and finding out what is that we aim to achieve with the platform. The second part that talks about finding out the exact output of the platform, is really like defining the business and organizational objectives. It can be, for example, to achieve active contribution from members of a community, or in a more general context, to lose weight. These combined together help us identify the needs and motivations of our users while carrying out the user research. User research could be carried out in a variety of methods and can vary depending upon the context (Rohrer, 2014)

Analysis Phase: In this phase, the findings from the research phase are analyzed and clustered to make the different persona. These should include the needs, likes/dislikes, desires, motivation and the type of player the persona is. This would form the basis of the game mechanics that we later choose.

Design and Evaluation Phase: In this phase, with all the necessary material in hand (i.e the needs of the users and also the game mechanics chosen), features of the application are decided, followed by making the information architecture which includes the entire navigation, the wireframes which form the skeleton of the application followed by the visual design.

In the next section, we present how we used this combined methodology for designing a particular e-government service in Switzerland.

4. Swiss process exchange platform: Presenting the use-case

4.1 Background of the project

The government of Switzerland figured that in order to implement cross-level organization through electronic procedures, they needed to understand each other's way of handling administrative procedures. Switzerland being a federal state, with responsibilities at diverse levels of the administration, has nocentralized overview of administrative procedures. Therefore process documentation in a common language is required. The eCH association (ech.ch, 2012), which has a mission of providing standards for e-government in general and process documentation in particular, has already set aside a range of standards with BPMN 2.0 as the language for process description. Also, harmonization of processes is seen as a way to reduce the complexity and administration cost as majority of the administrative entities in Switzerland follow common missions and provide similar services. Thus, in order to support the implementation of Business Process Management (BPM) and harmonization of processes, the federal government and conference of cantonal governments, and the eCH association, support the creation of the Swiss-wide process sharing platform. It will allow different public administrations to share their processes, be informed about the latest work in the BPM in alignment with the public sector and connect the various actors in the field. It aims to sustain on the standards set by the eCH association and by community contribution and collaboration.

In summary, the eCH-BPM platform is seen as way to foster the development of a BPM mindset in the Swiss administration with the larger goal being the optimization and modernization of operations and the delivery of quality services. However, actively sharing process descriptions and template business processes, participation and contribution in the community, requires motivation and engagement in the part of public servants. A key factor in the success of the platform will be its ability to create, retain and expand a critical users' base.

The project started in 2011. An initial beta-version of the platform was released by the end of 2013, mainly providing some example processes in the process repository and general information about the project. The first official release will be published online in early 2015. The work we present below was done in 2014 and is planned to be integrated in future releases of the platform.

4.2 Applying the methodology

4.2.1 Establishing the context

With the aim of creating a process-sharing platform, we familiarized ourselves with the context, and defined our problem statement. A minimal literature study was also done to find out other similar platforms. We found that a similar initiative (Prozessbibliothek.de, n.d.) had taken place in Germany, which had seemingly failed to elicit adequate user response. We analyzed the platform for the features it currently provided and then proceeded to the research phase. Here we present the problem statement:

*Problem Statement:*To design a platform which would help various public administrations of Switzerland to document and share their business processes with each other and build a community around them, which collaborates and fosters the development of a BPM mindset in the Swiss administration.

4.2.2 Research phase

We then identified the various stakeholders that would directly or indirectly affect the design of the platform. The stakeholders identified were a) people of the public administrations who would use the platform, b) private partners who could be potential sponsors, c) academic institutions interested in the use of BPM by the public administration for research purposes.

The next step was to identify the objectives of user research and to define exactly what we aimed to achieve from the platform:

Objectives of User research: a) To understand documentation and sharing of business processes at the various levels of government, b) To gain insights into the current methods of electronic documentation of business processes, in particular the aims, likes, dislikes, and frustrations of the user, c) To find out about the current ways of communication between the various levels of government in context of BPM and the reason for communication, d) To understand about the methods employed by people in the public administrations to update their knowledge in BPM.

What is it that we aim to achieve from the platform: a) To get people to join the platform, b) To get people to upload their business processes and fill in relevant meta-data c) Increase the use of business processes that have been already uploaded on the platform, d) Increase customer participation on the platform's discussions boards, e) Ubiquitous use of eCH standards.

It is important to note here that the above two steps go hand in hand. We then went on to recruit users for our qualitative user research. The entire user research was conducted in two phases, first with seven users (Hunacek, 2013, Fauquex, 2013) and later on with three more users. This was done in collaboration with two master students, who followed a part of the methodology as part of their thesis. Semi-structured qualitative interviews were conducted face-to-face in which the questions were kept open-ended, with an aim to understand the mental model of the user and these interviews went on for typically an hour. The questionnaire was prepared based on both objectives of user research and what we aim to achieve with the platform. These interviews were recorded and later transcribed for analysis.

The research phase revealed a number of interesting insights that helped us create personas and take adequate decisions to support the design of the platform. A few insights are discussed below:

1) There is no common language for documentation of business processes in the public administrations. Even within one public administration, multiple languages are used according to the convenience of the managers. This often leads to frustration on part of the people in charge of modeling processes (e.g. business analysts, process owners) who need to use multiple languages. This insight reinforced the need for a common language among public administrations. User Statement: *"It's difficult because for every process there's a different manager, and each manager has a different way of working. They work with different tools, and there are no universal guidelines followed here"*

2) It was observed that users are often curious about knowing the reason behind modeling a process and if it was successful in its implementation. Thus, these two features were included in the meta-data of a given process.User Statement: *"I'd like to know more about what happened after a process is executed- how satisfied were people with the process, how cost-efficient was the process, was it a success or was it disastrous"*

3) It was observed that process owners often like to consult each other while making processes, but there is no platform that provides way for such collaboration. They often rely on personal contacts in case they need to discuss their work. Thus, the eCH-BPM platform was seen as a way to facilitate collaboration of such a level with forum like features incorporated in it where users are free to ask questions, give answers and discuss about the work.

User Statement: *"I contact other public administrations, like Geneva (I've my friends and colleagues there) for benchmarking. It's always good to see how other public administrations work"*

4.2.3 Analysis phase

Once the interviews were analyzed, we identified a set of behavioral variables (for example, the current position, technology orientation etc.), to which we mapped the characteristics of our users to create personas. We present our personas here, and later while choosing the game mechanics provide supporting statements from the qualitative user interviews. A persona we came up with can be seen in Figure 2.
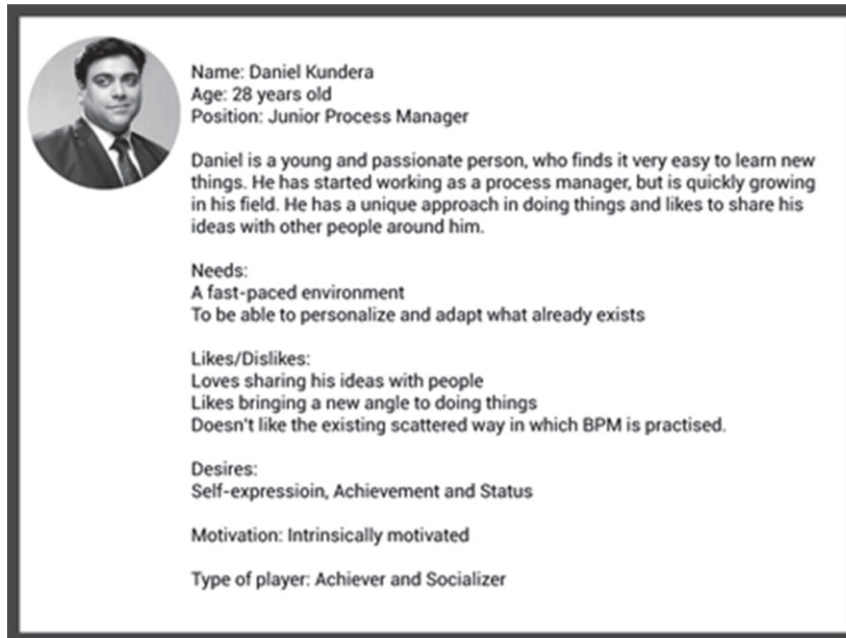
Figure 2: Example persona

Choosing game mechanics:A number of game mechanics were thought of and incorporated in the system, an overview of which can be seen below. User statements that we gathered from the user interviews also support some of the decisions.

Badge system: (Both temporary badges and permanent badges)

- Member badge (Permanent badge) - It would encourage people to join the platform and in addition would serve as an introduction to the entire gamification system.

- eCH certification badge (Permanent badge) - This badge was introduced in order to increase trust among users. This badge would ensure that a given process is up to the eCH standards. *User statement: "I'm not sure if the processes I see online are right, or in fact up to standards"*

- Maximum number of eCH certified processes (within a public administration and across public administrations)(Temporary badge) - This badge was aimed to satisfy the desire of recognition of people and encourage healthy competition between people and between public administrations.

- Most upvoted question (Temporary badge) - This was to ensure contribution in the forum or community

- Most upvoted answer (Temporary badge) - This was to ensure contribution in the forum or community *User Statement:"I would like my experience to be used by others, I want to help create an awareness of BPM in different public administrations"*

- Most liked processes (Temporary badge) - This was again to bring recognition for the work of the public servants.

- Maximum number of services covered from the eCH-BPM standard. (Temporary badge) Progress bar: All of the processes require users to fill in meta-data which could prove as a tedious task for some people. In order to motivate people to complete the form, a progress bar was introduced. In addition to this, long tasks if broken down into small pieces, become more achievable, we divided the form into smaller parts to make it easier for the user to fill it.

Chat feature: An important thing that came up in the user research was the fact that most people in the public administrations were new to BPM and its implementation. It was noted that users would want to talk to people

who've been or currently are in a position similar to theirs. Thus, apart from an active community, we also provided a private chat feature. This is also a typical trait for the 'socializer' personality type.

4.2.4 Design and evaluation phase

The persona was created and relevant game mechanics were used in this phase for the design of the website. The information architecture of the website was made, followed by wireframes and the visual design. A prototype of the platform's design is shown below in Figure 3, displaying a few features incorporated based on our findings from the research phase.

Figure 3: Screen shot of the web page

The website is under development currently, and we plan to proceed with its evaluation with our potential users, once the development is done. The platform is being developed on top of the Drupal Content Management System (Drupal.org, 2001) and uses an API to a Signavio Process Repository (Signavio.com, 2009) to manage the process library part. A detailed discussion on the technical implementation of the website is beyond the scope of this article.Although, we are yet to evaluate, we believe our experience with the project, which we discuss in the next section, could prove valuable to the research community.

4.2.5 Problems faced and lessons learnt

The sheer nature of the project taught us a lot about how public administrations work and we describe our experiences from the project.

First of all, because of the various disparate stakeholders involved, we realized that it was difficult to address the needs of all of them simultaneously. This was mainly because of the gap in vision between the various stakeholders involved. For example, the private companies involved in the making of the platform aimed for faster results and this sometimes proved to be a hindrance in following the methodology.

Secondly, one known problem in e-governance is the fact that while designing services and applications, the entire population needs to be addressed. Thus, this methodology has for now, been proposed for G2G services because addressing the entire population is a difficult task. For a country like Switzerland, the diversity in population is still less, and an approach like this can easily be taken advantage of. But for other countries, it can serve as a starting point for a more citizen-centered approach. The involvement of government officials in such a technique can help them realize the importance of a user-centric approach, helping in achieving the larger goal of understanding the perspective of disparate users and thus following a more citizen centered approach to e-governance.

Thirdly, during the user research, it was observed that some public administrations would have the tendency to give the responsibility of uploading business processes to one or two representatives. Although, this would solve the purpose of having a business process repository, it would have hampered the larger goal of having an active community. Hence, apart from creating a competition-based environment between public administrations, we also found it necessary to create one within a public administration. Also, while choosing game mechanics, we

identified the need to have a continuous activity loop. This leads us to introduce the system of temporary badgesthat would be awarded to different members every week. But, this posed another interesting problem - which was the need to have someone who would take care of the badge system from the backend. The entire process in turn, helped us realize the importance of choosing meaningful and relevant game mechanics, those which not only make the experience interesting, but which also cater to needs of the users.

Finally, another interesting observation that came up in the user research was the perception that public services are supposed to be "serious". This could pose to be a rather difficult thing to address, but we believe that an evaluation with real users can help us fill the gap. Also, we acknowledge that this process needs to be an iterative one, in which we continuously evolve the platform to make it more usable and engaging.

5. Conclusions and future work

In this paper, we have presented an original framework combining two well-known methodologies, namely, user centered Design Methodology and Gamification Design methodology, in order to design both a usable and engaging e-government service. This service was designed to serve as a platform for sharing business processes between public administrations of Switzerland, and establish a community around it and in turn foster the development of a BPM mindset in them. To the best of our knowledge, this is the first time gamification and user centered design have been combined in a government service, for a purpose like ours. The original aim was to design a usable and engaging application, and in turn set an example in the Swiss community to start the use of methodologies like these for the design of such applications. However, due to our inability to conduct evaluation at the current stage of the project, we cannot comment on the success of this methodology. But, at the same time, following this methodology gave us clear-cut objectives to stick to, giving us a direction the entire time. Identifying the objectives of user research, and defining what we aimed to achieve from the platform, really helped us identify the motivations that our users will have, in order to use a platform like ours. This was eventually translated in the design by choosing relevant game mechanics. In the future, we aim to study the effectiveness of the proposed methodology with a formal evaluation technique and real users. Once established, this could serve as a starting point for creating not only usable e-government services, but also services that are fun and pleasurable to use.

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Efficiency and Usability of Information Systems: E-Recovery System in Slovenia

Mitja Dečman and Maja Klun
University of Ljubljana, Faculty of Administration, Ljubljana Slovenia
mitja.decman@fu.uni-lj.si
maja.klun@fu.uni-lj.si

Abstract: In today's world, the work of public administration and its processes is based on the information technology. Complex information systems enable better working processes within and between governmental institutions as well as with private sector organisations and citizens. Especially complex systems are used within the compound activities, horizontally linking many governmental institutions that are targeting an increase in efficiency and flexibility. Within the public administration, tax administration systems are among the most complex. They connect governmental institutions (G2G) and their employees, demanding accurate data and transparent processes for their customers. In the case of Slovenia, one of the systems covers the process of tax recovery. It was set up at the Customs Administration of the Republic of Slovenia with the aim of more efficient processes of tax enforcement for non-tax claims of other state authorities. This system, called e-recovery, is used by more than 600 institutions and more than 170 executors, so it has to be easy to use, accepted among users and useful for them. Immediately after the implementation of the system in 2009, the backlogs were reduced practically to zero in one year, and the number of successful non-tax claims increased by 300%. Besides the improved efficiency of the system, there was strong interest in the satisfaction of e-recovery system users. The aim of the research was to test the issues of system performance, ease of use, user support and user satisfaction with specific functionalities. Through empirical quantitative research, we tested the opinion of more than 170 executors, users of the e-recovery system. The findings show that the system was well accepted among users and found to be very useful. Users evaluated the majority of indexes above average but stressed the lack of introduction courses. They do acknowledge that their work is faster because of the application, but their motivation for work is not affected. The most stressed imperfections were the occasional system failures, upgrade delays and connection interruptions, since users access the system through the internet.

Keywords: information systems, e-recovery, user satisfaction, efficiency, usefulness, software functionality, tax recovery, e-recovery

1. Introduction

Information and communication technology (ICT) is more and more involved in the functioning of public administration today. So called 'new styles' of policy and regulation enforce cost effectiveness, co-operation, the bottom-up approach, flexibility, dynamism, responsive regulation, etc. And all these can be achieved more effectively if the public administration uses ICT. Complex information systems enable better working processes within and between governmental institutions as well as with private sector organisations and citizens. Especially complex systems are used within compound activities, horizontally linking many governmental institutions that are aimed at increasing efficiency and flexibility. Therefore, ICT can radically improve the efficiency and effectiveness of public services.

Users represent one of the important factors of success of implementations of information systems. Not only in that the systems must be built up according to their needs and the demands of the processes they perform, but these systems must be easy to use, include al the needed functionalities and be backed up by helpdesk support and training.

The main purpose of the paper is to test whether the use of ICT improves tax recovery procedures in Slovenia. ICT solutions were developed for all three organisations (tax administration, custom administration and courts) that are included in the recovery procedure. We tried to evaluate whether the ICT solutions improved the procedure and whether they improved the efficiency and effectiveness. At the same time, we tested the opinion of more than 170 executors, users of the e-recovery system. The paper is structured as follows. After the introduction, the organisation of the recovery system in Slovenia is presented. Next, the importance of ICT in public administration is discussed. The next section presents an evaluation of e-recovery in Slovenia through the statistics of the organisations and through the empirical research of users and the analysis of the data gathered by the survey.

2. The importance of ICT in public administration

Over the last decade, public administration around the world has been following the goal of increasing its efficiency and flexibility by using ICT. This has been inspired by the success of ICT in other environments, especially the private sector. Different authors proved that ICT enables improved quality and performance of services (easier, faster, better) (Gupta et al., 2008), improved quality and increased operational efficiency, reduced costs and increased productivity (Gil-García and Pardo, 2005). But throughout the different efforts, the focus has to be multidimensional and interdependent (Wang and Liao, 2008).

While the term "information technology in government" goes back at least to the 1970s, the term e-government emerged in the late 1990s with the Internet boom (Grönlund and Horan, 2004). It does not rely only on the Internet but also includes other technologies and aspects. While e-government is described as a method for governments to use innovative ICT services, especially web-based ones (Fang, 2002), it is also focused on the areas of e-commerce, customer relationship management, knowledge management and others, stressing the distinction with e-governance (Cullen, 2010). E-governance is considered to be a broader concept than e-government, but these concepts often overlap. Some authors simplify the dilemma by narrowing the e-government focus to constituencies and stakeholders outside the organisation, whether in the government or the wider public sector, and setting the focus of e-governance on administration and management within an organisation, whether it is public or private, large or small (Palvia and Sharma, 2007). Our opinion rather leans towards the concept of Garson (2006, p. 19), whose concept of e-government is directed towards the provision of governmental services by electronic means and refers to e-governance as a vision of changing the nature of the state and stressing the importance of networks. On the other hand, Prabhu (2012) describes e-governance as a form of business comprising processes and structures involved in the deliverance of electronic services, including cooperation with various business partners.

But throughout the e-government domain a classification of areas of interactions with citizens (G2C), businesses (G2B), internal employees (G2E) and other institutional government organisations (G2G) emerged and stayed. While G2B, G2C and G2G are more common in the area of e-government, so-called G2E (government to employee) often correlates with G2G. While some authors see the purpose of it in offering the possibility of accessing information with regard to compensation and benefit policies, training and learning opportunities and civil rights to employees (Fang, 2002), others focus on automation and an increase in the efficiency of the internal performance of public agencies (Golubeva and Merkuryeva, 2006). In such a case, integrated information systems are also needed in order to gather, transfer, process and store internal data, which is the foundation for the further elaboration of electronic government services offered to external users, namely citizens, the private sector and other governmental organisations (Baležentis and Paražinskaitė, 2012).

Therefore, good G2G use of ICT is the foundation of other e-government activities like e-portals, e-services, etc.

We agree with Au and Cheng (2012) that ensuring that end-users (i.e., employees) are able and willing to use advanced information systems (IS) is critical for organization to gain operational efficiency and customer satisfaction. Many researchers have recognized user satisfaction as a critical determinant of the success of IS. In their work DeLone and McLean (2003) proposed that higher levels of individual satisfaction with using IS will lead to higher levels of intention to use, which will subsequently affect the use of the system. Hsieh et al. (2012) proved that employees' overall user satisfaction with their mandated use of IS (in their case CRM) has a positive impact on employee service quality. So IS performance, organisational environment and people who use the IS are crucial. Ivari (2005) also showed that IS performance has a positive relationship with satisfaction of IS user.

Considering users knowledge issues Mahmood et al. (2000) noticed end-users may lack knowledge of software and hardware; thus, adequate support is a must in order to realize productivity gains. Even if some knowledge is gained before the IS usage, it is important that more is available later on through the help desk or support service. Chawner (2012) found that the extent to which the developers were perceived as responding quickly and appropriately, as well as how easy they were to understand has a direct influence on end-user satisfaction with IS. On the other hand Poelmans, Reijers and Recker (2013), defining IS service quality as the quality of the support that end users receive from the IS department, found no significant influence on user satisfaction or perceived usefulness.

3. The organisation of recovery processes and recovery systems in Slovenia

When debtors do not settle their liabilities to creditors, an execution is carried out as a compulsory settlement of liabilities. In Slovenia, this execution is either an administrative, a tax or a court execution depending on which authority conducts it and which procedure is applied. Tax execution is regulated by the Tax Procedure Act (Official Gazette of the RS, no. 13/2011) and conducted by the tax or customs authority. In August 2014, both authorities merged into the Financial Administration of the Republic of Slovenia. Under the law, administrative execution comprises the collection of taxes and non-tax receivables under the competencies specified by the law. Since an administrative execution is primarily used for collecting taxes and other public duties under the rules specified in the Tax Procedure Act, this type of execution is also referred to as a tax execution. Court executions fall within the competence of courts, which conduct the executions to collect non-tax (civil) receivables owed to various creditors. In order to collect the receivables falling under the competence of the customs service, only an execution over the debtor's real property, equity stake or property rights is conducted through the court (Vasle et al., 2011).

As mentioned above, tax execution was performed by the tax authorities, specifically by two authorities, until 2014: the Tax Administration of the Republic of Slovenia (hereinafter: the TARS) and the Customs Administration of the Republic of Slovenia (hereinafter: the CARS). Most executions to collect tax revenues fell under the competence of the TARS, while the CARS conducted tax executions to collect tax revenues within its competence (customs duties, excise duties, VAT on import, environmental duties and some road tolls). As Slovenia entered the EU, certain competencies for tax execution were gradually transferred from the TARS to the CARS, and thus the CARS became competent for more types of tax charges. In that way, the CARS began collecting agricultural duties and the duties that are collected on behalf of competent authorities of other EU member states in the scope of international administrative assistance. The CARS chiefly assumed from the TARS the execution of non-tax receivables. This was done gradually, and in mid-2009 the customs service became competent for collecting receivables arising from minor offence procedures conducted by the customs service (fines, the costs of offence proceedings, temporary seizure of securities and movable property, seizure of proceeds). The CARS also started collecting receivables for various courts. In early 2010, it began collecting amounts due through administrative executions and administrative taxes. In 2012, the customs service took over the collection of fines and other non-tax receivables imposed by other non-tax authorities in minor offence proceedings. These involve more than 600 proposers, e.g. the Police, administrative units, inspections, social work centres, the Chamber of Craft, the Health Insurance Institute of Slovenia, ministries, etc. It is the centralisation of the execution of public non-tax receivables that has led to ICT support becoming indispensable. Since 2012, the CARS has been conducting all execution proceedings through the electronic application e-Executions (eIzvršbe).

After the CARS had taken over non-tax executions, the TARS only collected tax revenues. The TARS also wanted to simplify and harmonise the procedures for collecting tax revenues, but it was among the last to introduce the use of ICT in procedures. In 2011, it redesigned the information system, which resulted in a number of advantages in tax execution as well, as a uniform record was established enabling the comprehensive treatment of the debtor at a single location, covering all receivables and liabilities arising in the territory of the Republic of Slovenia, and thus led to a smaller number of tax execution proceedings and lower costs for the debtor and the Tax Administration of the Republic of Slovenia. System upgrades were also made, meaning that new tax execution processes were set up and existing ones optimised and transferred to the new production environment. A solution was prepared for the electronic exchange of writs of execution with banks.

The underlying act regulating the execution proceedings for the settlement of the debtor's debt to the creditor is the Enforcement and Securing of Civil Claims Act (Official Gazette of the RS, no. 3/07). The Act was adopted in 1998, but it has evolved over the years. The electronic procedure was introduced based on the amendment to the Act at the end of 2006, while the supplement from 2010 stipulated that electronic applications had to be submitted once the e-Executions system was established. Execution proceedings in court have been a problem in Slovenia for a long time, since they stretched out over several months and the backlogs were extensive. As a result, creditors were very poorly collateralised, because debtors managed to transfer their assets to other persons during the proceedings and companies went bankrupt. Until 2008, it was only possible to file for execution on paper, using prescribed forms submitted to the competent court in the place of the residence/registered office of the debtor. Once the Central Department for Authentic Documents (COVL) was founded, there was a shift in two directions. The Department began accepting applications for execution for all of Slovenia, meaning that applications no longer needed to be filed with various courts. Moreover, the electronic

procedure for submitting an application for execution was put in place in 2008. The entire procedure was electronic until the issued writ of execution became final. The COVL portal was operating from 2008 until the end of February 2012, when it was transferred to the e-judiciary portal (e-sodstvo) using the e-Execution subportal for execution proceedings.

4. E-recovery in Slovenia: The case of efficient information system

Slovenia widely opened the doors to e-government in the year 2000 by adopting e-commerce law and quite successfully followed the path of strategies and action plans through the following years. One of the most important areas was definitely the area of e-taxation.

As mentioned earlier, an electronic system was introduced for both tax execution and court execution proceedings. In all these authorities, the transition to ICT is evident in the efficiency of the executions, as the number of cases assigned to them increased and the number of complaints by debtors decreased, because records are more transparent. In addition, the issue of writs of execution has been expedited, and the number of cases solved is higher thanks to the faster proceedings.

The effects noted in the TARS are more difficult to evaluate, because the transition to the new information system has been taking place in recent years and in several phases, the last one as recent as 2013. The effects of this redesign will not be evident until a report is made on the activities of the TARS in 2014. This report is not yet available, but the increase in cases has already been observed in 2013. During the transition to the new information environment, the TARS even slowed the pace of issuing writs of execution, as it had to transfer data and re-arrange bookkeeping records as well as establish connections between the tax executions issued in the old system and the receivables posted in the new system. Owing to the high risks related to starting the mass implementation of tax executions, the TARS started issuing writs of tax execution in a limited scope first and then, under the necessary supervision, gradually increased the number of writs of tax execution issued. Moreover, by re-engineering the information system in 2011, it transferred part of its competencies to the CARS. Data on the volume and reduced pace of transition is presented in the following table.

Table 1: The number and volume of tax executions by the TARS

Year	The number of telephone calls, reminders sent and writs of execution issued	Claimed debt (in EUR million)
2009	568,985	1798.8
2010	587,098	1995.5
2011	443,626 (of which 128,623 non-tax)	1339.7
2012	474,810	1736.1
2013	633,256	1369.4

Source: Reports on the activities of the TARS for 2009–2013.

As already mentioned, the Customs Administration of the Republic of Slovenia (CARS) until 2012 gradually assumed a set of tasks from the Tax Administration of the Republic of Slovenia in the area of tax enforcement regarding the non-tax claims of other state authorities. Along with the acquisition of this extensive set of claims, the E-recovery information system came to life. When developing and building the E-recovery system, CARS especially pursued performance objectives. A complex and transparent information system with a high level of automatisation and access to all the information necessary for work in just one central application was established. E-recovery is used within a special administrative procedure for the financial recovery of debt in the area of customs, excise duty, environmental charges, administrative charges, fines from minor offence proceedings and other non-tax claims. E-recovery is a centralised IS and accessible through a web-based interface. Integration with other external systems is also possible, enabling organisations to use their own information systems and seamlessly exchange data with CARS via its web-based service. The biggest users of the E-recovery system are the police, local government inspection services, courts and traffic wardens. But the most regular users are definitely debt collectors (around 200 of them), which are obliged to use the system and also have mandatory training in application use. The reports on the activities of the CARS regarding execution show that in a very short period the authority received a number of new execution cases. As the execution proceedings were assumed by the TARS and COVL in 2012, the number of allocated cases increased seven-fold, since it also included other cases that had already been in the process of resolution and had been assigned by other

authorities. In 2013, this figure doubled, even though no new competencies were granted. The introduction of the e-Executions system was therefore urgent. However, as even more cases have been assigned to the CARS related to other receivables, the dynamics of tax executions, i.e. referring to taxes that are within the competence of the CARS, began to slow. In this case, the activities involved in tax execution scaled down as a result of the introduced electronic system.

Table 2: The number and scope of tax executions by the CARS

Year	Tax execution		Other non-tax executions	
	The number of writs of execution	Value (in EUR million)	The number of writs of execution	Value (in EUR million)
2009			10,050	
2010	1433	2.5	46,178	
2011	1442	7.7	24,367	
2012	944	2.7	167,855	91.6
2013	1270	5.6	332,889	100.1

Source: Reports on the activities of the CARS for 2009–2013.

The information system has already improved the success of collection of both tax and non-tax receivables. The year 2013 was successful. The system was already fully operational then, and 62% of tax execution cases were solved and 32% of receivables collected. In comparison with 2012, the success rate nearly doubled as there were 40% cases solved and 10% of receivables collected in that year. An even greater effect is visible in non-tax executions, as the rate of cases solved more than doubled, even tripled in some customs offices (e.g. from 14% to 51% and from 25% to 75%). Furthermore, the rate of debt collection also rose, doubling on average in 2013 and in one customs office increasing from 11% in 2012 to 52% in 2013. The introduction of an electronic court execution also increased the efficiency of the procedure. A year after the introduction of the execution proceedings via COVL, the case load rose by 60% as the complaints by debtors decreased. On the other hand, the share of unresolved cases decreased by more than 10% (e.g. company executions – executory title) to a little more than 35% (company executions based on authentic documents). The deadline for issuing writs of execution shortened, as in more than 80% of cases a decision is issued within 5 days, while the number of applications received has been growing since the introduction of e-execution, i.e. from 160,000 in 2008 to 218,789 in 2011; it only decreased in 2012, namely to 212,938 applications received (Ministry of Justice, 2013).

4.1 Empirical research of the users of e-recovery system – methodology and data analysis

To additionally focus on the users of the e-recovery information system, empirical research was conducted together with CARS to test the user satisfaction with the systems and supported activities. The focus group of our research were enforcement agents that according to their powers under the law use e-recovery information systems for activities of enforcement for non-tax claims for other state authorities. The empirical research was conducted by the online questionnaire. The invitation to the online questionnaire was submitted by e-mail to the 187 above mentioned employees. After 14 days, 74 questionnaires were received (response rate 40%). The questionnaire contained closed-ended multiple choice questions using a standard 6, 7 or 8 point Likert scale, open-ended questions (focused on suggestions for improvement of e-recovery information system) and demographic questions (focused on gender, age, years of working experience with e-recovery, use frequency of e-recovery and years of working experience in the area of enforcement).

4.2 Results

The first basic analysis was done using the IBM® SPSS® tool, gathering basic statistical data. The mean values show that all the indexes show the average values above the middle point of usefulness or satisfaction with the e-recovery system. The values of skewness and kurtosis of indexes show reasonable normality of distribution.

Table 3: Basic statistical values of measured indexes

	Index	Scale	Mean	Std. dev.	Skew.	Kurt
	How useful is the e-recovery system in your work?	1-not useful at all … 5-very useful	4.15	.855	-.699*	-.279*
	With the e-recovery system, my work is fast.	1-completely untrue … 6-completely true	4.84	.951	-1.138	2.983*

	Index	Scale	Mean	Std. dev.	Skew.	Kurt
	E-recovery system increases my working motivation.	1-completely untrue … 6-completely true	3.88	1.452	-.472*	-.613*
	How hard was it to learn to use the e-recovery system?	1-very hard … 6-very easy	4.16	.794	-.133*	-.148*
	How easy-to-use is the e-recovery system?	1-very complicated … 6-very easy	4.14	.926	-.063*	.004*
	How useful was the training for e-recovery system use?	1-very useless … 5-very useful	3.27	.910	.078*	-.860*
	How useful is the user manual?	1-very useless … 6-very useful	4.12	.832	-.539*	1.076*
	How good is the user support?	1-very bad … 6-very good	3.84	1.027	-1.310	1.814*
	How useful is the functionality of reminders?	1-very useless … 5-very useful	3.80	.965	-.142*	-1.089*
	How useful is the functionality of dossiers?	1-very useless … 5-very useful	4.04	.898	-.547*	-.590*
	How useful is the functionality of reports?	1-very useless … 5-very useful	3.58	.993	-.619*	.277*
	How useful is the functionality of interest calculation?	1-very useless … 5-very useful	4.22	.815	-.577*	-.791*
	How useful is the functionality of integration with other systems?	1-very useless … 5-very useful	3.82	1.077	-.585*	-.358*

within the "rule of thumb" normality limits

From the results, we can conclude that the e-recovery system does enable fast work of enforcement agents (the highest mean of all indexes), but it does not affect their motivation much. High means (Figure 1) are also detected when considering ease of learning to use the system, ease of using it daily and usefulness of the system at work. The lowest mean represented low satisfaction rate with the training. This result stresses the importance of appropriate training of users of information systems before making them use the system. Only well trained users who understand the abilities of the system can use it efficiently. Among different functionalities of the e-recovery systems, the highest mean was detected for the functionality of interest calculation and the lowest for the reports. These results show that users do evaluate system functionalities, and that their opinion could be meaningful information for the developers of the system and should be taken into account.
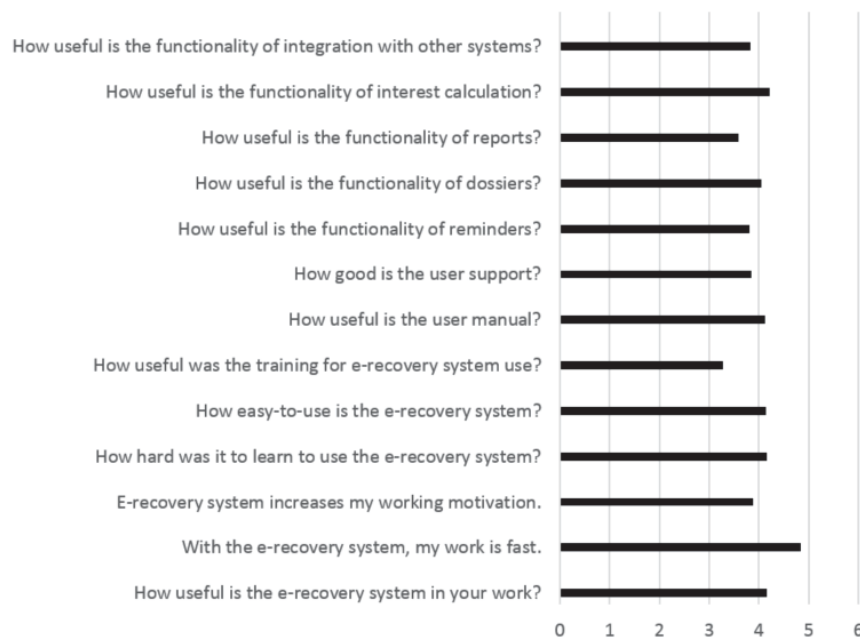
Figure 1: Mean values for survey indexes

Additional statistical analyses were conducted to test the influence of gender (male, N=56 and female, N=18), working experience in the field of recovery (less then a year, N=40 and one year or more, N=34), experience with the e-recovery system (lest then 12 months, N=41 and 12 months or more, N=33) and age of enforcement agents (less then 45 years old, N=33 and 45 years old or more, N= 41) that work with the e-recovery system. A t-test was used to test the influence.
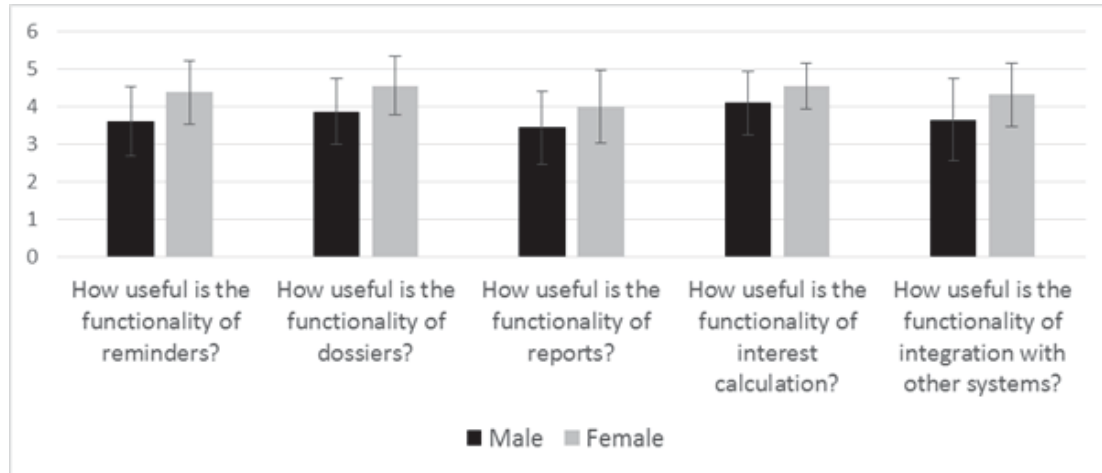
Figure 2: Average values with standard deviations for male and female groups

The results show that none of the indexes are significantly different considering age or experience at work. When considering experience with the e-recovery system, we detected that the two group means were significantly different for the indexes "How easy-to-use is the e-recovery system?" and "How useful is the functionality of dossiers?" (Table 4). The results show that less experienced users rated e-recovery system as less easy to use compared to more experienced users, $t(72) = -2.213$, $p = 0.030$. The results also show that less experienced users rated the usefulness of the functionality of dossiers as less useful compared to more experienced users, $t(72) = -2.615$, $p = 0.011$.

Table 4: The significant results of the independent t-test for experience of users with the e-recovery system

Index	Group	N	Mean	Std. Dev.	Std. Error Mean
How easy-to-use is the e-recovery system?	less than 12 months	41	3.93	.905	.141
	12 months or more	33	4.39	.899	.157
How useful is the functionality of dossiers?	less than 12 months	41	3.80	.872	.136
	12 months or more	33	4.33	.854	.149

When considering gender (Figure 2), all the indexes for different functionalities of the e-recovery system were statistically different for the two groups. The results show (Table 5) that male users rated the functionality of reminders less useful compared to female users, $t(72) = -3.170$, $p = 0.002$. The same holds true for the functionality of dossiers ($t(72) = -2.940$, $p = 0.004$), reports ($t(72) = -2.105$, $p = 0.039$), interest calculation ($t(72) = -2.075$, $p = 0.042$) and integration with other systems ($t(72) = -2.377$, $p = 0.020$).

Table 5: The significant results of independent t-test for gender

Index	Group	N	Mean	Std. Dev.	Std. Error Mean
How useful is the functionality of reminders?	Male	56	3.61	.928	.124
	Female	18	4.39	.850	.200
How useful is the functionality of dossiers?	Male	56	3.88	.875	.117
	Female	18	4.56	.784	.185
How useful is the functionality of reports?	Male	56	3.45	.971	.130
	Female	18	4.00	.970	.229
How useful is the functionality of interest calculation?	Male	56	4.11	.846	.113
	Female	18	4.56	.616	.145
How useful is the functionality of integration with other systems?	Male	56	3.66	1.100	.147
	Female	18	4.33	.840	.198

5. Conclusion

The importance of ICT solutions for better performance of public administration is widely acknowledged. Nevertheless, the evaluation of efficiency of the e-recovery system in Slovenia showed that the introduction of the ICT solution slowed down the process at the beginning but improved it considerably later on. The research showed that users also recognise the improvement to a great extent. The research indicated that for successful implementation of the ICT solutions, support and education are of great importance. One of the downsides of the e-recovery system is that a lot of effort is placed on training of users, but practically no or modest information is available for other participants of the system, especially debtors. The documents they receive through the system are not always easy to understand, the dates for objections are very tight and there is no possibility to update information in the system about partial recovery of debt. Therefore, there is always a place and need for further improvements of the ICT solutions in general.

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A Six-Dimensional Assessment Tool for e-Government Development Applied to the Homepage Sites of 25 U.S. States

Timothy Dolan

Texas A&M International University, Laredo, Texas, USA

Timothy.Dolan@tamiu.edu

Abstract: This work applies a six-dimensional assessment tool (6DAT). The 6 dimensions for determining site development and effectiveness include; site security, database development and maintenance, comprehensive internal (intranet) capability, lateral institutional interactivity (links to associated services), citizen interactivity and transparency of government process. Analysis using the 6DAT yields a rubric showing the presence or absence of three key indicators associated with each dimension. The results are summarized on a table of e-Government readiness on those six dimensions among 25 randomly selected United States state government homepages. It provides a useful diagnostic for relative e-Government development at the state level.

Keywords: e-government site assessment, state e-government in the united states, six-dimensional assessment tool, 6dat, assessment of subnational e-government

1. Introduction: E-government at the state level

The vast majority of the literature on e-Governmentdevelopment and assessment has focused on national governmentsand their agencies, seemingly oblivious to the fact that most citizen interactions with government occur at subnational levels. This has not been lost on some scholars though the literature is nowhere near as large as that focusing on national-level e-Government. Moreover, much of that literature does not evaluate existing sites, but instead outlines general approaches to their development. Investigations of the literature to-date have not found any studies focusing on systematically evaluating existing American state-level e-Government sites except in cursory fashion. Assessment of state e-Government sites are probably done at the industry level, but are not published. Such assessment would be useful in providing a picture of relative e-Government development among the states. It would inform and provide a means of focus for design improvement and augmentation for site developers moving forward. It would identify blind spots and provide a basis for identifying best practices. E-Government development continues to be dynamic and assessment models themselves might also incorporate new innovations, but there are foundational elements that are fundamental to e-Government effectiveness. These include security, database design and maintenance, internal communications comprehensiveness, lateral connectivity to relevant agencies and organizations, user-friendliness, and transparency of government process.

The instrument provided here, the "Six-Dimensional Assessment Tool" (6DAT) is informed by the existing e-Government development literature and designed for broad application over existing and anticipated e-Government sites. It has already been applied to assess ministry sites in Egypt and in a comparative study of 6 other nations' common ministry sites. It application here is thus an extension to state level homepages as a tool to assess their relative development in six critical areas of function and service listed above. These six areas comprise a common denominator of site effectiveness regardless of level of government. Its application is simple and here not very refined, but can nonetheless target key areas of functionality. Efforts to build upon and refine it are welcomed.

2. Literature review

How might e-Government site effectiveness be measured at the state level? One obvious method is a comparative approach using standard sets of measurements empirically informed by the e-Government effectiveness literature. This evaluative literature includes, Agranoff, R., 2011; Andersen, K. V., &Henriksen, H. Z., 2006; Bertot, J. C., Jaeger, P. T., & Grimes, J. M., 2010; Gil-García, J. R., &Pardo, T. A. 2005; Heeks, R., 2006; Layne, K., & Lee, J., 2001; Luna-Reyes, L. F., Gil-Garcia, J. R., & Romero, G., 2012; Rorissa, A., Demissie, D., &Pardo, T., 2011; Scholl, H. J., &Klischewski, R., 2007; Smith, A.G., 2001; UNDPEPA, 2002; United Nations Department of Economic and Social Affairs, 2010; United Nations Department of Economic and Social Affairs, 2012; Valdés, et al, 2011), and Ziemba. Papaj and Descours, 2014). The literature focusing on e-Government development and assessment at the state and local levels is more sparse and includes, Edminston, 2003, Greenberg, et al (2006), Gil-Garcia and Pardo, (2005), Luna-Reyes, Gil-Garcia & Romero (2012), and Dawes (2008). Of the state and local level works reviewed, only Luna-Reyes, Gil-Garcia & Romero offered a truly comparative evaluative instrument.

3. Research methodology

The broad literature on e-Government evaluation yields many useful schemes with some more comprehensive than others. Review of these evaluation methods yielded 6 critical dimensions for determining e-Government effectiveness from both an internal functionality and user experience perspective. Thisthen led to developing the 6-Dimensional Assessment Tool (henceforth referred to as 6DAT) builds upon the assessment models outlined in the broad e-Government assessment literature, incorporating their most critical assessment elements into a simple but fairly comprehensive scheme that also proceeds on the assumption that standards of e-Government effectiveness transcend any given level of government.

The six dimensions that this analytical tool assesses are, in foundational order:

- security
- strategic database development and maintenance
- a comprehensive and vertically integrated intranet
- lateral linkages to appropriate agencies
- user friendliness
- transparency of governmental process

These six dimensions are critical properties fore-Government effectiveness at all levels.

In applying this tool, 25 U.S. states were randomly selected for review of their respective official home pages. Contact to the various site administrators was made through the "contact us" links on their sites outlining the study purpose. However, as encountered in previous work on this approach, the response rate was very low.Only two of the states selected for this study, Virginia and California, completed the survey sent for this evaluation. The reasons for this low response rate are speculative, but might have included internal policies on responding to queries from outside of the state, protection of proprietary information, security concerns, or lack of staff to respond. E-Government site development and maintenance haslargely been given over to private contractors in the United States. This has apparently had the ironic effect of making voluntary disclosure of e-Government operations for outside assessment difficult if only out of concern to protect contractors' proprietary systems and practices. This is but one of the many contradictions and institutional constraints found in the structure and processes within which e-Government initiatives have to navigate (Yu and Robinson, 2012).

1 – Does the site provide for secure data entry (pertaining to on-line forms)?
2 – Does the site provide user registration for establishing client service accounts?
3 – Can the site provide for secure for financial transactions?
4 – Does the site create and utilize a comprehensive citizen/client user database shared between agencies?
5 – Does the site assign and utilize a user ID for provision of services?
6 – Does the site have on-line forms with auto-fill fields drawn from user information?
7 – Does the site link to a state intranet? (Internal email with a state government-specific address).
8 – Does the site have a vertically integrated intranet? (Email addresses for all state employees)
9 – Does the site have a directory of key department and/or agency contacts?
10- Does the site provide links to other state agencies?
11- Does the site provide links to nonprofit organization partners?
12- Does the site provide links to other private sector provider organizations?
13- Is the site fully functional now with no broken links?
14– Is the site regularly updated? (At least every 30 days)
15– Is the site interactive? (Providing email contact or live-chat capability).
16– Does the site display a summary list of state government functions?
17– Does the site provide reports on department/agency performance?
18– Does the site provide for citizen feedback? (ie. A Facebook page?)

Figure 1: The 6DAT checklist of state government home sites

The 6-DAT is not dependent upon the self reporting of site administrators. As a checklist gauging the presence or absence of dimensional indicators it lends itself to external evaluation as well. This evaluation was thus undertaken by the author for all selected sites for consistency of evaluation, though also cross referenced and reconciled with the two responses that were received.

The analysis was performed between January 1 and February 14th of 2015. Affirmative responses were recorded when the features under review were found on the homepage and selected links to common services such as vehicle licensing, judicial services, business licensing, tax filings and tourism sites. Only 12 out of a total of 450 data points (18 items * 25 states) could not be determined yielding 97% determination rate on the presence or absence of indicators. Below are the details of the analysis as it pertained to each of the six dimensions covered:

4. Research findings

The three indicators of site security included the availability of forms that could be filled out and submitted online, citizen/client registration mechanisms and the availability of secure financial transactions on at least one of the state agency sites. Only Nevada had no provision for on-line submission of user information. The others provided for such services though in many instances the services available were for business entities and not citizens. The citizen services available for secure transactions were generally confined to payment for automobile registration and driver's license renewals, camping permits and accommodations, child support payments, fees for vital records, and fines for parking or traffic violations. Services for businesses and professionals were more extensive and included on-line applications for permits and licenses of all sorts.

No state in this study has constructed their e-Government platforms to include integrated databases. Each state agency has its own specialized database for its specific users be they licensed drivers, certified professionals, regulated businesses, or convicted offenders. Only 3 states (Kansas, Vermont and Wyoming) had anything resembling an integrated database and these were very limited in their interoperability. They provided for a customizable "My Government" feature in which a user could register and receive featured information from various state agencies that they could select to receive bulletins, newsletters and the like. While the state of Virginia had no such feature for its citizens, they had a rather odd service on their site called "lobbyist in a box", which was literally for professional lobbyists to receive information on legislation and agency activities that they would select according to their interests. Since this service was not exclusively for citizens (lobbyists need not be citizens of the state). In any case, this was clearly not an integrated database access feature.

Determining the comprehensiveness of state agency internal on-line communications proved problematic. It might be reasoned that the sheer size of a state government's workforce in larger states would make such access to individuals too ponderous. It also made sense from a personal security perspective to limit public access. Four states, (Louisiana, Montana, South Carolina, and Wyoming) did not have an observable link to a statewide intranet for state agency staff. All contact points for those states were to a generic "contact us" link for each of its component agencies. Presumably messages received through this link would be routed to the appropriate officials based upon message subject or content. Wyoming did have a remarkable link to a large PDF directory apparently listing all state personnel with their contact phone numbers. It could be downloaded as a kind of state government phone book. Over half of the states in this study (15), had no observable vertically integrated intranet for all staff. All but 2 states (Michigan and Vermont) had an on-line directory of selected agency contacts for citizens. Michigan had an anonymized "contact us" form for all of its agencies available on the state homepage thus making it impossible to see if there was even an intranet for the state and its agencies at all.

It is highly unlikely that state agencies reviewed actually had no intranet, but public access to individuals within these agencies were restricted. Sometimes this was for pragmatic reasons as with the judiciary and law enforcement agencies where personal contact information must be kept confidential. Populous states with large numbers of employees were also less likely to have individual contact information available publicly, and instead provided contact to a generic agency or office address for internal rerouting. A comprehensive list of current state employees would be too difficult to keep current in those large states.

All states had lateral links to their respective state agencies through their home page. Most states also featured a keyword portal field on their home pages through which queries could be conveniently expedited to an agency associated with that keyword. The uniform layout of many of the state homepages with this feature suggested

a single contractor had developed them from a standard template from which individual components unique to the state were then added.

Lateral connectivity,was indicated by the existence of links with nonprofit organizations providing a variety of social and other services that state agencies did not cover. There were five states that did not have links to nonprofit organization partners (Delaware, Florida, Indiana, Louisiana and Mississippi). This was unusual since many states partner with nonprofit agencies for specialized services ranging from elder care providers to tourism promotion. Four of the same five states (Delaware, Florida, Indiana, Louisiana) plus Michigan, had no links to private partner entities as well. This was remarkable as there are usually abundant links to private partners, usually tourism related, but sometimes also including partners for contracted services ranging from university student housing to sanitary services.

General site functionality/user friendliness lends itself to several possible indicators, but here was confined to full functionality defined as having no broken links, having a site that was updated at least every 30 days, and interactive defined as having easily identifiable points of contact or live chat capability. Five states (Alabama, Alaska, Delaware, Michigan, and South Carolina) had broken links at the time their sites were visited. Nearly half (12 of 25) were not regularly updated within a 30-day cycle. Four states (Florida, Louisiana, Nevada and New Hampshire) did not offer easy email or live chat feedback through the state homepage. These issues around user friendliness have negative effects on public confidence, particularly in regard to broken links, which is the net's equivalent of going to a closed office or barricaded road. These issues aside, almost all of the sites studied here were generally easy to navigate for such high-frequency services as vehicle registration and licensing, tax and fees paying and voter information. Most sites offered a keyword portal, which was also a useful navigation tool. Still, 5 states were identified as deficient on this dimension with 2 of 3 elements found to be missing or with non-functioning links (Alabama, Alaska, Delaware, Nevada and New Hampshire).

The dimension of transparency of governmental process is something of a higher order attribute of e–Government. It's incorporation into state government sites is a manifestation ideal of e-Government as a democratizing agent. The prospect of easily obtained, and comprehensible information about what state agencies do is one of the most potent means torealize publicly accountable government. While every state site reviewed did provide a fairly comprehensive listing of component agency functions under each branch of government (executive, judicial and legislative), the publication of timely agency performance reviews was unavailable in 8 of the 25 states studied. The public posting of citizen feedback to key agencies was lacking in 3 states (Florida, Nevada and Wyoming). Several state sites had a special link to espoused policies of transparency, but, by and large, the actual content available on those links tended to be selective and sparse. Even state budgets, current and past, were not available on-line in many cases. Still, only one state, Wyoming, was deemed deficient on this dimension as lacking on two of the three indicators for transparency used here. (A listing of state agencies by general function, on-line publication of agency performance reviews, and open social media feedback channels such as a Facebook page.)

The following table summarizes the assessment results discussed in this work:

Table 1: State homepage assessment results)

State	S1	S2	S3	D1	D2	D3	I1	I2	I3	L 1	L 2	L 3	F1	F2	F3	T1	T2	T3
AL	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y
AK	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	Y
AR	Y	Y	Y	N	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
CA	Y	Y	Y	N	NA	N	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
DE	Y	Y	Y	N	Y	UN	Y	N	Y	Y	N	N	N	N	Y	Y	Y	Y
FL	Y	Y	Y	N	Y	N	Y	N	Y	Y	N	N	Y	Y	N	Y	Y	N
IN	Y	Y	Y	Y	Y	N	Y	UN	Y	Y	N	N	Y	UN	Y	Y	Y	Y
KS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
LA	Y	Y	Y	N	N	N	N	N	Y	Y	N	N	Y	Y	N	Y	N	Y
ME	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y

State	S1	S2	S3	D1	D2	D3	I1	I2	I3	L 1	L 2	L 3	F1	F2	F3	T1	T2	T3
MI	Y	Y	Y	N	Y	UN	Y	N	N	Y	Y	N	N	Y	Y	Y	N	Y
MS	Y	Y	Y	Y	Y	UN	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y
MT	Y	Y	Y	Y	Y	UN	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
NE	Y	Y	Y	N	Y	UN	Y	Y	Y	Y	Y	Y	Y	UN	Y	Y	Y	Y
NV	N	N	N	N	N	N	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	N
NH	Y	Y	Y	N	Y	N	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y
ND	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
PA	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SC	Y	Y	Y	N	Y	Y	N	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
TN	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
TX	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
VT	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
VA	Y	UN	UN	UN	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
WV	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
WY	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	N

5. Conclusions

Findings indicate that the state homepage sites studied are generally effective. However over a third of the states reviewed showed deficiencies in at least 6 of the 18 indicators used in the 6DAT (Alabama, Arkansas, Delaware, Florida, Louisiana, Michigan, Nevada, and Virginia). These states need to develop capacity in database development, user-friendliness and transparency.

This is very much a preliminary study intended to begin a deeper inquiry into e-Government development from both technical and user perspectives. The six dimensions used here are intended to provide an initial starting point for any e-Government assessment as they are critical areas for development, and are likely to remain so into the foreseeable future. Much work remains to refine and broaden the indicators associated with the 6DAT. Ideally this can be done in collaboration with designers and developers, as well as agency administrators and public stakeholders

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The Impact of e-Democracy in Political Stability of Nigeria

Moses Duruji, Charles Ayo, Daniel Gberevbie and Jonathan Oluranti
Covenant University,Ota,Nigeria
moses.duruji@covenantuniversity.edu.ng
charles.ayo@covenantuniversity.edu.ng
daniel.gberevbie@covenantuniversity.edu.ng
jonathan.oluranti@covenantuniversity.edu.ng

Abstract: The history of the Nigerian electoral process has been hitherto characterized by violence stemming from disputes in election outcomes. For instance, violence erupted across some states in Northern Nigeria when results indicated that a candidate who was popular in that part of the country was losing the election leading to avoidable loss of lives. Beside, this dispute in election outcome lingers for a long time in litigation at the electoral tribunals which distracts effective governance. However, the increasing penetrating use of ICTs in Nigeria is evident in the electoral processes with consequent shift in the behavior of actors in the democratic processes, thus changing the ways Nigerians react to election outcomes. This paper examines the trend in the use ICT in the Nigerian political system and its impact on the stability of the polity. It assesses the role of ICT in recent electoral processes and compares its impact on the outcome of the process in lieu of previous experiences in the Nigeria. Furthermore, the paper also examines the challenges and risks of implementing e-Democracy in Nigeria and its relationship to the economy in the light of the socio-economic situation of the country. The paper adopted qualitative approach in data gathering and analysis. From the findings, the paper observed that e-democracy is largely dependent on the level of ICT adoption, which is still at its lowest ebb in the country. It recognizes the challenges in the provision of ICT infrastructure and argues that appropriate low-cost infrastructure applicable to the Nigerian condition can be made available to implement e-democracy and thus arouse the interest of the populace in governance, increase the number of voters, and enhance transparency, probity and accountability, and participation in governance as well as help stabilize the nascent democracy.

Keywords: e-democracy, ICT, election, governance, politics

1. Introduction

The experience of Nigeria with democracy has not been palatable. For instance, the first experimentation with democracy in the First Republic could only last for six years as the politicians were unable to manage electoral process and governance properly, setting the stage for the military class to take over the reins of government. The transition to the Second Republic and all the reforms done prior to the 1979 handed over by the military failed to achieve stability as the subsequent post transition election quagmire forced another round of military rule in 1984. The subsequent attempt for a Third Republic in the 1990s was stillborn until the country managed to transit to another dispensation of civil democratic rule in 1999. Though the country has witnessed a successful civilian to civilian transfer of power in the Fourth Republic, the desperation of politicians and do or die attitude to electioneering, has continued to heat up the polity. Moreso, reports of civil society groups indicates that the cause of the tension in the land is the lack of confidence by stakeholders in the Nigerian democratic project that is responsible for the threat of instability in the Fourth Republic dispensation. Paper argues that the deployment of ICT has indeed brought some positive development to the Nigerian electoral system and advocates for a full embrace of e-democracy as a vector for the much desired stability of the Nigerian polity. This paper shall also examine the challenges and risks of implementing e-Democracy in Nigeria and its impact on the economy in light of the socio-economic situation of the country. The paper observes e-democracy is largely dependent of the growth of ICT, which is still at its lowest ebb in the country. It recognizes the challenges in the provision of ICT infrastructure and argues that appropriate low cost infrastructure applicable to the Nigerian condition can be made available to implement e-democracy and thus arouse the interest of the populace in governance, increase the number of voters, and enhance transparency, probity, accountability, and participation in governance as well as help stabilize the nascent democracy.

2. Review of related literature

E-democracy represents the use of information and communication technologies and strategies to promote active citizen participation in governance (Clift 2005). E-democracy also includes the process whereby citizens are offered information through the use of electronic communication in order to form an opinion on political matters (Clift 2000).The new media as a platform for e-democracy has been very significant channels of reach out. Through them, candidates and political parties showcase and mobilize the citizenry towards performance of their civic responsibility. Posting of political communication through the new media usually complement

political rallies, radio and television news advertisements, postal and other published materials. The social media is now used to collate feelings of the electorate, their prediction of election outcomes and their assessment of parties or candidates' performances during political debates or rallies (Clift 2003). The new media channels breathe more life into political communication. Functionally, good political communication via the Internet enables the electorate to evaluate and chose the candidates of their choice thus conferring on the electorate the power of preferment. Udende (2011) posits that though mass media were inadequate in Nigeria, they still played significant role in creating general awareness in the political process. Urvan (2005) also argues that mass media helps voters to make an informed choice during election. As such, new media as part of the mass media, have contributed to helping voters. The new media are seen as public sphere facilitating debate, interaction and articulation of problems (Lagerkrist 2005 Vang, 2003). For instance internet access provides parties and candidates with unmediated and inexpensive access to voters and also offers new technological options for communication and information presentation (Druckman's 2007 cited in Hurme 2009). Raji-Oyelade (2012) refers to new media as the practice and tools of retrieving and disseminating information, narratives, histories, performances and ideas in a way that both collation and delivery, as primary acts of writing are qualified in the immediacy of virtual or mass circulation. Fagorusi (2013: 15) describes the new media as "the interactive form of communication that uses the Internet". Thus, the new media includes podcasts, Rocs feeds, social networks, text messaging, blogs, websites, wikis, virtual worlds and other social forms. Telephone and the Internet have made social media such as twitter, video, my space, sharing sites, you tube sites, Aigg, flick, LinkedIn, face-book and Skype possible for global use either in the realm of business, politics, education or international relations.

He opines that the cause of globalization has been furthered by the new media which has made connectivity realizable. According to him, the new media has brought about flatness of the world with the understanding that from one end of the world, one can see the other. This has further given credit to Mcluhan global village postulation. The new media has been made possible and elastic due to invention of the computer, the installation of satellite in space, the digital world and new knowledge in telephony.

Ojebuyi (2012:56-59) posits that the emergence of the new media does not suggest the disappearance of the traditional ones, rather the convergence of the old and the new media has created a complementary phenomenon where the strength of one genre takes care of the flaws of the other. Media products through Internet channel are controlled by direct users and are targeted at not only the local but global audiences thus bridging the gap between the information rich and the information poor. For instance, Facebook social media platform inaugurated in 2004 is now available in over 70 languages including English, French, Arabic, Hausa, Igbo and Yoruba. In the same light, Twitter that was founded by Jack Dorsey in 2006 as one of the popular online social networking and micro-blogging site is widely used in Nigeria. According to Smith (2012), a total of 1,6m tweets was generated in Nigeria in 2011, making the country the 3rd largest tweeting nation in Africa that year behind Kenya and South Africa. The hastags on one's twitter post has been used to raise public awareness on issues, promote social event, share knowledge and join trending topics and conversation during elections in Nigeria.

Expansion in cyberspace in Nigeria has further enhanced information flow and ease as Ojebuyi (2012) notes that with the Internet, one does not need extensive journalistic experience, ethical training or a huge amount of money to feed the audience with the latest report. For instance to become a blogger, requires access to a functional computer, an Internet connection and an active web address which have enhanced citizenship journalism in Nigeria. The new media have injected element of entertainment into political communication as parties and candidates mold their messages to be more engaging to the audiences through the use of different creative forms. Furthermore, blog can be used for self branding; to set parties and candidate apart from others and in this stead one can argue that the new media is freer than the traditional media in the handling of political communication (Famutimi 2013).

3. The concept of e-democracy

The origin of democracy is traceable to ancient Greek as far back as 2400 years ago. The original meaning of the word "democracy" is "rule by the people." By this definition therefore, the citizens in a democracy govern their nation. The main reasons why people establish democratic government are the protection and promotion of their rights, interests, and welfare. Democracy is intended for the freedom of every individual to participate in the political community's self-government. At the heart of democracy therefore is the concept of political freedom.

Electronic Democracy or e-democracy on the other hand, refers to the use of information and communications technologies (ICTs) and strategies by "democratic sectors" within the political processes of local communities, states/region, nations and the global stage (Steve, 2009). The democratic sectors include democratic actors such as governments, elected officials, media (and major or online portals), political parties and interest groups, Civil society organizations, International governmental organizations, citizens/voters. Just as there are democratic sectors that include democratic actor like government, elected officials and civil society organizations among other, there are also e-democracy sectors as articulated by Council of Europe. The various e-democracy sectors (as cited in COE 2009: 15-17) includes e-parliament, e-legislation, e-justice-mediation, e-environment, e-voting, e-consultation-participation, e-initiatives, e-petitioning, e-campaigning, e-polling/e-surveying.

4. The nature of Nigerian electoral system

Representative democracy was introduced in Nigeria by the British colonialists during the era of colonial constitutional engineering. Precisely in 1923, following the introduction of elective principle by the Clifford Constitution of 1922, that year male adult Nigerian that have 100 pounds were allowed to elect three and one unofficial members of the Legislative Council in Lagos and Calabar respectively. Ever since then, there was an incremental widening of the electoral space until the 1959 parliamentary election that set the stage for Nigerian independence. At this time universal adult suffrage has been granted to Nigerians of 21 years and above including women from the then northern region of the country to participate in casting votes for their representatives at the National Assembly. The colonial policy of divide and rule led to formation of ethnically based political parties that engaged in fierce competition for power at the regions and the centre in the run up to withdrawal of the colonialists from the administration of the country. The three major parties which controlled the three regions, made the regions a closed shop for other political parties from which they launched their bid to control the central government. For instance in the 1964 general election, the Northern People's Congress regional government ensured it frustrated the candidature of opposition parties that at the end of the day, most NPC candidates were returned unopposed. The northern delegation which had earlier opposed independence for Nigeria in 1956 when the motion was move by Anthony Enahoro in 1952 insisted that before independence the northern region should be granted half of the seats at the House of Representative. The nationalist from the south who were eager to see the back of the British allowed them to have their way. The do or die attitude of the political parties to control the regions and the centre led to all manner of tactics outside the rules of the game which resulted in violence that led to loss of lives and properties notable been being 'operation wetie' in the western region. The uncontrollable ways the electoral process of the First Republic was going, led to intervention of the military who came in with a messianic clad of correcting the ills of the civilians but the return to power in 1979 saw a re-enactment of the drama of the First Republic in terms of thuggery, violence and vote rigging particularly during the 1983 General election in which the ruling National Party of Nigeria (NPN) recorded a 'moonslide' victory that was rejected by the other political parties. The violence that followed the announcement of the results in some states culminated in the second coming of the military into power again shortly after the inauguration of the post transition government.

Guided by this experiences, General Ibrahim Babangida who promised to return the country back to civilian democratic rule started the song of 'newbreedism' or a departure from the old ways of politicking in Nigeria, including the creation of two political parties, Social Democratic Party (SDP) and the National Republican Convention (NRC) and the introduction of open ballot system(OBS) to reduce the incidence of money bags hijacking the parties and transparency in the voting system as a way of instilling confidence in outcome of election that would ultimately reduce the violence that accompany elections in Nigeria. However, the attitude of Nigerians and insincerity of the regime truncated that process and threw the country into a crisis after the annulment of the June 12, 1993 presidential election.

The prolongation of military rule further plunged the country into a political quagmire following insistence of the apparent winner of that election to form the government, but the death of the major actors led to a hurried transition organized by Abdulsalami Abubakar that ushered in the Fourth Republic but the nature of the Nigerian electoral system have remained the same, with constant assassination of political opponents, unleashing of violence before ,during and after elections and tension that creeps in following unguarded statements by politicians and their supporters in the run up to elections. The most recent manifestation being the eruption of post-election violence in some state of north following the announcement of Goodluck Jonathan as the winner of the 2011 presidential election.

5. The impact of unstable democracy in Nigeria

The instability of the Nigerian democratic process has had its greatest impact on the development of institutions in the country. For the many times the military has intervened, institutions such as the legislature are often abrogated and never allowed to develop. The implication is that the legislature since 1999 has become the weakest link in the tripod governance structure of the country. Apart from the fact that the legislators that came on board in 1999 lacked any kind of experience as regards legislative process, the bureaucracy to act as back up were virtually absent and everything has to start from the scratch. This of course has affected the effectiveness of the legislature as an institution at both the federal and state levels. Even when huge resources are devoted to training the legislators and their staff, the high turnover rate at the legislature after every election cycle, implies that these new entrants has to go through the process over again. Apart from the legislature which has suffered due to long sojourn of the military is the body that organizes elections in Nigeria which has not been allowed to learn from mistakes or for a proper and efficient national electoral body to evolve over the years Nigeria has been experimenting with democracy. New sets of officials and personnel are often drafted whenever there are transitions to civil rule programme that military regimes in Nigeria often institute to legitimize their rule. The implication is the shambolic performance of electoral bodies in the conduct of elections and the high level of litigation that follow every election following the unsatisfaction of the parties in the election to outcomes announced by the electoral body. In fact the courts in Nigeria since the inception of the Fourth Republic has turned out as the final determinant of election outcomes in Nigeria unlike what obtains in mature democracies where winners and losers accept results of election even before they are officially announced.

The story is same for other institutions such as security services in the country whose orientation as public servants are yet to sink in as their conduct since the inception of the Fourth Republic portrays them as serving the ruling party and people in government. This even plays out in elections where security personnel are used to intimidate opponents of the ruling party. Even civil society groups that ought to play important role in the strengthening of democracy are very weak due to the over bearing policies of the military that tended to suppressed them and gave them little space to fetter

6. ICT penetration in Nigeria

According to National Population Commission (NPC) report of June, 2012, Nigeria's population stands at 167 million. This translates to 2.3% of the population of the entire world. The CIA World Stats also reports that the annual growth rate of Nigeria is 2.33% and that the population is expected to double in the next 30 years. Apart from this rise in population, reports also from NCC and other bodies have shown an improvement in the ICT sector of Nigeria. In this report therefore we focus on ICT penetration in Nigeria. Here we consider the percentage of active users of a service with respect to the population in terms of internet connectivity, Mobile connectivity and online shopping.

6.1 Internet penetration

According to the Internet World Stats report 2012, about 48 million Nigerians now use internet. This according to the report translates to internet penetration rate of 28.4%. Nigeria is said to be the largest internet population in Africa and 11th in the world. The number of internet subscribers in Nigeria is about the size of the entire population of Tanzania. Report from Terragon Insights in 2013, said between December 2011 and June 2012, a total of about 3.3 million new internet users were added in Nigeria. The report also shows that the average internet time spent by Nigerians is close to 3 hours. From the report also we gathered that most internet users are youth of age between 19 and 35 years with students representing 45%. A comparison of mobile and desktop internet users was also carried out. It shows there are about 61% of mobile internet users in Nigeria.

Mobile Penetration

According to NCC report of 2012, Nigeria mobile penetration stands at 69.01%. Also based on data obtained from NCC, mobile subscribers grew by 18% between 2011 and 2012. TNS also reports that 25% of mobile subscribers use smartphones, 59% use basic feature phones while 16% use advance feature phones. Akinwumi (2012), said in all there about 110 million mobile phones in Nigeria. A survey by NBS (General Household Survey, 2011), indicates that 84% of urban dwellers have access to mobile phones while only about 59% of rural dwellers have access to mobile phones. Also 60% of mobile internet hits come from feature phone (Gs.statcounter.com).

6.2 Online shopping

Reports from Terragon Insight in 2013, indicates that only 15% of internet users in Nigeria have bought goods online and that 78% of those who have not bought something have browsed to find out things from the online marts. According to Euromonitor International (2011), online shopping in Nigeria grew by 25% and was valued at 62.4.billion naira.

7. Usage of ICT in Nigerian elections

One major sustaining force of democracy is Information and Communication Technology (ICT). The evolution of ICT on African continent is commendable, especially its deployment to election processes. The impact of the involvement of ICT can be seen from the perspectives of making governance transparent and drawing government nearer to the voters. In Nigeria, the use of ICT for electoral processes is on the increase. Virtually every aspect of the electoral process has been transformed to use ICT except actual voting. This is still a subject under consideration at the national assembly as our constitution at the moment prohibits the use of ICT for voting. While we wait for the required amendment to our constitution in respect of voting, INEC and all other parties involved in the organization and conduct of elections have continued to deploy and improve on the use of ICT.

All the stakeholders in the electoral process namely INEC, politicians/political parties, electorates/voters and civil society organizations make use of ICT one way or the other. INEC, before the 2011 elections captured electronic data of registered voters and has recently distributed to them their permanent voter cards (PVC). INEC has also improved it official website to facilitate interaction with electorates and election officials during elections. INEC has also adopted the social media to share information on the elections and receive feedbacks from the public on the performance of election officials. Politicians/political parties now use ICT to reach out to the voters and canvass for support. The voters in turn use ICT to report their experiences and receive election related information including uploaded results while the Civil Society Organizations (CSOs) uses ICT to mobilize and educate the electorate as well as cover and report the outcome of their monitoring of the electoral process.

8. Objectives of the study

- How can ICT enhance transparent electoral process in Nigeria?
- What are the impacts of Nigeria's teledensity on democratic process?

9. Methodology

To address the above listed objectives, the paper relies on documented materials from library and internet sources for data gathering. Descriptive analysis was employed in the analysis of the data to show the impact of e-democracy on political stability in the country.

10. The case for e-democracy in Nigeria

E-democracy should be preferred because it makes it easy for citizens and the electorate to be approached. The application of e-democracy makes the transport of information flow in a more pointed way. E-democracy also makes communication effortless such that it becomes unnecessary to move physically. This will be of immense advantage to Nigeria's electoral process, where challenges of logistics have remained the greatest problem to achieving credible elections (Efeizomor, 2014). This of course means that in e-democracy communication becomes more effective and cheap. Messages in an environment of e-democracy can be delivered to a great number of recipients without much additional effort. The ease of access to e-democracy tools has reshaped the "silent majority" to active, articulate citizens, making use of their democratic capacities to shape the destiny of their society.

In Nigeria, the use of e-democracy has brought in more citizens participation in the affairs of their country. One typical example, is the role social media played in the occupy Nigeria movement, when Nigerians rose up in unison across the country to say no to the government desire to hike prices of petroleum products (Hari 2014). Furthermore, efforts by the Independent National Electoral Commission to introduce certain elements of e-democracy in the aspect of electronic register and use of card readers, not only makes the voters' role in Nigeria credible, but the process of voter authentication (Musari, 2015). The use of ICT in the timely transmission of election results has gone a long way to positively affect outcomes of elections in Nigeria in the sense that the time lag which politicians lap on to falsify results in their favour is no longer there and the populace who follow

the event real time, are able to see the transparency of the process that ultimately shape their perception against image of the past that elections in Nigeria are rigged.

The degree of Nigeria's teledensity provides a platform for policy makers to push for electronic voting that would bring further transparency in the Nigerian electoral system. This will be bring about a timely transmission of results from the polling stations to a central server broadcasting to the country realtime, thereby eliminating the delay and movements in collation of results which provides fraudulent politicians and electoral officials the leeway to manipulate results. Adopting this will ofcourse make it unnecessary for the government in power to deploy security officials to not only accompany the delivery of election materials across the polling stations but manning the streets, thereby militarizing the electoral process. This will effectively bring down the cost of organizing elections, as issues such as the printing of ballot papers and boxes would be eliminated.

11. Challenges of implementing e-democracy in Nigeria

Some of the major challenges to implementation of e-democracy in Nigeria, include low level of computer culture poor telecommunications infrastructure; and general lack of awareness (Ajayi , 2003). Another constraint that affects the use of ICTs in Nigeria is low level of computer culture (Ifinedo 2004). When many Nigerians are reported to be computer illiterates, so when the facility is available, its utilization would be a problem (Haliso 2011). In other words, having a good background in computer skill makes the use of computers very practicable. Lack of awareness on the other hand makes availability impossible. Another challenge is in the area of poor ICT infrastructure particularly the provision of power on a regular basis. This is very vital because when the ICT infrastructure is widely available it requires power to operate (Anandarajan 2002). In most part of Nigeria, there is still challenge of connecting to the National grid as dependence of generator may not be the solution because atimes fuel and diesel are not readily available.

Beside this is the attitude of the people particularly the leaders who believe that the system as it is favours them and so any move to create the environment that encourages wider participation of the people in the democratic process. The National Assembly at that time with the opinion that Nigeria is a 'complex society' made up of many illiterates and a lot of people without the knowledge of Information Technology lack the technical know-how to utilize the E-Voting system for election 9Mbarika 2002 etal). Consequently, this reform in the voting system was faced with this major challenge and could not be implemented as planned d (Duruji, 2008). But notwithstanding, there is an opportunity in this, as it stand the chance of eliminating our usual election fraud.

12. Conclusion

The history of Nigeria with democratization has always been associated with instability owing to the dispute and tension that have always arising from the electoral process. The high level of manipulation of elections creates the environment that in the past has prompted the military to strike, putting an end to the democratic process. However any measure that brings about credibility in the system and inspires the confidence of people goes a long way to create a system where outcome of elections are largely acceptable to the stakeholders and participants which would in turn ensure political stability in the country. With the widespread use of ICT and the degree of teledensity in the country, policy makers especially the election management agencies are but to look in the direction of applying more e-democratic measures, that will not only encourage greater participation but promote transparency, that will make the system more credible, thereby eliminating the questions that bring doubt and causes violence and instability.

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Making a Case for e-Voting in Nigeria

Moses Duruji[1], Charles Ayo[2], Samuel Oni[3] and Aderonke Oni[4]
Covenant University, Ota, Nigeria
moses.duruji@covenantuniversity.edu.ng,
charles.ayo@covenantuniversity.edu.ng,
samuel.oni@covenantuniversity.edu.ng
aderonke.oni@covenantuniversity.edu.ng,

Abstract: The challenge of developing an acceptable voting system that can reduce the manipulation and falsification of election results has been a major issue in Nigeria over the decades. The consequences of the perception of voting fraud have led to social upheavals with negative implication for the polity. Post election experiences, such as eruption of violence, prolonged litigation and sometimes culminating in the collapse of the democratic experiment, have informed the muting of ideas to create a leak prove voting system to surmount the challenges of electoral manipulation. The open ballot system was adopted in the Third Republic to reduce incidences of election rigging associated with the secret ballot system which was in use before then. This was modified and used to conduct the aborted 1993 presidential election in Nigeria. Though most analysts saw the modified system as an improvement over the voting systems previously used in the country, the secret ballot system re-emerged in the Fourth Republic and for fifteen years has been in use with its attendant fraud-prone shortcomings. Calls for improvement informed the recommendation by the Uwaise Commission and the National Conference for adoption of electronic voting system. This paper employs secondary sources and descriptive analysis in the gathering and analysis of data respectively. Findings reveal the unsuitability for the Nigerian political environment, of the various voting systems adopted in the country, particularly, the secret and the open ballot system. It therefore advocates a faithful application of the system of electronic voting which has been found capable of eliminating the flaws of traditional voting system and enhancing the credibility of election results in the country.

Keywords: e-voting, elections, electoral frauds, secret ballot, open ballot, Nigeria

1. Introduction

Elections in Nigeria have always ended up in dispute over the results announced by the electoral body. Sometimes, announcement of results is followed by widespread violence to challenge the results often alleged as not reflective of the wishes of the electorate. The consequences of the perception of voting fraud have led to social upheavals with negative implication for the polity. Therefore a major challenge confronting Nigeria is that of developing an acceptable voting system that can reduce the manipulation and falsification of election results. Post-election experiences, such as eruption of violence, prolonged litigation and sometimes culminating in the collapse of the democratic experiment, have informed the muting of ideas to create a leak prove voting system to surmount challenges of electoral manipulation. For instance, the open ballot system was introduced in the Third Republic of Nigeria to reduce incidences of election rigging associated with the secret ballot system that was in use before then. The modified version of the open ballot system was used to conduct the aborted 1993 presidential election in Nigeria which most analysts saw as an improvement over the system that was previously in use. However, the secret ballot system re-emerged in the fourth republic and, for fifteen years, has been in use with its attendant fraud-prone shortcomings that are well documented in reports of election monitoring groups. The desire by the government of Nigeria for improvement of the ballot system in informed the recommendation by the Uwaise Commission and National Conference for the adoption of electronic voting system in the country. The question that this call for electronic voting system insinuates is the extent to which e-voting system can enhance credible election in Nigeria. This is the focus of this paper. It examines the various voting systems that have adopted in Nigeria particularly the secret and the open ballot system and their unsuitability for the Nigerian political environment and investigates the potential of e-voting for enhancing credible elections in the country.

This research paper relies heavily on secondary sources of data. It employs a combination of historical and descriptive research in the gathering and analysis of data. The historical approach enables a systematic and chronological examination of the various voting systems and factors that informed the adoption and jettisoning of those systems. This is based on the conviction that effectively tackling the contemporary voting challenges in Nigeria necessitates delving into the various interactive antecedents that culminated to the present electoral crisis. Descriptive approach however was necessitated by the need to give a detailed account of the process and system of voting in the contemporary Nigeria with the view of chatting pathways for credible voting system in Nigeria. The combination of these two research design thus, enables a comprehensive study of voting in Nigeria.

2. Review of related literature and theoretical framework

Voting in a competitive election is a form of political participation and hence a defining feature of democracy (Mahler, Jesuit and Paradowski, 2014). There are various extralegal institutions through which ordinary people can participate in politics, however, it is not uncommon, for practitioners of politics to emphasize voting as a critical and essential aspect of authentic participation (Isumonah, 2004). It is in the light of this that Klein (2005) avers that the most notable form of political participation is voting in elections. Similarly, Magstadt (2006:313) conceptualises voting as the most visible form of conventional participation and a measure of active citizens' participation in politics. Heywood (2007) observes that voting commands a central position in political analysis because it provides one of the richest sources of information about the interaction between individuals, society and politics. As a form of political participation, voting is a critical means of promoting public accountability because it gives power to the electorate to dispel elected officials who have not performed well in the public interest. It is an essential component that is required for ensuring the stability and legitimacy of every political system (Kumari & Kidwai, 1999).

According to Chareka and Sears (2006), voting is a democratic process of selecting political leaders and representatives of the citizens. It is a means of effecting change in the direction of a country as well a means for citizens to have a voice. Similarly, Bernhagen and Marsh (2007) conceive voting as pivotal to liberal democratic practice because of its implications for selecting leadership, influencing the policy choice of government and reflecting the views of the people. In this regards, voting is an exercise of citizen's sovereign power in a democratic regime. Consequently, the political power people in a society have would be linked directly to the degree of their voting in the political process of that society (Lewu, 2005). In fact, as argued by Mahler, Jesuit and Paradowski (2014), the existence of varying proportions of all eligible citizens who actually exercise voting right is one of the most remarkable political differences among contemporary democracies. Thus, in every society, the wielders of political power are very keen on ensuring that substantial proportion of eligible citizens exercises the voting right (Kumari and Kidwai, 1999). For Chareka and Sears (2006) voting is a key element of democratic governance, a hard-won right, and a duty of democratic citizenship. It is a vehicle for realising the democratic idea of the consent of the governed. It is because of this crucial place that voting as a form of political participation holds that Kumari & Kidwai (1999) asserts that its denial to substantial part of the population can result to explosive situation.

The fact that voting is the most quantifiable form of political behaviour has generated academic interests about the factors that affect voting. Heywood (2007) identified short-term and long-term influences on voting. According to him, short-term influences are specific to a particular election and do not allow conclusion to be drawn about voting pattern in general. Heywood (2007) thus identified the state economy as the chief short-term influence on voting pattern. The extent of the influence of the state of economy on voting pattern reflects on the relationship between the popularity of a particular government regime and such economic variables as unemployment, inflation and disposable income. On this note, the material circumstance of individuals has a great influence on such persons' voting pattern. Supporting the influence of economic status on voting, Leigh (2004), in his studies of the impact of demographic factors on voters' partisan choice in Australia, discovered that income as a factor of individual's economic status has a far reaching influence on voting. The study by Dewa (2009) of the factors affecting voting behaviour and patterns in the Zimbabwe's 2008 harmonized elections, revealed the impact of the devastated Zimbabwean economy on the voting pattern of the citizens. As observed by him, the 2008 elections came amidst economic challenges such as inflation, famine, unemployment, currency depreciation, etc, which made Zimbabweans desired change of government, hence voting tilted in favour of the opposition party. It is on the recognition of the importance of economic factor on voting that government often attempt to create pre-election booms in the hope of improving their chances of gaining re-election (Heywood, 2007). Similarly, in their exploration of the relationship between voting and economic factors in the developed world, Mahler, et al (2014) found out that such economic variable as income inequality and redistribution by way of social transfers accounts for the variation in voting across democracies in the world.

Heywood (2007) identified the personality and public standing of party leaders as another short-term influence on voting. This is because party leaders are seen as the brand image of their parties. In view of this, parties may replace leaders considered as electoral liability in order to elicit voters' support. McAllister (2003) lends his credence to the influence of the personality of party leaders on voting by arguing that trends in all liberal democracies is that politics has become increasingly personalised. Party leaders are increasingly becoming more important in democratic politics thereby making the nature and style of political leadership having great effect

on voting. Thus, party leaders, exploiting their exposure particularly through electronic media have been seen as crucial in shaping and attracting votes (McAllister, 2003). The style and effectiveness of a party's electoral campaign strategy is another short-term influence on voting identified by Heywood (2007). Curtice (1999) studied the influence of newspapers election campaign on the 1997 British general election. With his observation of the highly partisan British press, Curtice (1999) was interested in finding out whether or not newspapers do influence votes. His research findings revealed that newspapers campaign can influence voting behaviour and aggregate elections outcome. Heywood (2007) noted that the mass media may have both short-term and long-term influence on voting. In line with this, Dewa (2009) identified the significant role of the media in influencing voting. He observed that in the 2008 Zimbabwe's election, the contesting political parties did not have equal access to using the media for adverts and campaigning. This changed the voting patterns significantly. Closely related to this is the impact of political education and mobilization. Base on the hypothetical conjecture that political knowledge boosts political participation because it promotes an understanding of the relevance of politics, Huang, Wang, and Lin (2013) studied the Taiwan's 2008 and 2012 legislative Elections and discovered that political education and mobilisation have important influence on political action, such as voting. Another very crucial factor that influences voting, according to Brady and McNulty (2011), is the cost implication of voting. The cost implication of voting in this regards, include the energy, time and resources expended in finding and getting to the polling place. Convenience voting in the form of electronic aided voting have therefore, been found to greatly impacts voters' turnout (International IDEA, 2011).

The imperative of voting hinges on the theoretical framework of representative democracy which exposes the imperative of voting by all eligible citizens in electing representative to make political decisions as the hallmark of modern democracy (Setala,). As observed by Twomey (2013), one of the primary goals of representative democracy is the expression of the will of the people through their choice of representatives in democratic elections. In this regard, the elected representatives listen and act according to the wishes of the populace. Three factors determine the effectiveness of a representative democracy. First, is a genuine competition which presents opportunity for citizens to select, through election, political leadership. Second, is the existence of free communication, both among the people and in the press and third, the existence of meaningful choice to voters between candidates (Jancic, 2012). Election of representatives is therefore central to democratic process (Dahl, 1989). Credible platform for people to participate in voting enhances the legitimacy of the resulting government and its mandate to govern, but voting system that is marred with manipulations will result in low voter turnouts and doubt about the legitimacy of the government (Twomey, 2013). It is therefore important that mechanism for improving credible elections and voters' turnout be vigorously pursued by all democratic regimes.

3. The voting method in Nigeria

The voting method in Nigeria has been conventional paper balloting which was in use in almost all elections conducted in Nigeria until in the 1990s when the electoral body headed by Professor Humphrey Nwosu introduced what was called Open Ballot System which required voters to queue behind their preferred candidate and political parties. The Modified Open Ballot System (MOBS) that introduced elements of secrecy was used in the June 12, 1993 presidential election where paper ballot are given to all accredited voters who presented themselves for accreditation within a specified period of time before commencement of thumb-printing in a closet and dropping of the paper ballot in transparent ballot box placed in the open.In the Fourth Republic Dispensation, the electoral body started with conventional paper ballot system but of recent, particularly for the 2011 General Elections and subsequent elections, the Remodified Open Secret Ballot System (REMOBS) has been in use. This system involves a separate period and process of accreditation in order to ascertain and authenticate the voters at every polling unit. This is usually done between the hours of 8:00am when the polling station opened and 12.00noon when accreditation ended provided that any prospective voter already on the queue to be accredited before 12.00 noon was accredited.

The accreditation process requires that a voter presents himself/herself with the temporary voters card (TVC) to each Assistant Presiding Officer in charge of the voting point, who upon satisfaction of the holder's identity made a mark on the appropriate checkbox on the register. At the end of the accreditation process, all accredited voters were expected to line up in either a single queue or two (separate for men and women according to cultural preferences) for counting of all accredited voters in that unit. The total number of accredited and counted voters was loudly announced and recorded in the appropriate column of the results sheet (Form EC 8A series).

At the end of the count, the voters, still on the queue, were issued with ballot paper duly stamped and signed by the Presiding Officer. The voter then proceeds to the voting cubicle to make a confidential and secret finger print impression on the ballot paper against the party of his/her choice and then dropped the ballot paper in the Collapsible Transparent Ballot Box in full glare of all present. Voting ends when the last voter on the queue votes.

Despite the various modifications of voting system, the Nigerian experiment with elections has been bequeathed with myriads of challenges. The desperation for power by Nigerian politicians has led to devising of ways to circumvent the system to their advantage. This rigging method is highlighted below was as articulated by Ibrahim (2007);

Compilation of fictitious names on voters registers
Illegal compilation of separate voter lists
Illegal printing of voters' card
Illegal possession of ballot boxes
Stuffing of ballot boxes
Falsification of election result
Voting by under-aged individual
Illegal printing of forms used for elections and declaration of election results
Deliberate refusal to supply election materials to certain areas
Announcing results in places where no elections were held
Harassment of candidates, agents and voters
Change of list of electoral officials
Box-switching and inflation of figures
These myriad of problems necessitates an introduction of voting system different from the traditional method of voting in the country.

E-voting a panacea to Nigerian voting system

The indispensability of voting to democracy is seen in that it allows the populace to choose their representatives and express their preferences for how they will be governed. In Nigeria however, the various voting systems adopted since independence has proved to be incapable of ensuring the sanctity of the election. Cranor (1996) has succinctly outlined the features of a good voting system as follows;

Accuracy: A system is accurate if (1) it is not possible for a vote to be altered, (2) it is not possible for a validated vote to be eliminated from the final tally, and (3) it is not possible for an invalid vote to be counted in the final tally. This means that a good voting system will not allow inaccuracies or where inaccuracies are introduced, can be detected and corrected.

Democracy: A voting system is democratic if (1) it permits only eligible voters and (2) it ensures that each eligible voter can vote only once.

Privacy: A voting system is private if (1) neither election authorities nor anyone else can link any ballot to the voter who cast it to prevent voter intimidation and (2) no voter can prove that he or she voted in a particular way, which can help prevent vote buying and extortion.

Verifiability: A voting system is verifiable if anyone can independently verify that all votes have been counted correctly. There are different ways of verifying votes depending on the system of voting; some systems allow voters to verify their own vote and correct any mistake without sacrificing privacy. Some systems might allow mistakes to be pointed out but not corrected, or verification of the process by party representatives but not by individual voters.

Convenience: A system is convenient if it allows voters to cast their votes quickly in one session, and with minimal equipment or special skills

Flexibility: A voting system is flexible if it allows a variety of ballot question formats, including open ended questions; this makes it possible for write-in candidates and some survey questions. Cryptographic voting protocol such as yes/no used in referendum are inflexible.

Mobility: A voting system is mobile if there are no restrictions on the location from which a voter can cast a vote. Participation of voters may increase if people could easily cast votes from computers in their homes offices, schools, libraries etc. The mobility property itself is a major contributor to some of the problems associated with designing a secure and private electronic voting system. By allowing voters to cast their votes from virtually anywhere, the chances become very high of expand the universe of ineligible people who may attempt to vote. Furthermore, this also limits abilities to prevent voters from proving how they voted, as there are no longer private voting booths that can prevent vote buyers from observing vote sellers as they cast their votes (Duruji 2008).

The use of the conventional paper ballot in Nigeria over the years has proved to fall short of a good voting system as postulated by Cranor (1996). This system of voting is incapable of ensuring the sanctity of the election. It is, as we highlighted earlier, susceptible to manipulation which has made it imperative that Nigeria, at this time, should adopt electronic voting system as a measure to potentially check and of eliminate, to the barest minimum, most of the frauds that usually mar credible elections in country.

Electronic voting system is the system of voting whereby computers and telecommunication systems are used to handle aspects or entire gamut of the electoral process. E-voting systems covers six areas of voting processes including voter's register, voters' authentication, voting and votes saving, vote management, vote counting and auditing Jegede et al (2012).

There are two categories of e-voting systems; e-voting through machines and remote e-voting (Folarin et al., 2014). The machine based e-voting is located at polling stations and requires supervision of electoral agent's representatives. The remote voting also referred to as i-voting is a self-help form. It is described as any voting process where an electronic means is used for votes casting and results counting. Based on these categories, there are several types of e-voting that Nigeria could employ to suffice the traditional voting system (Goldsmith and Ruthrauff, 2013; International Idea, 2011):

Direct Recording Electronic (DRE) voting machines eliminate paper ballots from the voting process. Compared to traditional elections, voters go to the polling station, verify their identity and are issues a PIN or other form of authorization to approach the polling terminal. They enter the PIN and vote for candidates of choice. DRE gives voters summary of selection and a chance to review selection before ballot is "cast" and the voter is subsequently free to leave. DREs often come with or without a voter-verified paper audit trail (VVPAT). VVPATs are intended to provide physical evidence of the votes cast.

Optical Mark Recognition (OMR) systems are e-voting systems that make use of scanners to read voters' choice on special machine-readable ballot papers. It combines paper ballot with vote counting. Using OMR, vote counting can take place at either the central count systems (where ballot papers are scanned and counted in special counting centres) or polling stations where scanning and counting happen directly as voters drop their ballot paper into the voting machine).

Electronic Ballot Printers (EBPs) works like the DRE machine. They produce a machine-readable paper or token containing the voting choice(s). The machine-readable paper or token is then fed into a ballot scanner which does the automatic vote count. Internet voting systems allow votes to be cast in remote locations and transferred via the Internet to a central counting server. Votes can be cast from an unsupervised remote location, public computers or from voting kiosks in polling.

Electronic voting is a system that is compelling because of its inherent inbuilt advantages over the conventional paper balloting system in use in Nigeria. One of such compelling reasons for its preference is the fact that it produces tallies faster than the conventional manual process. E-voting system defines rules for valid ballot and gives an efficient method of counting votes which ultimately yield reliable result. Electronic voting also reduces the likelihood of human error in generating election results as use of computer application gives hundred percent accuracy of tabulating the figures (International IDEA, 2011). It has also been proven that electronic

voting brings down the cost of conducting elections in terms of deployment of human and material resources compared to the conventional system (Jegede et al., 2012).

Moreover, electronic voting provides the potential for voters to be alerted when they make simple mistakes in casting their vote unlike the paper ballot which can be voided even when ballots are folded to be slotted into the ballot box. A typical instance is when a voter selects more candidates than are allowed (called over voting) and Called under-voting - an instance where the voter accidentally skips selections or selects fewer candidates than are allowed (Jegede et al., 2012). Furthermore, electronic voting system when compared to the conventional paper ballot system, improves accessibility, in that all eligible voters can cast their vote in privacy. Weak candidates cannot be accused of being a spoiler for any candidate s voters input in an electronic voting system are correctly entered.

E-voting has been recognized (International IDEA, 2011) as a tool for advancing democracy, building trust in electoral management, adding credibility to election results and increasing the overall efficiency of the electoral process. E-voting solutions have the potential to eliminate most common flaws of traditional voting system. As noted by International IDEA (2011) e-voting can eliminate election fraud, speed up vote counting and election result processing, increase accessibility and make voting more convenient for citizens. In addition, e-voting can improve voter's identification process by utilizing biometric recognition (Yinyeh and Gbolagade, 2013).

While there is a surge in the deployment of electronic voting system around the world, the Nigerian case hit a brick wall after lawmaker prohibited its use in the electoral act of 2006. The INEC led by Attahiru Jega however, introduced elements of electronic voting when a DDC machine was procured in 2010 to capture biometric data of voters and the desire to use card readers for authentication in the 2015 General Election which has brought in some improvement in the outcome of elections in Nigeria. It is imperative that Nigeria to joins the rest of developed nations in fully embracing Electronic Voting System. The success recorded in the use of General System of Mobile clearly shows that the Nigerian population is ripe for the adoption of e-voting system as a solution to the challenges of voting in the country.

4. Conclusion

No doubt, the voting system in Nigeria over the years have been highly prone to fraud and manipulation and experience over the years shows that politicians has taken advantage of this to outdo one another hampering the desire to attain a credible and acceptable elections. The Fourth Republic with its series of elections has provided the environment for comparison and basis for suggesting improvement. The urgency for this change follows the embarrassing outcome of recent elections in the country as indicated in reports of election observers. Consequently, adoption of a voting system that inspires confidence has become imperative. EVM becomes plausible judging from its impact in places where it in used. More so, the experiences of the country in other aspect of life, clearly indicate that the country is ripe for the introduction of EVM as a solution to the challenges of voting. The trend of the times in terms of the deployment of information and communication technology (ICT) which has become the vogue in most part of the world should be adopted by the country more so when such system is comparatively cheaper with the potential capability to reduce fraud. This paper therefore, calls for the relevant legislation that will enable the smooth migration to EVM in the country's elections.

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Cyber-Attack as a Menace to Effective Governance in Nigeria

Oluyemi Fayomi, Oly Nelson Ndubisi, Charles Ayo, Felix Chidozie, Lady Ajayi and Uchechukwu Okorie
Covenant University, Ota, Ogun State, Nigeria
nike.fayomi@covenantuniversity.edu.ng
olynel@hotmail.com
charles.ayo@covenantuniversity.edu.ng
felix.chidozie@covenantuniversity.edu.ng
adaina.yartey@covenantuniversity.edu.ng
ucheson4excel@yahoo.com

Abstract: Cyber-attack is an attempt by hackers to damage or destroy a computer network or system for purposes of mischief, fraud, and/or hedonism. To say that the incidences of cyber-attack are increasing rapidly in Nigeria is not only an understatement but also a cliché. From the organized private sector to public service, hackers have not spared any entity. More recently, governments in both developed and developing countries have had to deal with this menace on a frequent basis. The government of Nigeria is not an exception the thorn in the flesh. Indeed some government officials have blamed ineffective governance on the menace of cyber-attack, thereby creating the impetus for this research. The study therefore investigates the incidences of cyber-attack in Nigeria and its impact on democratic governance. The study was based on descriptive and explorative research design. This involves the use of research instrument administered to retrieve vital information from the target audience. The information gathered were coded into scale variables that support empirical investigation of the subject matter. In this study a total of 150 questionnaires from which a total of 126 were retrieved and used for the analysis. The data analysis utilized frequency distribution involving percentage and factor analysis. This method is frequently used in the Social Sciences research. Both factor analysis and relational analysis were applied. Factor analysis establishes the most prominent factor responsible for cyber-attacks motivation while the relational analysis was further utilized in examining the determined effect of incidence and nature of cyber-attacks on the assessment of the effectiveness governance in Nigeria. The evidence from the study provides significant result in support of a significant influence of cyber-attack menace on the perception of governance. Analysis of the motivating factors suggests that financial benefits and wide spread dissemination of the virus accounted for most factor responsible for the attacks. The study therefore recommends that government and law enforcement agencies should strategize on means of providing a more comprehensive data base to facilitate effective investigation and further research in this area.

Keywords: cyber attack, governance, e-governance, factor analysis, Nigeria

1. Introduction

Cyber-attack is often described as a crime that has some form of computer or cyber facet to it. The phenomenon is constitutes a bigger risk recently than before due to the precipitous number of connected people and devices. The distinguishing features of cyber-attack are: Cyber-attack crime has now surpassed illegal drug trafficking as a criminal moneymaker; an identity of an individual is stolen every 3 seconds as a result of cyber- attack; without a sophisticated security package, unprotected PC can become infected within four minutes of connecting to the Internet.Perpetuators of cyber-attack use a number of methods, depending on their skill-set and their goals. These include theft of personal data, copyright infringement, fraud, child pornography, cyber stalking, bullying. It should be noted that cyber-attack covers a wide range of different attacks, that all deserve their own unique approach when it comes to improving the computer's safety and protecting the users and the citizens as a whole. In Nigeria, the survey led by Gantz (2013) reveals that perpetuators of cyber-attacks entrench or implant counterfeit software with dangerous malware as a new technique of preying on computer users who are unaware of the potential danger. Therefore, more danger awaits the computers of those acquire counterfeit and pirated software.The Internet has facilitated dramatic increases in worldwide interconnectivity and communication. This form of globalization has yielded benefits, such as improved standards of living in the developing world, but it has also given rise to new weapons of resistance for groups seeking to oppose certain political measures and ideologies. Hence, for a proper understanding of the study, this paper will be focusing on the following objectives;

- To identify whether there is a significant link between incidences of cyber-attacks and the assessment of effective governance in Nigeria and

- Secondly this study intends to examine the influence of variant cyber-attacks on perception of governance performance in Nigeria.

1.1 Conceptual clarifications:

The concepts that are germane and will be discussed in this article include Cyber-attack and Governance.

Cyber-attack: It has been observed that the concepts cyber-attack and cyber-terrorism are used by scholars have most times interchangeably to mean the same thing (Ristucci and Baich, 2012). But in actual sense the two concepts are different. Therefore, it is necessary to demystify the concepts cyber-attack and cyber terrorism.

McEachern (2011) defines cyber terrorism as:

> *a computer based attack or threat of attack intended to intimidate or coerce governments or societies in pursuit of goals that are political, religious, or ideological. The attack should be sufficiently destructive or disruptive to generate fear comparable to that from physical acts of terrorism. Attacks that lead to death or bodily injury, extended power outages, plane crashes, water contamination, or major economic losses would be examples. . . . Attacks that disrupt nonessential services or that are mainly a costly nuisance would not [be cyber terrorism].*

McEachern (2011) describes Cyber-attack as an umbrella term for several types of cyber-related activities, each of which has different motivating factors. For example Hacking, is a cyber-attack motivated by political activism that often involves ruining a website for the explicit purpose of publicly shaming the target. Cyber-crime may involve using cyber-attack as a means, but its sole motivation is to gain financially from the attack (i.e., using a cyber-attack to steal credit card information); and Cyber-espionage involves an individual or team using various cyber-attack methods to capture sensitive foreign government information and plans, backed by a foreign state, and done by an individual or team. All of these forms of cyber-attacks are performed by what has been known popularly since the 1980s as a computer hacker or hackers. Originally, hacker was used as a term of compliment and egotism among individuals who were interested in programming, and has origins as early as the 1970s at the Massachusetts Institute of Technology, but has since that time come to be better known to represent malicious individuals who break into computer systems by effecting their information with countless tools (Lachow, 1999).

Karnouskos (2014) defines Cyber-attack;

> *as any type of belligerent scheme employed by individuals, organizations and countries that targets computer information systems, infrastructures, computer networks, and/or personal computer devices by various means of malicious acts usually originating from an anonymous source that either steals, alters, or destroys a specified target by hacking into a susceptible system.*

Also, the U.S. National Research Council (cited in Shackelford, 2013) defines;

> *Cyber-attacks as deliberate actions to alter degrade, deceive, disrupt, or destroy computer networks or systems or the information and/or programs resident in or transiting these networks or systems.*

On the other hand, Shackelford (2013) observes that Cyber-attack is often broken into four main categories namely; espionage, criminal activity, cyber warfare and terrorism. This she disagrees with. She opines that cyber-attacks should not be categorized in this manner; motivations can overlap and targets abound in cyberspace. For example, there has been a spate of high-profile cases of cyber-crime and espionage, as well as alleged state-sponsored cyber- attacks involving criminal organizations and terrorist groups targeting both private and public sectors. Cyber- attacks against states in particular are on the increase. Examples of such attacks can be seen in Estonia in 2007, Georgia in 2008, Iran in 2010, and South Korea in 2013 (Herzog, 2011).These attacks could be said to emanate from foreign rivals in pursuit of exclusive data or hackers demand in revenge or looking for profitable loopholes, or even terrorists anticipating to cause economic havoc and also distort political activities (Brenner, 2013).

Hathaway, Crootof, Levitz, Nix, Nowlan, Perdue and Spiegel (2012) defines a cyber-attack as consisting of any action taken to undermine the functions of a computer system or network for political or national security or hinder the effective governance of any country. Imbedded in this definition is the prerequisite that the conduct must be active: either offense or active defense. Active defense includes "electronic counter-measures designed to strike attacking computer systems and shut down cyber-attacks midstream."This

definition says that cyber-attack "consists of any action taken". Such actions include hacking, bombing, cutting, infecting, et cetera. But the objective can only be to undermine or disrupt the function of a computer system or network in explaining the phrase, to undermine the function" in the definition. It is certain that the main objective of a cyber-attack must be to undermine the function of a computer network. A computer network may be compromised indifferent ways. Syntactic attacks disrupt a computer's operating system, causing the network to malfunction. Examples of such include viruses, worms, Trojan horses and denial of service attacks.Cyber-attacks are becoming widespread and constantly under attacks are organizations, institutions and countries. Despite the intrusion detection systems (IDS), firewalls (FW), evasion prevention systems (EPS), network patches, anti-virus applications, fuzzers, and other penetration detection tools available in the cyber security marketplace (Udo-Akang,, 2014). It is a posing a serious threat to effective governance and national security of most countries. It has a global origin and every organization or country is a potential target.

Governance: Fukuyama (2013) defines governance as a government's ability to make and enforce rules and to deliver services, regardless of whether that government is democratic or not. It is about the performance of agents in carrying out the wishes of principals, and not about the goals that principals set.

Marc (2011) relates governance to the processes of interaction and decision-making among the actors involved in a collective problem that lead to the creation, reinforcement, or reproduction of social norms and institutions.

Effective Governance in Nigeria: For governance to be termed effective or good it should have attained the following; equity, justice, enhanced participation of citizens, protection of life and property, respect of the rule of law and improved living standard of the populace, responsiveness, a strong civil society, free press, social sanction and reward system, efficient systems and structures. Thus, Anyadike and Emeh (2014) define governance as that process employed to achieve the noble end of the state.

It is an obvious datum that despite Nigeria's vast resources and huge potentialities, she remains grossly undeveloped as abject poverty, acute youth unemployment; heightened crime rate, poor health prospects and widespread malnourishment have been the main features of Nigeria's political economy (Ogundiya 2010 cited in Anyadike and Emeh, 2014). Hence, the problem of development in Nigeria is a problem of governance; especially when defined in terms of the proper, fair and equitable allocation of resources for the achievement of the ends of the state, which is the promotion of the common good of the people. Not to mention most importantly the fact that, Nigeria has been categorized among countries practicing all manners of online fraud such as hacking, fraudulent transactions via the internet, theft of credit cards among others, although, this categorization does not augur well with the country. But irrespective of that, the practice continues unrelenting and the individuals involved are catching fun, as there seems to be no law guiding against cyber-attacks in the country.

Dickson (2012)affirms that one fundamental thing Nigeria lacks in governance and government is the word "good" even when many Nigerians have identified good governance as the sine qua non for peace, progress, and stability, free and fair elections. In fact it is viewed as the only passport to delivering the dividends of democracy. For the nation to work, we need good governance. In order to maximize our potentials, improve the general welfare of the Nigerian people and even development in geo-political terms, there must be good governance. Until good governance is viewed as the process of decision-making and the process by which decisions are implemented, we are still far off simply because the way and manner public persons deal with public institutions, conduct public affairs, manage public resources, are questionable, corrupt, and without due regard for the good of the people.

1.2 Review cyber-attacks on governance in some selected countries

Cyber-attacks have been widely acknowledged as computer-to-computer attacks undermining the confidentiality, integrity, and /or availability of computers and/or the information they hold (Hathaway et al, 2012). The importance of securing cyberspace is increasing, along with the sophistication and potential significance of the results of the attacks. Moreover, attacks involve increasingly sophisticated coordination among multiple hackers across international boundaries, where the aim has shifted from fun and self-satisfaction to financial or military gain, with clear and self-reinforcing motivation (Kim et al, 2012:66). Indeed, cyber-attacks on states have in recent time proliferated both in numbers and severity. While incidences of

cyber-attacks in developed countries are well documented, very little research appears to be available about developing countries.

1.3 State of Estonia

Estonia was attacked in April 27, 2007 in what has come be recognized as the world's first cyber-attack that threatened the national security of an entire state. In a matter of hours, the Web sites of Estonia's leading banks and newspapers crashed. Government communications were compromised. The attack was reported to have originated from thousands of zombie private computers around the world (Shackelford, 2010). In essence, the persistent attacks involved computer robot networks, known as botnets that seized more than a million computers from 75 countries and directed them to barrage targets in Estonia (Beidleman, 2011:57).

Beidleman (2011) further argued that the majority of the attacks came in the form of distributed denial of service (DDOS) attacks that overwhelmed websites with a massive number of requests for information and crippled the underlying network of routers and servers. Despite efforts by government of Estonia to seek international support, especially from advanced countries of Russia and United States to combat the scourge, it nonetheless proved futile. The incident robbed the country of a huge slice of its national income before it was resolved.

1.4 The State of Belarus

The state of Belarus experienced a series of cyber-attacks in April, 2008 when the website of Radio Free Europe/Radio Liberty's Belarus service became a target of a Distributed Denial of Service (DDOS) attack. Corporative Cyber Defense Centre of Excellence (CCDCOE, 2010) argued that service of the radio station was inundated with about 50,000 fake pings every second, which the organization reported as unprecedented in the history of cyber assaults against them. It was also reported by the agency that in a few hours following the commencement of the DDOS attack against the Belarus Service, seven other RFE/RL websites in the Eastern European and Central Asian/Middle East region (Kosovo, Azerbaijan, Tatar-Bashkir (ethnic regions within the Russian Federation), Radio Farda in Iran, South Slavic, and Tajik) were also affected. The attack was reported to have lasted for two days and caused incalculable damage to the Belarus government.

1.5 The Lithuanian State

Following the passage of the amendment of the law and its condemnation by the Russian Federation, on June 2008, cyber-attacks against Lithuanian websites began. According to the report released by the Lithuanian embassy cited in (CCD COE, 2010), the main type of the attack was defacement of websites and some e-mail spam. It furthermore noted that the original content of nearly 300 websites was replaced with communist images on a red background portraying the flag of the Soviet Union. According to the Lithuanian Computer Emergency Response Team (CERT-LT, cited in CCD COE, 2010), the majority of the attacked Web sites were hosted on a single Hostex Web server, which had a vulnerability either in the Web server software or the Linux operating system. CERT-LT further reported that the hackers launched the attack against all that was accessible in Hostex' Servers with no specific regard to any particular website. CERT-LT has estimated that about 95% of the sites that were hit belonged to private sector organizations, since the public sector largely avoided the damage due to early warning.

1.6 The State of South Africa

The South African Consumer Union (SACU) had in 2003 drawn the attention of the South African government to the urgent need to protect their clients against Internet Banking Fraud. According to Herselman and Warren (2010) hackers defaced more than 60 South African web sites in 2003. They contended that the incident was a new daily record and significantly higher than the previous record of 52 web sites defaces in one 24-hour period. They reported that on 20 July 2013, a hacker cleaned out a number of ABSA bank accounts, noting that the hacker used spyware to obtain usernames and passwords, essentially engaging in identity theft in siphoning off funds from unsuspecting users.

Similarly, The Cape Times, (cited in Herselman and Warren 2010), had in June 2003 reported that the African Bank website was hacked onto by an unknown party. According to the report, the "7up hacker" had invaded their website and defaced the site. 7up removed all the content from the bank's home page and left a

damaging message. Consequently, 7up hacked into more than 52 South African websites – mostly in the Western Cape – in less than 18 hours; however, there is no evidence to suggest that the hacker gained access to bank accounts.

Furthermore, South African universities have come under cyber-attack in the past. On July 2, the IT Services website at the University of Cape Town was defaced by hackers. Before that, the University of Natal fell prey to attacks on May 21 and August 20. The University of the North was hacked on April 18, UCT on April 18 and the Medical University of South Africa on October 20, 2002 (Herselman and Warren, 2010).

1.7 The Nigerian State

Cyber-attacks committed in Nigeria are more than any other country in Africa. World ranking in cyber-attack indicate that Nigeria is on top of the list after United States and Britain but first in Sub-Saharan Africa (Chiroma et al, 2011:7). Documented cases of cyber-attacks most prevalent in Nigeria include yahoo attack, hacking, software piracy, pornography, credit card or ATM fraud, denial of service attack, internet relay chat (IRC) crime, virus dissemination, phishing, cyber plagiarism, spoofing, cyber stalking, cyber defamation, salami attack and cyber terrorism (Olusola et al, 2013). Indeed, Nigeria which boasts of a 29% internet penetration rate, 40 million internet users as at 2013 and projected 70 million users in 2015, the highest in Africa, has suffered for years from cyber related crimes (The Guardian Nigeria, 2013). According to Isaac (cited in the Guardian Nigeria, 2013), Nigeria as a fast emerging market risks higher foreign invasion of cyber-attacks because of the glut in capacity utilization. It is this influx of foreign investors into the country and opportunities that result from such that puts the country on the international sport light in contemporary cyber related crimes.

In 2011, a group of Nigerian hackers known as Niger Cyber Hacktivists attacked government sites including the National Poverty Eradication Programme website and the Niger Delta Development Commission, posting a letter protesting against the N1b ($6.6m) cost of inauguration for President Goodluck Jonathan and the country's Freedom of Information Act. In a similar attack in January 2013, the Economic and Financial Crime Commission (EFCC) was attacked in response to reports of corruption (IDG Connect 2013). It is on this score that I T News Africa estimated the sum of $200 million as the annual cost of cyber-attacks to the Nigerian economy.

According to another report released by the International Data Group (IDG, 2013), the world's largest technology media company, for years Nigeria has been the leading country in spam, with promises of Nigerian Princes offering millions for only small advance fee. It argued that these 419 Scams are so synonymous with the country they are often called Nigerian scams. IDG further reported that back in 2005, Lagos state in South West Nigeria was widely considered the world's leading place for scam crimes. It is important to note that although scam crimes are still common in Lagos state, they have been on the decline of late because the Nigerian Police have been more active in recent years in shutting down these kinds of operations.Perhaps what can be attributed to the persistence of cyber-attacks in Nigeria is the twin factor of the exponential growth in mobile telecommunication users and the rise in social networking – potential sources of globalization - especially among the teeming mass of unemployed youths in Nigeria. According to Akwule (2011), increasingly more cyber-attacks are perpetrated through mobile phones and social networks such as face book, twitter etc. He averred that Nigerian government is demonstrating increased awareness of cyber security issues, but existing capability to deter, monitor, or pursue cyber security is relatively low due to the forces of globalization. He submitted that the African Union is cooperating with other international agencies to arrive at harmonized legal framework that will be suitable to arrest the scourge of cyber-attacks in African countries.

1.8 Research hypotheses

The following statements were hypothesized and tested in the course of this study;

Hypothesis I

H_1: There exists a significant linkage between incidences of cyber-attacks and the assessment of effective governance in Nigeria

H_0: There exists no significant linkage between incidences of cyber-attacks and the assessment of effective governance in Nigeria

Hypothesis II

H_1: The variant cyber-attacks has a significant influence on the perception of governance performance in Nigeria

H_0: The variant cyber-attacks has no significant influence on the perception of governance performance in Nigeria

1.9 Research methodology

Research Design: The exploratory and survey research design were utilized in this study. The survey research design provides the bases for method enquiry and information gathering that cuts across different target audience at a point in time. The exploratory design offers the researcher opportunity to gain more insight into the nature and occurrences of cyber-attack as well as it relationship with the perception and assessment of effective governance in Nigeria. In addition explorative research design enables the researcher to have a better understanding of a situation that is not quit clear and thus has not attracted serious investigation and research in the past, (Asika, 2004).

The analytical techniques were regression and descriptive method of data analysis.

Sample and sampling procedure: The population consists of experts in information and communication network systems in Covenant University, Bells University of Science and Technology cyber Café, internet users, and three major cyber-domains within the two Universities. A sample size of 150 was randomly selected from a targeted population of 250. The target audience was drawn randomly from the different schools. The simple random technique is basic sampling approach that gives opportunity for equal representation and selection of subjects. The sampling procedure was done in such a manner that will include all categories of inter users cutting across the institutions considered. This was to provide necessary variety of information needed for this study.

Target audience: A total of 150 copies were administered while filling of the responses was personally supervised by the researchers from which 126 copies dully filled were retrieved and utilized for this analysis. The response rate was 0.84 percent was recorded from the returned questionnaires. The responses were coded into scale variables that are measurable using a five point likertscale; Very high, High, Moderate, Low and Minimal. The coded responses were subjected to both descriptive and regression analyses that enable the study reach a conclusion.

Research Instrument: The research instrument employed was a well structured questionnaire. The subjects were administered the questionnaire at their respective place of work. The administered instrument contained the instruction on how filling the questionnaire. The respondents assured of the confidentiality of the information provided in the instrument. In developing the research instrument, it was divided into two parts; part A and B. The first part focuses on the demographic information of the subjects. Part B is sub divided into five Sections I-V rated on a 5-1 point scale (Very High – Minimal) with a total of 37 items measured. Section I relates to the outcomes related to types of attacks, section II measures the incidences of a the attacks, section III deals with potential sources of attacks, in section IV, we considered the motivating factors while section V relates to assessment and perception of governance performance. The questions used in this study were gathered from literature and adapted for the current research.

Validity and Reliability: In ascertaining the validity of the research instrument, face and content validities were established from the management professionals and experts in the centre for system and information services (CSIS) department. The CSIS department is responsible for internet security and communication services. The reliability was tested with Cronbach alpha statistic 0.934 with a total of 37 items tested in which the instrument was highly reliable.

Research Model: The analytical frame work for this study was adapted from the cyber incident analytical model approach by Mugavero and Sabato (2014). This present study model measures the relational effects of the outcomes related to types of cyber crime on the assessment and perception of effective governance in Nigeria. The researchers have drawn the constructs for model from the outcomes of related to types of attacks by Vatis (2001). In the research model the explained constructs measured the assessment and perception of

effective governance while the explanatory constructs measured the severity of the outcomes related to the types of threats associated with cyber-crime. In structuring the research instrument, the explanatory constructs were measured as the outcomes (includes; websites defacements, distributed denial of service attacks, internet relay crime, virus and Trojan dissemination effects unauthorized intrusion, attacks and system penetration) of threats and attacks rated on a five point likert scale (Very High, High Moderate, Low and Minimal effects) based on the severity of their effects. The explained construct was measured with the individual assessment and perception of effective governance (in terms of institutional public affairs management, enhanced citizen's participation, sanction and reward system and protection of life and property). However, it is pertinent to note here that only the threats with significant relations with the assessment and perception of effective governance were reported in the case of social sanction and reward system in section IV.

1.10 Data analysis and results

The responses from the survey provided the framework for the analysis. The research instrument was structured into two main parts. The first part deals with the information that relates to the demographic characteristics of the respondents while the second part was intended to ascertain valid information patterning to cyber-attacks and effective governance.

▪ **Demographic information of the respondents**

Table 1: Age

		Frequency	Percent	Valid Percent	Cumulative Percent
	15-25 years	100	79.4	79.4	79.4
	Between 26-35 years	23	18.3	18.3	97.6
	36-45 years	3	2.4	2.4	100.0
	Total	126	100.0	100.0	

Source; Authors' Survey, 2015

The analysis of table 1 shows the demographic statistics of the respondents who participated in the survey study. It further reveals that of the total respondents 100 which represents 79.4% were between the age bracket of 15-25 years, 23 (18.3%) were between 26-35 years while only 3(2.4 %) were within the age 36-45 age boundaries.

Table 2: Education

		Frequency	Percent	Valid Percent	Cumulative Percent
	None	8	6.3	6.3	6.3
	Primary school leaving certificate	14	11.1	11.1	17.5
	WAEC/NECO	67	53.2	53.2	70.6
	B.Sc./OND	28	22.2	22.2	92.9
	Above B.Sc.	6	4.8	4.8	97.6
	Professional certificate	3	2.4	2.4	100.0
	Total	126	100.0	100.0	

Source; Authors' Survey, 2015

The educational background (table3) of the respondents shows that 8(6.3) had no formal education, 14(11.1%) had primary school leaving certificate, the majority of the respondents were WAEC/NECO holders, 28(22.2%) were B.sc./OND holders, 6(4.8%) had additional qualification beyond B.Sc. while 3 had other professional certificates in their own fields.

Table 3: Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
	Petty Trading	8	6.3	6.3	6.3
	Farming	9	7.1	7.1	13.5
	Skilled Worker	45	35.7	35.7	49.2
	Cyber Operators	64	50.8	50.8	100.0
	Total	126	100.0	100.0	

Source; Authors' Survey, 2015

The occupational distribution of the respondents in table 5 suggests that 8 representing 6.3% of the total respondents were petty traders, 9(7.1%) were farmers; most of the respondents were skilled workers and cyber operators 64(50.8%).

Source; Authors' Survey, 2015

Figure 1: Nature of attacks

In figure 1 above, a large proportion of the respondents (37.30%) observed that the incidence of cyber-attack occurrences in recent time has moderated while (35.71%) also on the high side based on daily occurrences as shown in figure 1 above.
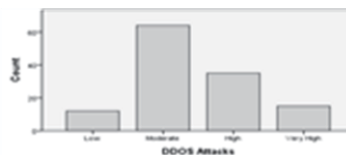
Figure 2: Distributed denials of service attacks

In figure 2, it could be observed that majority (64(50.8%) of the respondents are of the opinion that there is a moderate occurrences of the distributed denial of services attacks on their cyber networks, 35(27.8%) confirm that the attacks has been high in recent times while 15(11.9%) believed that it has been on a very high rate compared to previous incidences.
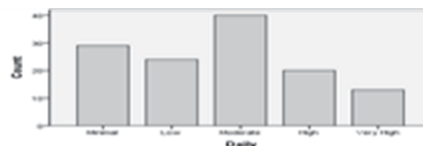
Figure 3: Incidences of attacks on daily basis

As shown in figure3, the greatest proportion of the respondents (31.7%) observed that the incidence of cyber-attack occurrences in recent time has moderated while some (15.9%) also affirmed it is on the high side based on daily occurrences as shown in figure 1 above.

1.11 Discussion of results

The analysis of the regression models for governance assessment, nature and incidence of attacks shows that estimated results are statistically significant at 1 percent given the analysis of variance result of 15.685 for governance perception and nature of attacks and 26.985 for governance perception and incidences of attacks. This further suggests the empirical results are free from spurious effects and reliable for useful policy recommendations. The evidences from the co efficient result of the determined effect of nature of attacks (NOA) and incidences of attacks (INCD) reveals that the frequency of cyber-attacks occurrences (0.423) has more determined effect on governance than the nature of the attack (0.335). This implies that the frequent occurrences of cyber-attacks in its variant forms and corresponding impact such as defacement of public and privates websites, Trojan horses and virus dissemination and unauthorized intrusion effects poses a great threat on governance in Nigeria as revealed by this current study. On the contrary it could deduced from the study that some attacks such as distributed denial of services (DDOS) attacks, internet relay crime (IRC) attack and system penetration have not so dominant compared defacement of public and privates websites, Trojan horses and virus dissemination and unauthorized intrusion effects However, the evidence from principal components analysis suggest that financial benefits and the wide spread dissemination of virus and Trojan effects constitutes the most prominent motivating factor for cyber-attack menace to effective governance in

Nigeria among other motivational factors as exploring break through challenges and development of new destructive exploits scripts.

1.12 Policy recommendations

Empirical evidences from this study reveal that the nature of occurrences and incidences of attacks poses the greatest menace to effective governance in Nigeria. This study thus recommends for the establishment of institutional framework to curb the proliferation of cyber-attack. This can be done by monitoring the various forms and nature of attacks so as to come up with appropriate counter-attack as well as preventive measures as a pro-active strategy to be implemented , considering the vulnerable targets cites and domains.

Finally, this study recommends for a concerted effort by the Nigerian government, law enforcement and security agencies to build and maintain a robust record of reliable data and documented reports of cyber-attack activities as this will provide useful information and necessary data required for effective study and research and investigation on this area as paucity of data and reliable source of information could pose a significant challenge to scientific research in this areas especially for developing economies like Nigeria.

2. Conclusion

It is obvious that the proliferation of internet and websites operations has brought an unprecedented innovation and development in different aspects of Nigerian development. It has significantly increased business networking and communication channels that have enhanced globalization and faster dissemination of ideas in different human endeavors. However, the complexities and negative outcomes associated with this recent development in internet and websites activities have remained a threat to internet users, cyber domains and in general administration of effective governance. Consequently this has implications on the assessment and perception of credible governance among the populace and its role in curbing this menace that have lingered over the time

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E-Governance: Strategy for Mitigating Non-Inclusion of Citizens in Policy Making in Nigeria

Daniel Gberevbie, Charles Ayo, Francis Iyoha, Moses Duruji and Ugochukwu Abasilim
Department of Political Science and International Relations, Computer Science and Accounting, Colleges of Business and Social Sciences, Science and Technology, and Leadership Development Studies, Covenant University, Ota, Ogun State, Nigeria
daniel.gberevbie@covenantuniversity.edu.ng
charles.ayo@covenantuniversity.edu.ng
iyoha.francis@covenantuniversity.edu.ng
moses.duruji@covenantuniversity.edu.ng
ugochukwu.abasilim@covenantuniversity.edu.ng

Abstract: The Nigerian federation that currently has 36 states structure adopted the Weberian Public Administrative system before now as an ideal way of running government, which was characterized with the traditional way of doing things without recourse to the deployment of Information Communication Technology (ICT). Today e-governance is seen as a paradigm shift from the previous way of governance. Research has shown that, the adoption and implementation of e-governance is more likely to bring about effective service delivery, mitigate corruption and ultimately enhance citizens' participation in governmental affairs. However, it has been argued that infrastructure such as regular electricity power and access to the Internet, in addition to a society with high rate of literacy level are required to effectively implement and realize the potentials of e-governance for improved delivery of services. Due to the difficulties currently experienced, developing nations need to adequately prepare for the implementation of e-governance on the platform of Information Communication Technology (ICT). Hence, this study seeks to examine whether the adoption and implementation of e-governance in the context of Nigeria would mitigate the hitherto non-inclusion of citizens in the formulation and implementation of government policies aimed at enhanced development. To achieve the objective of the study, data were sourced and analyzed majorly by examining government websites of 20 states in the Nigerian federation to ascertain if there are venues for citizens to interact with government in the area of policy making and feedback on government actions, as a way of promoting participatory governance. The study revealed that the adoption and implementation of e-governance in the country is yet to fully take place. This is due to lack of infrastructure, low level of literacy rate and government inability to provide the necessary infrastructure for e-governance to materialize. The paper therefore, recommends among others the need for the Federal Government to involve a sound and clear policy on how to go about the adoption and implementation of e-governance through deliberate effort at increasing budgetary allocation towards infrastructural development and mass education of citizens.

Keywords: citizens, development, e-governance, ICT, policy making, public administration

1. Introduction

As a former colony of Britain, the post-colonial Nigerian federation accepted the weberian public administrative system in the management of public affairs at independence on 1st October, 1960, to provide among others, enhanced social services. Thus, recent studies on public administration in developing countries revealed that for the government to improve and enhance its administrative capacity to offer quality services and improve on the living standard of the people; there is need for a shift from the weberian public administrative style to a modern system of e-governance. E-governance is brought about by the advent of Information Communication Technology (ICT) that reduces to the barest minimum the bureaucratic bottleneck that attends to government operations (Nkwe, 2012; Fatile, 2012; Ojo, 2014).

Research has also shown that e-governance enhances participation of citizens in governmental affairs, because it enables the people to understand government activities, promote transparency in the governing process, saves time due to provision of services via a single window, better record management and also, for the government to obtain feedback from citizens in order to enhance its policy making capability for development (Michel, 2005; Monga, 2008; Nkwe, 2012). However, it has been observed that for e-governance to realize the potential for improved service delivery in any country, there are things that must be accomplished such as: the ability to overcome the challenges of erratic power supply, inaccessibility to internet and reduction in the high illiteracy level of citizens (Ayo, 2014). In this regard, some countries in Africa such as South Africa, Mauritius, Mozambique, Botswana and Namibia have put in place structures, institutional and regulatory frameworks solely dedicated for the adoption and advancement of e-governance for improved social services and societal development (United Nations e-Government Survey, 2008; Nkwe, 2012).

One of the major arguments against the weberian model of public administration which has continued to be the practice by public administrative systems of most developing nations including Nigeria, is the requirement that issues affecting the public, no matter how urgent they seem, should be formally documented and procedurally attended to by hierarchical officials without due consideration to time and needs of the people. This situation which requires most of the time, the physical presence of citizens before the issues could be attended to have created moments of apprehension and hence contributed to delay in the implementations of government policies for societal development (Fajonyomi, 1999; Ojo, 2014). According to Monga (2008:53):

> *Public administration, governed by bureaucratic structures built on rationale principles, that dominated the twentieth century, has failed to respond to the changing requirements of the present times. It is so because it tended to be rigid, laid too much emphasis on red-tapism, sap creativity, thwarted initiative, wore out dynamism and denied justice as of resultant delays. In addition, the focus was more on following procedures.*

The above argument points out the challenges faced, delays and lack of initiative for performance on the part of public officials due to bureaucratic bottleneck to the detriment of development in societies. Hence, there is need for a shift from the traditional way of organizing government (weberian bureaucratic system of public administration) to a modern system of e-governance that encourages speedy dissemination of information and policy making on issues affecting the citizens. In this regard, Ojo (2014:77) posits that "the discovery of Information Communication Technology has made the activities of government more accessible to the governed, while the traditional barrier of distance becomes surmountable through the modern approach of communication." Arising from the foregoing, the questions that come to mind are: what is the relevance of e-governance in mitigating the non-inclusion of citizens in policy making for development? Has the adoption and implementation of e-governance for improved social services taken place in Nigeria? What are the benefits of the adoption of e-governance in reaching out to citizens on issues affecting them? What are the likely barriers to the successful implementation of e-governance for development in Nigeria?

2. Objective, methodology and structure

The main objective of this paper, is to examine whether the implementation of e-governance in the context of Nigeria would mitigate the hitherto non-inclusion of citizens in the formulation and implementation of government policies aimed at enhanced provision of social services for development. The paper adopted the historical research method to analyze the data obtained from secondary sources. Research has shown that the historical research method involves investigating, recording, analysing and interpreting events with a view to arriving at an acceptable research outcome (Osunde 1993; Gberevbie, 2014).

To achieve the objective of the study, data were sourced majorly by examining government websites of 20 state governments in Nigeria to ascertain if there is avenue for citizens to interact with government in the policy making process and feedback on government actions as a strategy of promoting participatory governance in Nigeria. Furthermore, the paper is structured into 7 sections. Section 1 is the introduction, section 2 looks at the objective, methodology and structure of the paper, literature is addressed in section 3, section 4 examines the state of web presence of e-governance activities at the state governments level in Nigeria, section 5 discusses the obstacles and benefits of adoption of e-governance on the platform of ICT on policy making, section 6 is the analysis of the findings and section 7 concludes the paper.

3. Literature review

3.1 Concept of public policy

The concept of policy is central to the well-being of an organization, community or a nation as a whole for the realization of a desired goal. A policy refers to a statement of what an organization wants to do, what it is doing, what it is not doing and what would not be done for the realization of a specified goal of either an organization, a community or nation for improved profitability or the enhancement of the living standard of the people (Ikelegbe, 2006). A policy therefore acts as a road map to achieving specified goals of an organization or nation.

On the other hand, a policy is seen as "the relationship of a government unit to its environment" (Eyestone, 1971:18). Although, this definition could be considered relevant to proper understanding of public policy; but it is rather too broad. In this regard, Anderson (1975:3) sees public policy as "a purposive course of action followed by an actor or set of actors in dealing with a problem or matter of concern." This implies that a policy of

government focuses attention more on what is actually done as against what is intended (Egonmwan, 1991). The main goal of public policies is "to resolve societal problems particularly those considered to require public or collective action" (Ikelegbe, 2006:4). However, where such policies of government are formulated without the inputs of the people to whom the policy is meant to care, there is bound to be problem at implementation. Hence, there is need to involve the people at both the formation and implementation stage.

Egonmwan (1991) argues that policies fail to achieve their intended goals in developing countries because; governments do not engage the public at policy formation, thereby facing opposition from the people at the implementation stage, no matter how laudable they seem to be. According to Jimoh (2007), for public policies to achieve their intended goals, there is need to involve the stakeholders – people to whom the policies are set to affect. In fact, some scholars have argued that involving the people in the formulation of public policies particularly on issues affecting them is the hallmark of good governance in a society (Oladoyin, 2006; Babawale, 2007; Ekpe, 2008). Therefore, it could be concluded that there is a relationship between involvement of citizens in the formulation of government policies and successful implementation of such policies.

3.2 Concept of e-governance

The concept of e-governance originates from governance. "Governance refers to the exercise of political, economic and administrative authority in the management of a country's affairs, including citizens' articulation of their interest and exercise of their legal rights and obligations" (Ojo, 2014:80). The implication of this definition is that, governance could only be regarded as good when the rights of the citizens are considered in terms of giving proper consideration to their inputs into the policyformulation process of government. Therefore, "good governance entails the respect for and protection of human rights, abiding by the rule of law and running an open and transparent government" (Igbuzor, 2005:79).

On the other hand, e-governance denotes the use of technology in the system of governance in any society (Ojo, 2014). Nkwe (2012) argues that "e-governance, which is a paradigm shift over the traditional approaches in public administration, means rendering of government services and information to the public using electronic means." In the same vein, Ayo (2014:76) sees e-governance as "the governing of a country/state, using ICT. It means the application of ICT to transform the efficiency, effectiveness, transparency and accountability of exchange of information and transaction." The foregoing implies that e-governance is the application of ICT for assisting the government in the efficient and effective exercise of political, economic, social and administrative management of public affairs through the involvement of citizens in the policy making process.

Some scholars have argued that the adoption of e-governance in a country help to involve citizens in the policy making process of government that facilitates smooth implementation of such policies for improved service delivery (Nkwe, 2012; Fatile, 2012; Ayo, 2014). In addition, the adoption of e-governance reduces government spending and increases interest earning because of its ability to reduce the number of people in contact with governmental agencies, easy access to public services, reduction of negative attitude individuals have toward public agencies and easy access to public information at any given time (Fatile, 2012). Emphasizing the importance of the adoption and implementation of e-governance for improved living condition in developing nations, Chowdhury and Satter (2013:43) assert that, "In developing countries, service at doorsteps through ICT is vital not only to establish a democratic and transparent government, but also to fight against poverty, promote economic growth and serve as a great engine for driving good governance." The foregoing revealed that e-governance is a strategy for mitigating the non-inclusion of citizens in the policy making process of government.

4. State of web presence of e-governance activities at the states government level in Nigeria

In a bid to implement e-governance, various state governments in Nigeria have established official websites to among other things interact with citizens, showcase their activities and identify with the new trend of managing public affairs for development, otherwise known as e-governance. Below is a table showing the web presence of 20 state governments in the Nigerian federation in their bid to implement e-governance. The states considered in this study are: Abia, Akwa Ibom, Anambra, Bauchi, Benue, Delta, Ebonyi, Edo, Enugu, Gombe, Imo, Jigawa, Kaduna, Kano, Kebbi, Kogi, Kwara, Lagos, Niger and Oyo, cutting across the six geo-political zones of the country.

Table 1: Websites of 20 state governments for e-governance implementation in Nigeria

S/N	State Government	Official Website	Level of Interaction
1.	Abia State (South East)	http://www.abiastate.gov.ng/	a, b, c, e, j
2.	Akwa Ibom State (South South)	http://www.akwaibomstate.gov.ng/	a, b, c, f, g,
3.	Anambra State (South East)	http://www.anambrastate.gov.ng/	a, b, c, d, e, f, g, h, i, j
4.	Bauchi State (North East)	http://www.bauchistate.gov.ng/	a, b, e, f, g, h
5.	Benue State (North Central)	http://www.nigeria.gov.ng/	a, b, c, e
6.	Delta State (South South)	http://www.deltastate.gov.ng/	a, b, c, e, f
7.	Ebonyi State (South East)	http://www.ebonyionline.com/ebonyi-state-government/	a, b, e
8.	Edo State (South South)	http://www.edostate.gov.ng/	a, b, c, e f
9.	Enugu State (South East)	http://www.enugustate.gov.ng/	a, b, c, e
10.	Gombe State (North East)	http://www.gombestate.gov.ng/	a, b, c, d, e, g, j
11.	Imo State (South East)	http://www.imostateblog.com/category/government-house-updates/	a, b, c, e
12.	Jigawa State (North East)	http://www.jigawastate.gov.ng/	a, b, c, e
13.	Kaduna State (North West)	http://www.kadunastate.gov.ng/	a, b, c, e, g, h
14.	Kano State (North East)	http://www.kano.gov.ng/kanogov/	a, b, c, e, g, h
15.	Kebbi State (North West)	http://www.kebbistate.gov.ng	a, b, c, e
16.	Kogi State (North Central)	http://www.kogistate.gov.ng/	a, b, c, e, h
17.	Kwara State (North Central)	http://www.kwarastate.gov.ng/	a, b, c, e, g, k
18.	Lagos State (South West)	http://www.lagosstate.gov.ng/	a, b, c, d, e, g, j, l
19.	Niger State (North Central)	http://www.nigerstate.gov.ng/	a, b, c, e, g
20.	Oyo State (South West)	http://www.oyostate.gov.ng/	a, b, c, e, g

Source: Official Websites of 20 States in Nigerian federation

The table 1 above shows the websites presence, level of government interaction with citizens, adoption and implementation of e-governance by state governments in Nigeria. Below is a legend showing what A-I represent.

Legend
a. Structure of the state government.
b. Overview of the entire state.
c. Photograph of the state Governor.
d. Emergency phone numbers for citizens to interact with government officials on issue of public interest.
e. Provision of official e-mail to contact government officials.
f. Space showcasing monthly events in the state.
g. Regular newsletters about government activities.
h. Space for announcing completion of new infrastructure completed by the state government.
i. Provision for tax collection by the government and payment by citizens.

j. Provision of social network links to contact government officials.

k. Information of business opportunities in the state.

l. Emergency dials

5. Obstacles and benefits of adoption of e-governance on the platform of ICT and policy making for development in Nigeria

Studies have shown that e-governance is a better strategy that facilitates proper management of public affairs in terms of transparency, efficiency and effectiveness of resource utilization for societal development, based on citizens' inputs into the policy making for proper implementation (Tanushree et al, 2010; Sharma et al, 2011; Fatile, 2012; Oye, 2013; Ojo, 2014). However, scholars and practitioners alike have also identified some obstacles to the unsuccessful adoption and implementation of e-governance in Nigeria to include: lack of infrastructure such as regular electricity power supply and limited access to the Internet, in addition to low rate of literacy level (Fatile, 2012; Ojo, 2014; Ayo, 2014). Of the obstacles listed by the foregoing scholars and practitioners, low illiteracy level and the problem of electricity supply seem to be the foremost challenges hindering the successful adoption and implementation of e-governance in Nigeria. Buttressing this position, UNDP Human Development Report of 2011 puts Nigeria's illiteracy rate for adult (both sexes) at 61.3 per cent (UNDP, 2011). No doubt, such a high illiteracy rate creates a digital lock-out.

In the case of electricity power supply, its generation has been so inconsistent over the years. For instance, the electricity generation capacity in 1998 that was 4,548.5MW rose to 6,130MW in 2004, and declined in 2005 to 2,687.1MW. This nonetheless increased to 8,644MW in 2013 but can only produce 3,718MW, which insufficiently caters for the electricity need of over 160 million people in Nigeria due to poor maintenance culture (CBN, 2005; CBN Online, 2006; Ayanruoh, 2013; Abiodun, 2014). Comparatively, it has been observed that "South Africa with a population of 52 million has an installed electricity generation capacity of over 52,000MW. On a per capital consumption basis, Nigeria is ranked a distant 178th with 106.21 KWh per head, and a capacity electricity generation of 8,644MW, but only produces 3,718MW – well behind Gabon (900.00); Ghana (283.65); Cameroun (176.01; and Kenya (124.68)" (Ayanruoh, 2013:1). This statistics stated go to show that the adoption and successful implementation of e-governance in Nigeria would require the establishment of the needed infrastructure in electricity power supply and increase in literacy level in the society to achieve the desired goals. This implies that there is a strong relationship between availability of adequate infrastructure, high rate of literacy level and successful adoption and implementation of e-governance in a society.

The benefits of adoption and implementation of e-governance in a country have been identified by scholars such as Monga (2008); Nkwe (2012) to include:

- Quality service delivery

- Increase in organization's transparency and ability to management information faster

- Better office and record management

- Simplified office procedures

- Facilitate better policy making

- Saving of time and cost in the management of public affairs

- Promote use of ICT in other sectors of the society

- Promotes accountability in government

- Findings and Discussion

It has been established in this study that e-governance enhances citizens' involvement in the policy making and facilitates proper implementation of such policies for development of societies. However, where government fails to put in place required measures to enable citizens to gain access into the policy making process due to lack of infrastructure, low rate of literacy and government inability to create the needed avenue by way of websites presence for citizens to interact with government officials on issues affecting them; the attempt to adopt and implement e-governance is likely not to succeed. In this study, of the 20, out of the 36 state governments websites in the Nigerian federation visited only one state (Anambra) or 5 percent of the sample size has semblance of a move towards e-governance adoption and implementation in Nigeria. On the website of Anambra State government, the following were noticed: structure of government and overview of the state,

emergency phone numbers for citizens to interact with government officials, provision of official e-mail address to contact government officials, provision of social network links to contact government officials, space showcasing monthly events in the state, regular newsletters about government activities, space for announcing completion of new infrastructure by the state government, provision for tax collection by the government and the modality for tax payment by citizens. This is as depicted in the pictograph below.
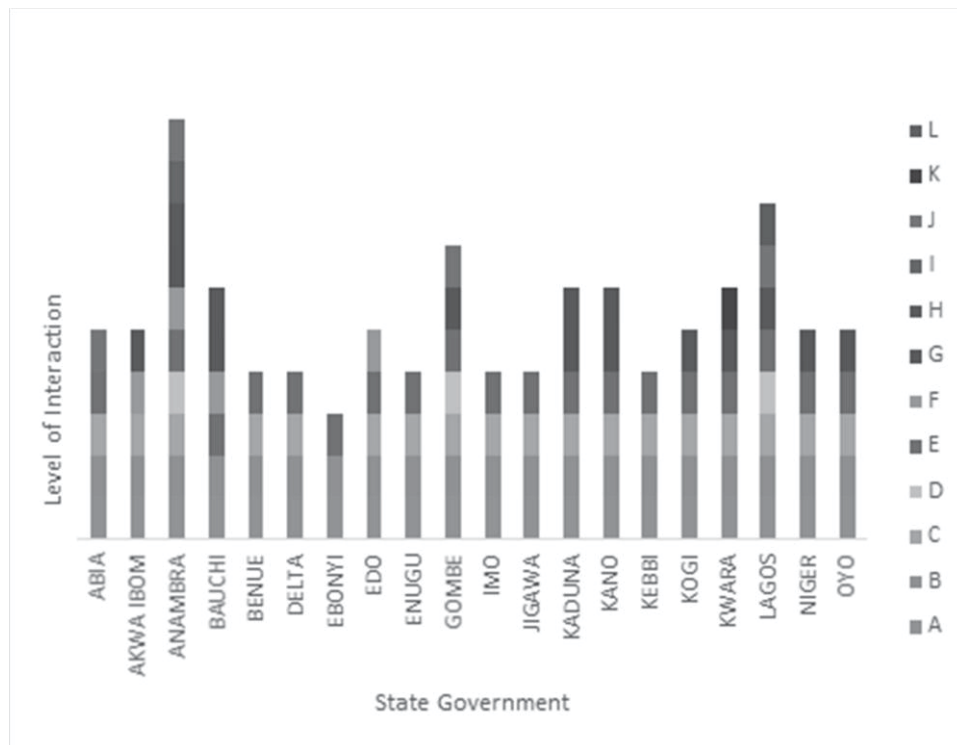
However, going through the other 19 state governments' websites or 95 percent of the sample size revealed what is commonly displayed on the websites to include: structure of government and overview of the state and provision of e-mail address to contact government officials, in addition to the display of the photograph of State Governors. There is little or no room for citizens to interact with government either on what they are expected to know and do or available avenues for citizens to contribute towards the formulation of government policies. The implication of the foregoing is that state governments in Nigeria still rely heavily on the traditional public administrative system practiced in most developing nations that gives little or no room for citizens' involvement in the policy making. As a result, provision of social services is more likely to be affected negatively to the detriment of the citizens. This is so because it has been established in this study that there is a relationship between citizens' involvement in policy making, support for such policies at implementation and development. This implies that policies of government are more likely to receive support from the people at implementation when they are involved in the formulation of such policies.

6. Conclusion

Most nations of the world are in constant search for the best way to make life easy and worth living for their citizens through the adoption of e-governance on the platform of ICT to offer quality services. Research has shown that e-governance enhances participation of citizens in governmental affairs. This is because it enables the people to understand government activities and also, for the government to obtain feedback from citizens in order to enhance its policy making capability for development. This study examined the importance of e-governance as a strategy for mitigating the non-inclusion of citizens in policy making in Nigeria.

The analysis of data obtained from the government websites of 20 States of the Nigerian federation revealed that the adoption and implementation of e-governance in the country and resolution of doubts about government actions, as a way of promoting participatory governance in Nigeria are yet to fully take place. This is due to lack of infrastructure, low level of literacy rate and government inability to make provision for the process of e-governance to materialize. Based on the aforementioned, the paper recommends that if Nigerians are to enjoy the benefits of e-governance as currently being experienced in the developed nations and some

African countries, there is need for the Federal Government to involve a sound and clear policy on how to go about the adoption and implementation of e-governance both at the federal, state and local government levels. This is possible through deliberate effort at increasing budgetary allocation towards infrastructural development and mass education of citizens about the benefits associated with the adoption and implementation of e-governance for social development.

Acknowledgements

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E-Inclusive Society in Malaysia: Ameliorating the e-Disadvantage Communities

Rugayah Hashim[1], Normarliana Laili[1], MohdAnuar Mazuki[2] and Peter Saunders[3]
[1]Faculty of Administrative Science & Policy Studies, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia
[2]Bursary,Universiti Teknologi MARA, Shah Alam,Selangor, Malaysia
[3]Social Policy Research Center, Social Policy Research Center, University of New South Wales, Sydney, Australia
guy73106@yahoo.com
normarliana@ns.uitm.edu.my
mam@salam.uitm.edu.my
p.saunders@unsw.edu.au

Abstract: The government's agenda towards an e-inclusive society in Malaysia are not without challenges; one of which is the digital divide.The empirical evidence from a cross-sectional investigation showed that 52.2% of the sample population are without internet access.Consequently, the impact and effect of non-internet access will be a paradox in attaining e-society. By understanding the impacts of the e-disadvantagedamong rural communities and the poor, policymakers can develop a strategy for an inclusive society that leverages technology to support access for socio-economic assistance at the federal, state, and local levels. This can further democratize the government-to-citizen relationship and accountability for the government's Economic Transformation Program (ETP). Lastly, suggestions for policymakers as well as for future research to deeply understand this research gap on democratizing e-government system and information access will be described.

Keywords: e-government, e-disadvantage, digital divide, poverty, social computing

1. Introduction

In today's digital era and economic affluence, it isassumed that the digital divide is shrinking between the disadvantage and the privileged (Economist 2004). Technology costs' inverse relationship to device capability has been significantly evidenced as per Moore's Law (Mastromatteo 2014). The increased usage of cellphones in Malaysia (86.3% in 2012) (Malaysian Communications and Multimedia Commission 2012). The Malaysian Communications and Multimedia Commission (2012) indicated that mobile technology has penetrated a significant segment of society in Malaysia and has revolutionized the way Malaysians communicate.Nevertheless, the aspects of communication should also include internet usage such as e-mail and social media platforms for example, FaceBook, Twitter, Blogs, etc. Consequently, having smartphones will allow for both purposes of communication and internet access, which require the user or citizen to have extra funds to purchase the device. Again, from the report by the Malaysian Communication and Multimedia Commission (2012), only 12% of the population are using smartphones and this in itself, provides the motivation needed to pursue the research project.

Although Malaysia is still a developing nation, the socio-economic planning for the country has never slackened particularly in ensuring that an inclusive e-society is attained according to the Malaysia's Vision 2020 (Mohamad 1999). Moreover, the push for better accessibility and an e-society has been on the Malaysian government's agenda in all the tabled annual budgets. For example, in his speech, Prime Minister NajibRazakintends to expand internet access by way of a High-Speed Broadband (HSBB) for rural areas costing RM1.5 billion (Bernama 2013). These efforts show that the government is serious about ameliorating the e-disadvantaged communities and ensuring that these communities' welfare are taken care of through immediate information access via the internet.

2. Problem statement and significance of study:

Reaching out to the citizens is not an easy task for the Prime Minister of Malaysia. But with internet access and other wireless communications, the nation's leaders and the communities can get up close and personal. However, not all the citizens and communities have the ability to communicate and use the various wired and wireless channels as the low income levels of certain segments of the society does not allow for the wants rather than the needs. Furthermore, the effectiveness of ICT implementation of the infrastructure and info-structure plans for public usage have to monitored to ensure project management compliance (Hashim et al 2007).

The lower income level groups and those within the poverty line for Malaysia is at 10% of the 30 million population. "To encourage entrepreneurship among the rural populace and increase their incomes, a sum of RM20mil is allocated for Rural Business Challenge program which includes food production, fish farming, auto repair and agro-tourism" (Bernama 2013).

Hence, the findings from the research gap will showcase the existence of segments of Malaysian society that are e-disadvantaged. Policy makers and other stakeholders can use the report to ameliorate the situation. It is important for the nation's growth to narrowthe digital divide which will inherently lead towards the government's agenda of an e-inclusive society. Ameliorating the disadvantaged communities is a continuous effort but the circumstances of the situation will rely on the reciprocity of information received by both the community and the government.

3. Research objectives

There were twoobjectives for the two-year study. The first objective was to determine the income level of the communities and, the second was to assess the communities' internet accessibility. Combined, the findings from the two objectives will evidence the extent of internet usage and wireless communications among the people living in sub-urban and rural locations in Malaysia.

4. Literature review

The tsunami effect of information and communication technology (ICT) has allowed spectra undertakings particularly for communication. The global population has been touched by how fast and easy one's communication is with the internet and other electronic modes or channels, be it wired or wireless. Therefore, a community that rejects ICT will certainly be left behind. This is particularly true for Malaysia as digital access (Hashim et al 2013) through e-governmenthave been the federal government's consistent, annual initiatives.All the same, for a developing nation like Malaysia, there are two choices for getting connected, wired and/or wireless. For the former, there are still some parts Malaysia that require land lines because of the landscape or topology. Consequently, these are paradoxical examples of e-participation as the communities need to get connected in order to utilize the e-government services portal.

A thought-provoking question on the digitaldivide is whether the e-chasm indicates a symptom of inequality, or the cause (Molina 2003).Factually, the digitaldivide is almost always described in terms of the difference in the number of telephones, internet users or computers per head in rich and poor countries (Molina 2003, Mossberger et al 2003). Yet, the difference in the availability of information and communication technologies (ICTs) has continued to become the focus of concern among policymakers, academics and non-governmental organizations, whereas, the far wider availability of ICTs in rich countries enable the rich to get richer, while the poor continuallylags behind. Showing and presenting the empirical evidence on this issue does not solve the problem (van Dijk 2006). Not only is there a worrying "digitaldivide" between the haves and the haves-not but the chasm is widening--with ominous consequences Molina 2003). On the contrary, two World Bank economists, Carsten Fink and Charles Kenny (Fink & Kenny 2003), questions the logic of this argument (Mossberger et al 2012). The authors conclude that the divide's size and importance have been overstated, and that current trends suggest that it is actually shrinking, not growing--which means policies designed to "bridge the digitaldivide" may need rethinking (Fink & Kenny 2003). ICTs might have less impact on productivity in poor countries than in rich countries because of lower adoption levels although it is possible that a certain threshold level of adoption is required before the productivity benefits of ICTs are reaped (Mossberger et al 2006, Lor&Britz 2007, Mossberger et al 2012). It has also been observed that the adoption of ICTs within poor countries may show a wider divide and limited to a relatively affluent minority, so that the digitaldivide within countries may grow even as the digitaldivide between countries shrinks (Fink & Kenny 2003, OECD 2012). As a consequence and as shown in the OECD's 2012 report (OECD 2012), rich countries with high penetration of ICTs are more likely to do business online with other affluent countries, at the expense of poor countries as the broadband priority areas are easily accessible in developed nations (OECD 2012). Hence, one the objectives of this paper aptly suggests the need to gauge the income level of the citizens in order to improve their plight yet assist the government in ensuring inclusiveness and a connected community or e-society.

In connecting the communities, a popular platform to entice usage of e-government services is on health issues. Coincidentally, one of Malaysia's e-government pilot project is e-health and ironically similar outcomes on e-

government access are reported where socio-economic inequality remains an impediment to digital inclusiveness(Nagler et al 2013).

All the same, with regards to the digital divide, other evidences of e-disadvantage are shown in the literature reviewed where similar reports on the increasing evidence that the lack of access to information and communication technology (ICT) severely limits education, employment and economic prospects (Broadbent & Papadopoulos 2011). Interestingly, in Broadbent and Papadopoulos's (2011) study, the evaluation on bridging the digitaldivide brought new insights into the impact of the internet on isolated communities.This is similarly reported in OECD's internet economic outlook highlights (OECD 2012). Again, the drawbacks were accessibility and internet literacy, thus, the digitaldivide in the twentieth century is a serious e-disadvantage particularly for rural areas of a developed nation like Australia (Broadbent & Papadopoulos 2013).

4.1 The e-society for e-participation through social computing

The main impact of globalization for everyone is internet usage for socializing, that is, the exchange of information for communication using various social computing platforms. Social computing technologiesoffer users the opportunityto connect, participate, engage, collaboratefor social support (Lee &Tsung 2013). Henceforth, these activities automatically encourage e-participation which then converts to e-society.In addition, the mobility that social computing technology providesfurther enriches the lives of the users through the exchange of immediate information including the social dynamics of the community and sharing of knowledge, etc. (Lee & Kim 2014). As a result, social computing technologies can be leveraged to empower both the government and the citizens. Popular social computing technologies or online social media such as Facebook and Twitter are increasingly being used for various social-related purposes. A 2013 online survey suggests that 59.9% patients used Twitter for increasing knowledge and exchanging advice and 52.3% used Facebook for social support and exchanging advice (Poortinga 2012). Consequently, the use of social computing has revolutionized the way people communicate, thus, the government and politicians should continue to leverage on these popular technologies to connect with the citizens. This would require the continuous development of the country's infrastructure, info-structure and internet access through planned and gradual broadband upgrade. As noted by Dasgupta (2013), the cyber capability framework and other ICT projects in developing countries should progress from "simple growth and access through information infrastructure to an understanding of the complexities involved in the social developments of ordinary citizens." Yet, the different dimensions of exclusion and the implications of these should be considered by policymakers towards limited exclusion and anti-poverty (Saunders 2013).

4.2 The inclusive society

Increasing participation in social, economic, and community life is considered to be one of the defining principles of an inclusivesociety (Lloyd et al 2010). Many countries aspire to have a utopian society but central to the principle of inclusiveness is the ability for capacity building among communities and society using the internet as the enabler.When an inclusive society is attained, individuals and groups from all walks and life and geography develop connectedness which then leads to engagement in nation-building through democratic decision-making. For Malaysia, understanding the meaning of an inclusive society requires better education and knowledge impartment. There are still many segments of Malaysia's society that have literacy issues (Hashim, Omar & Saunders 2012). No doubt, participation such as this improves a community's well-being and would positively affect other neighborhoods' quality of life such as socio-economic prosperity (Arata 2013). A prerequisite for participation, inclusion, and informed citizenship is the ability to develop knowledge from information about the social, economic and community dimensions.While the theory of social inclusion is broad and extends to all sectors of the community, the concepts of social inclusion and exclusion also includes information poverty (Lloyd et al 2010). Thus, the reconciliation of cultural and traditional practices correlate to the communities' information needs with the hope that relevant infrastructures will bring about economic, social, and human development to these disadvantaged societies (OECD 2012).

4.3 Electronic government (e-government) in Malaysia

It has been more than 17 years since Malaysia's fourth Prime Minister, Tun Mahathir Mohamed launched the Multimedia Super Corridor consisting of seven flagships; one of which is the e-government flagship. Over the years, the pilot projects under the e-government flagship have grown to encompass various systems relevant to the citizen's needs for e-services. Henceforth, the outcome of this study will benefit the government's

continuous efforts to meet the citizen's needs for speedy services through full usage of e-government provisions in Malaysia. Therefore, descriptions on the currency of e-government practices in Malaysia are compulsory to relate the problem of e-inclusive society and e-disadvantage communities. Usage of e-government services is not about revolutionizing public administration in the 21st century but should be more concerned with reaching out to the grassroots. Keeping up with the speed of changing technology has been a challenge for Malaysia, but thus far, the success rate and increasing utilization of the e-services have been pleasing through the expanding broadband infrastructure (Bernama 2013, Abdullah et al 2013). To borrow Epstein, Newhart and Vernon's (2014) statement, "Between Twitter revolutions and Facebook elections, there is a growing belief that information and communication technologies are changing the way democracy is practiced." Malaysia's e-government services should continue to progress based on technology upgrades. Highlighting and promoting the advantageous of e-government services to the public will increase usage. Another enticement is to consider free training and having kiosks at strategic locations particularly for those living in sub-urban and rural areas. This federal government agencies' initiatives in helping to engage the public will lead towards active complex policymaking processes.

Anyhow, from the scholarship ferreted, the discourse on e-government and e-services deliberation are frequently focused on technical solutions (Epstein et al 2014) and, based on the optimism that citizens will favor the online applications.Moreover, most literature on e-government studies focused on identifying and describing barriers to online usage, this study offers an in-depth analysis of what it takes to address them using a particular case study.

5. Methodology

5.1 Research design

A cross-section research design was used for this exploratory study where the respondents were the residents in sub-rural and rural areas of Peninsular Malaysia. A questionnaire formed the primary data collection which was administered to the respondents with the assistance of enumerators. In doing so, the research objective on determining the accessibility to the internet versus the socio-economic factors of the respondents will be focused.

5.2 Instrument development

The survey instrument consisted of two sections: Section A was on demographic profiles while Section B gleaned responses on ICT peripherals and internet access. Prior to the actual data collected, two rounds of pilot tests were done for reliability and validity of data. Thereon, the feedbacks from these pilot studies were incorporated into the final version of the instrument.

5.3 Sampling technique

A two-phase sampling technique was used;the first phase was on the zoning of West Malaysia, that is, North, East, South and West. This requires stratified sampling which was later narrowed to the states within the zones.

5.4 Units of analysis

The units of analysis are the residents living in the pre-identified communities or villages throughout West Malaysia.

5.5 Data analyses

Parametric analysis will be the mainstay for dataanalyzed using SPSS version 20. The analysis of the findings will follow the objectives' chronology.The raw data are a mix of ordinal, nominal and ratio, hence, other procedures such as validity and reliability of data were also executed.

6. Findings and implications

The first part of the findings will showcase the demographic profiles of the respondents. The later part will highlight the evidence based on the research objectives. For the first objective, the respondents' income levels is displayed as Table 1 and Figure 1. As can be seen, 45% of the community's income range is between RM401-

1500 which is equivalent to USD126-471 (1 USD = 3.18653 MYR as at August 5, 2014), while 34.4% earned more than MYR1500 per month.

For the availability of internet access (see Table 2), 56.6% reported that they do have access to the internet. However, there is no indication of whether accessibility is via their mobile phones, broadband subscription or wired/cable internet.

Table 1: Income level of respondents

	Frequency	Percent	Cumulative Percent
< MYR200	98	9.8	9.8
201-300	38	3.8	13.6
301-400	70	7.0	20.6
401-1500	450	45.0	65.6
> 1500	344	34.4	100.0
Total	1000	100.0	
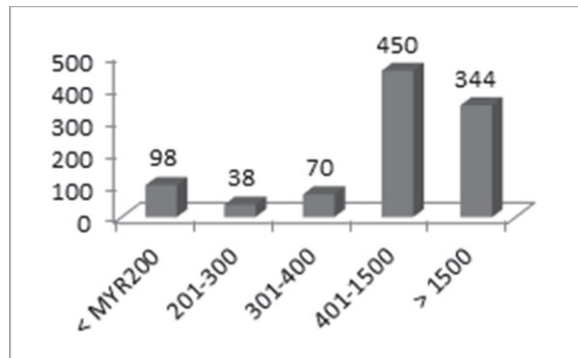
Figure 1: Histrogram on respondents' income level

Table 2: Availability of internet access

	Frequency	Percent	Cumulative Percent
Yes	478	47.8	47.8
No	522	52.2	100.0
Total	1000	100.0	

Lastly, the respondents were asked to state whether they own any computer peripherals at home. From Table 3, 56.6% indicated a positive response.

Table 3: Computer ownership

	Frequency	Percent	Cumulative Percent
Yes	566	56.6	56.6
No	434	43.4	100.0
Total	1000	100.0	

Table 4: Demographic profiles of respondents

Age	Frequency	Percent	Cumulative Percent
Below 30 years	341	**34.1**	34.1
31-40 years	224	22.4	56.5
41-50 years	213	21.3	77.8
51-60 years	140	14.0	91.8
above 61 years	82	8.2	100.0
Gender			
Male	513	**51.3**	51.3

Age	Frequency	Percent	Cumulative Percent
Female	487	48.7	100.0
Race			
Malay	932	93.2	93.2
Chinese	28	2.8	96.0
Indian	31	3.1	99.1
Others	9	.9	100.0
Education			
No formal education	105	10.5	10.5
UPSR	35	3.5	14.0
PMR (Form 3) and below	79	7.9	21.9
SPM/STPM	453	**45.3**	67.2
Tertiary (University) education	328	32.8	100.0
State			
Perlis	1	.1	.1
Kedah	140	14.0	14.1
Penang	3	.3	14.4
Perak	265	**26.5**	40.9
Kelantan	108	10.8	51.7
Pahang	13	1.3	53.0
Selangor	156	15.6	68.6
WP Kuala Lumpur-Putrajaya	180	18.0	86.6
Negeri Sembilan	4	.4	87.0
Melaka	1	.1	87.1
Johor	101	10.1	97.2
Terengganu	25	2.5	99.7
Sabah	3	.3	100.0

The demographic profiles of the respondents are shown in Table IV. The highest number of those who responded to the survey based on age range are those below the age of 30 and below (34.1%), where the male respondents are the highest at 51.3%. Moving on, 93.2% of the Malays make up the race category from which 45.3% only studied up to SPM/STPM (equivalent to high school diploma). Lastly, the state of Perak indicated the highest number of respondents at 26.5%.

The implications from the findings shown above are varied. Clearly, from Table 1, the income level of the respondents indicated that the economic ability is limited to daily living, that the income is enough to cover food, shelter, children's education and mobility. Such inequality is also experienced in developed countries (Mackintosh 2013), hence, there is a need to protect this worrying findings as they underline the need to protect the vulnerable society. Further, it is recommended that governments pursue the necessary task of bringing public spending under control(Mackintosh 2013). As income inequality is detected in developed and developing nations, urgent measures have to undertaken by policymakers by having policies to boost jobs and growth must be designed to ensure fairness, efficiency and inclusiveness(Mackintosh 2013). Nonetheless, the evidence from this study is mirrored in the other OECD countries where the levels of income inequality have worsened across three-quarters of all OECD countries since 2007(Mackintosh 2013). Consequently, the implication of income inequality indicates substantial poverty among the communities that responded to the survey as stated by

Santos-Paulino (2012) -- although poverty and inequality are generally studied separately, there are significant trade-offs between both issues.

Thus, with that level on income inequality, having a computer with internet access is considered a luxury as shown in Table 2 and 3. From the nominal responses, although those who do have a computer and internet access (56.6%) at home, the state of the computer and the mode of access could be older versions of the operating system with wired cables. With new computers and newer operating system versions on the shelves, the need to replace their current computer set would not be of priority. More recently, the Malaysian government has been promoting broadband access in rural areas, hence, the need to have a better set of computers. Also, through pilot studies consisting of interviews, the respondents stated that they would rather access the internet through their mobile devices. Therefore, it is recommended that future studies delve deeper into the preference for using e-government services among the rural communities in Malaysia.

7. Conclusion

In reaching the grassroots whilst concurrently tackling e-disadvantage and poverty issues, ameliorating the socio-economic problems of the rural communities is a gradual process. It takes both parties to cooperate and realize their targets in achieving a good quality of life and well-being. By understanding the impacts of the e-disadvantage, policymakers would have the information to strategize and implement effective plans on democratizing e-government system. By working towards an inclusive society that leverages technology to support access for socio-economic assistance, the federal, state, and local level governments will have a better government-to-citizen relationship and accountability, hence achieving the government's Economic Transformation Program (ETP) and other relevant national agenda. This will also transform the virtual economic landscape for Malaysia through cyber-active and informed citizens.

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Decision Objects for IT Cooperation Decisions in the Public Sector

Markus Jakob[1], Petra Wolf[1] and Helmut Krcmar[2]
[1]fortiss – An-Institut der Technischen Universität München, Munich, Germany
[2]Technische Universität München, Munich, Germany
jakob@fortiss.org
petra.wolf@fortiss.org
helmut.krcmar@in.tum.de

Abstract: Various issues like the competition for qualified employees or constantly changing threats for IT security stand as contemporary challenges for IT departments of companies and public authorities. Diverse forms of IT cooperation offer a practicable way to tackle such issues. However, in Germany the federal government, federal states and municipalities still plan, order, develop and run their IT mostly independently on their own. Although benefits of IT cooperation are heavily discussed in the literature, IT cooperation in the public sector is characterized by low adoption. To investigate the reasons for the low adoption, we will explore the decision objects of IT cooperation decisions in the public sector, such as the characteristics of IT tasks and the characteristics of IT cooperation forms. Outsourcing projects or cooperation decisions that appear regularly in the private sector turn out to be difficult or nearly impossible in the public sector. For example, legal regulations regarding data security and data safety hinder public organizations to take part in certain kinds of private cooperation forms, like public cloud based offers. However, not every combination of public and private business is popular among citizens. A transparent overview of which IT task can be done in an IT cooperation is a helpful artifact therefore. In order to achieve these goals, a literature review is conducted and the characteristics of IT tasks, as well as cooperation forms are analysed. Following on from this, the characteristics are classified and structured. Existing literature provides an overview of whether or not an outsourcing project is an interesting option. The important aspect of the eligibility of a partner or IT cooperation form is not discussed yet. This issue is addressed by this paper, because IT cooperation alternatives have different advantages that should be used by the public sector.

Keywords: characteristics of IT task, characteristics of cooperation form, IT cooperation decision, public sector, public organizations

1. Introduction

The public sector has a large potential for combining resources over all federal layers. Ulschmid (2003) provides some figures that illustrate the potential of such collaborations, especially in the field of IT. Throughout Germany, the public sector covers about 10,000 IT groups, IT functionality and IT applications. Additionally, all over the public sector in Germany approximately 250,000 professionally developed applications are in use. Klinger (2007) also criticizes, that in more than 10,000 municipalities in Germany, similar IT artifacts are created redundantly. Subsequently, this causes the same problems over and over again.

In addition, the public sector chronically suffers from low budgets. At the same time, citizens and corporations expect a wider range of services and higher service quality from the authorities (Schweizer, zu Knyphausen-Aufseß & Bornhauser, 2005). In addition, the demographic change is an upcoming challenge the public sector has to deal with (Becker, Niehaves & Ortbach, 2009).

One way to face these challenges is the cooperation of public authorities. IT services are especially suitable for combining resources of different authorities, in order to reach economies of scale. Cooperation between different public authorities provides substantial benefits. Fiedler, Peters and Schuppan (2009) describe the different occurrences of how several public organizations can work together. Besides, the collaboration of public organizations private organizations can also take part in joint ventures, like shared service centers (SSC).

In available literature, diverse types of motivation for cooperation in the public sector IT already exist. Besides the monetary factors, the request for a higher level of know-how or the ability to innovate (Borman, 2010), are the main driving factors for outsourcing considerations. Additionally, the possibility of concentrating on core competencies (Sun, Gregor & Keating, 2014) or technical reasons, for example, to gain a higher level of standardization are often named as the most important factors.

IT outsourcing or IT cooperation is popular in the private sector. Many companies already benefit from advantages, like economies of scale or more access to know-how. In the public sector, some examples of cooperation in several countries demonstrate the possibility of partnerships, which in the end lead to the participating public authorities (Ulbrich, 2010) benefitting.

For example, the public-law institution "Dataport" in the north of Germany is working as a professional shared service center for a community of federal state users (Ertl, Schwertsik, Wolf & Krcmar, 2014). Amongst other services, Dataport provides a SAP customer competence center (CCC) for all participating authorities (Schweizer *et al.*, 2005). Another good example is "AKDB". The Bavarian organization provides software, consulting or hosting for municipalities (Fähnrich 2004). Daum (2012) describes the potential collaboration of municipalities in the metropolitan area Rhein-Neckar in Germany. Hence, the handling of single award procedures could be concentrated in one SSC. Over all, good practice examples from small collaborations to complex cooperation networks exist in several countries.

The previous examples show that IT cooperation in the public sector does work. However, for some reason IT cooperation in the public sector is not as widespread as one would expect (Graudenz & Schramm, 2010). Accordingly, Schulz and Brenner (2010) state that they found less definitions of SSC in the public sector compared to the private sector. A possible reason for this could be the fact that there are missing definitions for what kind of task can be outsourced. Therefore, IT managers at all federal levels in Germany argue that they have no decision support systems in place, which helps, to decide which tasks, under which circumstances or to which extent are suitable for any kind of collaboration, cooperation or outsourcing. Silva (2013) states similarly that helpful information regarding outsourcing decision in the public sector is still missing.

IT departments from the public sector organizations are facing several challenges in the future. Both, the lack of IT experts and the need for more IT services, are only some examples, caused amongst others by the demographic change. Private economy as well has to manage similar challenges. Due to higher competition and profit orientation, the private sector was forced to develop solutions quite early in order to handle these issues. Even though there is considerable experience of IT outsourcing in the private economy, and there is at least some experience in the public sector, outsourcing or doing work in cooperation is not widely dispersed.

Lacity, Khan and Willcocks (2009) and others provide useful literature about outsourcing in private as well as public organizations. Some articles name motivations for IT outsourcing decisions and other give an overview about benefits and risks of IT outsourcing. In this paper we build on their findings. In order to make an initial step towards the facilitation of the decisions process of IT outsourcing in public sector, we search for characteristics which help to describe a task on the one hand, and a cooperation form on the other hand. By having a set of characteristics, the evaluation of IT task and cooperation form can be done more efficiently.

The remainder of this paper is structured as follows: First, the research methodology is briefly described. Second, the findings of the literature reviews are presented. They are split into two sections, namely for characteristics of IT tasks as well as characteristics of IT cooperation forms. Finally, a conclusion is drawn out for possibilities of future research in this field.

2. Methodology

In order to identify the desired characteristics, a literature review following the guidelines of Webster and Watson (2002) and Fettke (2006) is carried out. Firstly, journals and conferences with e-governmental background, some journals of the basket of eight with known relation to public management and other relevant outlets like HICCS or AMCIS are searched via key-word search. The used search terms are always combinations of keywords of category 1 and category 2, joined by *and* as well as *or*:

Table 1: Search terms for the literature review

Category 1	Category 2
collaboration	*e-government*
cooperation	*public sector*
outsourcing	*public management*
partnership	*public service*

Additionally, Google scholar was considered as well by using the selected key-words. In a next step, the references of the relevant articles are searched via forward-backward search.

Overall 2513 articles were found and 27 of these were considered for this work, as they deal with IT outsourcing or cooperation in the public sector. The decision of whether or not a retrieved article was analyzed in detail in this literature review, was based on the article´s title and subsequently on its abstract. The focus of this review lies on cooperation of IT within the public sector. Essentially, articles are extracted, which have a close relationship to collaboration and cooperation within the public sector. Articles like the one by Silva (2013) were found which address IT outsourcing decisions. They further provide characteristics respectively factors and consequently are quite close to the topic of this work. This helped to get enough material to fill in the gap this work addresses. However, no article answered a similar question.

In a next step, the findings were classified into similar topics to limit the number of different types of characteristics and to get a clear structured result, which is detailed in the following section of this paper.

3. Findings

Following Picot and Maier (1992), companies (and therefore also public authorities) have to make plenty of decisions in order to decide whether services should be made in-house, be outsourced or which specific form of IT cooperation should be selected. Tasks, processes or services need to be analyzed by a set of criteria to show, if a task, process or service is suitable for IT outsourcing or IT cooperation at all and which specific form of IT cooperation fits best. Küchler and Heiling (2008) investigated 750 municipalities concerning what influences their decision to outsource certain tasks. They found that less financial and rather other factors influence the willingness to outsource IT tasks.

The analysis of the related work revealed criteria for describing the specific IT task to be outsourced as well as criteria describing different forms of IT cooperation. Thus, we will first give an overview of characteristics describing IT tasks and second show the characteristics of cooperation forms.

3.1 Characteristics of an IT task

According to the literature, the characteristics named below are important to describe an IT task. Figure 1 as a "Zwicky box" shows the characteristics that describe and categorize an IT task. The selected task has to be evaluated considering to every single characteristic. As a result, one receives a typical pattern of characteristics that features for a special type of IT task.

A task in the public sector can be of **sovereign nature**, which means, it can only be fulfilled by a public authority and it is not possible to hand it over to a private company. As in this work the focus lies on IT tasks, it has to be mentioned, that commonly not the IT task itself but the supported business process is of a sovereign nature. For making an IT cooperation decision it is crucial to distinguish if the sovereign nature of the business process also restricts the eligibility of the related IT task for IT cooperation.

The second important characteristic is the **complexity** which is related through fulfilling the IT task (Silva, 2013). IT tasks especially in the public sector differ from the regarding knowledge level. Besides common IT tasks domain specific processes and applications do exist. In relation to the outsourcing decision, the level of required domain specific or expert know-how is important to decide if a partner at all or what partner can realize the desired work. Beus and Städler (2010), Joha and Janssen (2010), Picot and Maier (1992) and others mention the necessity of an appropriate cooperation for an increase of service quality or a higher availability of skilled resources (Paagman, Tate & Furtmueller, 2013). If the task is from a high complexity this can mean, that the partner needs to be highly skilled or that the task rather will be fulfilled in house (Silva, 2013).

The required level of know-how is related to the next characteristic, namely **core competencies**. In contrast to the previous point it is not primarily important if a partner could fulfill the IT task, but if the client organization (owner of the task) is willing and/or allowed from a legal point of view, to let other companies do that work (Sun *et al.*, 2014). Besides, this will only work if outsourcing was accepted by the public as well. In summary, like Silva (2013) also states, a task will be outsourced more likely if it is of a common nature.

Characteristic	Options		
Sovereign nature of the supported business process	Yes		No
Complexity	High	Middle	Low
Core competence	Yes		No
Legal regulations	High level	Common rules	None
Technical requirements	High level of standardization	Medium level of standardization	Low level of standardization
	High level of modularization	Medium level of modularization	Low level of modularization
Social or political relevance of the supported business process	High	Middle	Low

Figure 1: IT task characteristics

Legal regulations have a close relationship to the sovereign nature of the task, as the sovereign nature itself is described by legal regulations (Schweizer *et al.*, 2005). Besides that, privacy and data security are based on regulations and have a high level of importance in the public sector (Schweizer *et al.*, 2005). For the selection of a cooperation form it can be important to know if one has to consider a high level of legal regulations or only to follow common rules or if there are no legal rules concerning a particular IT task. This characteristic has a strong relation to the characteristic complexity. IT tasks or their supported business processes are often dependent on legal specifications. This characteristic describes how strong the implementation of the IT task is regulated by legal restriction.

In the field of information technology, technical requirements are of high importance. Besides common technical knowledge, like programming, infrastructure or process knowledge, the two topics of standardization and modularization are important for this work. Schuppan and Reichard (2010) describe the modularization of processes. In the case of a task of sovereign nature it can be worth investigating the task in relation to its potential for modularization. It possibly turns out, that a sub-task is not of a sovereign nature and therefor can be met by a private company. Accordingly, this expands the range of IT tasks eligible for cooperation. The standardization is a basic requirement to gain the advantages out of a cooperation. More service for citizens or cost reduction are only two examples that Klinger (2007) names. According to this, a standardized task has a higher potential and can be fulfilled more easily in cooperation. Ziemann, Matheis and Werth (2008) provide a more technical insight into the interoperability of public authorities and the need for efficient products, for example data exchange, which also needs standardized processes as a basis.

The social or political relevance of the business process of an IT task can have significant impact on a cooperation decision (Silva, 2013). An example for a task with high political and social relevance is the tax calculation. If this process won't work, the political level will escalate immediately.

3.2 Characteristics of an IT cooperation form

Figure 2 illustrates the characteristics describing a possible cooperation form. After the desired task is evaluated, it is necessary to know which cooperation forms can be used or at least, what form of cooperation is not possible at all.

IT cooperation show a wide range of variations. These leads from small consulting activity for IT cooperation (e.g. "Vitako" (Löhr, 2008)) over bigger municipal joint ventures for IT services (Andersen, 2004) to more rather complex shared service centers, which can have different federal states as their members (e.g. "Dataport" (Kammer, 2007)). A differentiation of partners involved can also exist between federal levels (Hanken & Wind, 2006). For some tasks, only cooperation among public organizations is allowed (Janssen, Kamal, Weerakoddy & Joha, 2012; Löhr & Kammer, 2006). In other examples, only local municipalities take part in cooperation (Groppo

& Heck, 2009; Janssen *et al.*, 2012). While for other tasks private companies may have advantages or in another constellation the pure outsourcing model is preferred (Joha & Janssen, 2010).

The characteristic **partners involved** describes which kind of organizations take part in a cooperation form. The three dimensions in Figure 1 are public organizations only, a mixture of public and private like described by Ohemeng and Grant (2014) and private organizations only. This category allows to identify possible alternatives regarding special legal prerequisites.

The next characteristic describes the **type of cooperation form**. A classical outsourcing relationship is described as one vendor takes over one task of one client. In case of only a few partners involved, the few participants have several advantages. One advantage would be the higher impact every single participant has, for example, on the future development of the cooperation (Currie & Willcocks, 1998). This category is named as joint ventures. The largest category, which usually also have the most participants, are shared service centers. Here, the single partner has only minor impact on decisions.

The characteristic **legal form** offers two essential possibilities of action. In private legal forms the partners involved can gain a maximum of economic freedom and the highest economic impact. Whereas in public legal forms a higher regulation through different authorities occurs (Trapp & Bolay, 2003). Supplementary, the legal form is also determinant for whether a private company may fulfill a certain task (Schuppan & Reichard, 2010).

Characteristic	Options				
Partners involved	Public only		Public-Private		Private only
Type of cooperation form	Outsourcing		Joint Venture		Shared Service Center
Legal form	Public form			Private form	
Provision model	Technical			Personnel	
	Specialized	General		Experts	General
Specialization	Specialized			Diversified	
Cultural fit	Yes			No	

Figure 2: Characteristics of cooperation forms

The characteristic provision model describes the extent to which the goods and services provided in a special cooperation fit to the needs of the client. The provision can cover a wide range of services or know-how e.g. combined procurement, share any kind of service or provide a special kind of service (like SAP support (Saxe, 2005). This characteristic differentiates between the technical and personnel support a cooperation form offers. Both can appear in a specialized and in a more general manner. Hence, some organizations can provide special software development skills, where others offer deep understanding in public management processes.

The characteristic specialization has a close relationship to the characteristic provision model. It describes if the cooperation form offers services of only one or several kinds. When public authorities enter into a contract, they often have a look at future assignments and long-term cooperation. The characteristic specialization can help to take the long-term into consideration. The chance of a future collaboration is higher, when a cooperation form can provide divers services in contrast to a high specialized form, which e.g. only delivers SAP support.

The characteristic cultural fit summarizes different items. Those depend from the decision maker`s personal perception (Silva, 2013). The cultural fit can show up as cultural differences which appear within a workgroup or the main language(s) the teams of the different organization speak. Lee and Kim (1999) state that the existence of a cultural fit improves the partnership quality.

4. Discussion

The following section analyzes the identified and categorized characteristics, which are described above. Besides the limitations of this work and possible future research topics are addressed.

Although the characteristics are separated into two sections. There are strong relations between some of them across categories. A task of sovereign nature for example requires a specific legal form concerning a potential cooperation. While for example the characteristic core competency is more or less independent from the cooperation form. Based on the current findings from the literature review a comprehensive analysis of relations is not possible.

First: Characteristics of IT tasks. The investigation of the characteristics of IT tasks turns out some central points which can help to evaluate an IT task. The sovereign nature of the supported business process at least in Germany has high impact on the decision if a partner at all or what partner can realize the corresponding IT task. Tasks of a sovereign nature can be fulfilled within the public sector, but still it is not clear what is required, when private organizations want to take over parts of the provision for such tasks. The complexity level, discussed second, has a strong impact on the cooperation form decision. A potential cooperation partner needs the required know-how, legal prerequisites and also the man power to fulfill a high complex task. The core competence as well as the social or political impact are related to the citizens' opinion. To let a private company manage processes where sensitive data of citizens have to be handled, can lead to rejection by citizens and subsequently rejection by politicians. Furthermore the technical requirements provide information about the technical flexibility of the task. That means, that a highly standardized process using standard interfaces has a good chance to find a possible cooperation form, which can fulfill it. While a very individual process which has to be customized or even newly developed has completely different requirements on a cooperation form. In sum we found a lot of articles on IT outsourcing in the literature, whereas less material about the characteristics of an IT task and a cooperation form is existing. However there is literature which describes surrounding topics like outsourcing in private and public sector and gives good hints for further investigation.

Second: Characteristics of cooperation forms. The investigation of the characteristics of the potential cooperation form turns out, that legal aspects are from a high meaning. The partners involved, the type of the cooperation form and the legal form are all three needed to cover legal requirements. Whereby the corresponding IT task characteristics are the sovereign nature of the supported business process and the legal regulations. A private only outsourcing partner normally is no sufficient cooperation form for an IT task of sovereign nature. But a shared service center consisting of public organizations is adequate for this type of tasks. Besides the fulfillment of the legal regulations, a cooperation form has to be able to handle the task. The characteristics provision model, specialization and cultural fit should respond to this point. The technical or personnel quality as well as their level of know-how have a close relationship to the task's complexity or its technical requirements. Having possible cooperation forms identified, further characteristics can help to identify a certain organization. The standing of an organization for example could be such criteria. The standing characteristic makes a statement to the experience and the reputation (Silva, 2013) of a cooperation form. Groppo and Heck (2009) discuss challenges of sourcing with shared services in their paper. More experience and a high reputation should help to minimize most of the challenges they mention in their article. Additionally, Niehaves and Krause (2010) state, that experience in a prior cooperation leads to more success in cooperation. A low standing subsequently would lead to the exclusion of the cooperation form.

5. Research limitations and future research

For this work not only but mainly articles in the field of e-government were investigated. Besides that, examples from different federal layers in Germany lead to a mainly German focus. For future research, this two limitations should be addressed to get a big picture and at least to get an idea about the differences between various countries. Furthermore the characteristics of the findings section should be verified in practice. This should turn out, whether they are complete and realizable or if some characteristics are still missing in theory. Accordingly it should be further investigated how the combination of characteristics of IT tasks and characteristics of IT cooperation forms fit together and how they affect each other. Additionally it is important to know how the combination of characteristics gets applicable for practitioners and subsequently to analyze the usage to evaluate, if the predicted advantages really appear.

6. Conclusion

Amongst others the public sector suffers from low budgets, increasing demand of services by citizens and a lack of IT experts. These problems are partial caused by creating similar services in every single municipality and over all federal levels as well as the high legal demands, every public authority has to meet. To counteract this situation, there are already a lot of different motivations described in the literature. One possibility to gain benefits is to strengthen working in cooperation. Different reasons were mentioned, why IT cooperation in public sector still is not as widespread as one could expect. To gain more cooperation among public authorities some more assistance is needed for the decision whether a topic or task is relevant for outsourcing. In a next step it is crucial to know, if an organization or a type of cooperation meets requirements to take over the chosen task.

Hence the question, what characteristics a certain task or process needs to have the potential to be outsourced is not discussed yet. Hence this work tried to fill the mentioned gap. The uncertainty of such decision shows the statement of Schuppan and Reichard (2010) when they say, that a task/service which cannot be specified sufficiently, an IT cooperation partner should rather be a public than a private organization.

Based on the findings a categorization can be made, which characteristics of tasks do have influence on the potential of outsourcing. Additionally different characteristics can be used to describe the cooperation forms which come into consideration. Having the characteristics of a task as a basis an organization has a more transparent view on it. This helps to decide whether outsourcing makes sense in a particular case. Once a public organization has identified a task and is willing to outsource or work in cooperation, the next question is which type of IT cooperation matches this task. The characteristics of IT cooperation forms can help to categorize potential types. This simplifies the process of selecting a cooperation form or vendor. In an ideal case a one to one match can be gained out of the two schemes.

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Information and Communications Technology in Government, an Historical Perspective

Terence Keefe and Paul Crowther
Sheffield Hallam University, Sheffield, UK
t.keefe@shu.ac.uk
cmspc3@shu.ac.uk

Abstract: The purpose of this paper is to address a paradox in e-Government, namely a reputation for failure existing alongside an apparent reality of successful implementation. There are frequent and much publicised stories and statistics about the high rate of failure in e-government projects. Yet at the same time as there seems to be an almost universal adoption of Information and Communications Technologies by governments at all levels, local and national. Our approach is to explore e-Government's origins for an explanation, examining the issue from a historical perspective to see if there are lessons to be learned about the future development and implementation of e-Government. This study and analysis addresses the similarities and differences between the present situation and what has happened in the past. The aim is to use the perspective of history to comment upon the longer term issues and questions which have an impact upon the success and failure of e-Government projects.The study is focused on developments in the UK, but with some reference to experiences in the US, Canada and Australia. The bulk of the research comes from a library search of government studies and reports, supplemented by informal conversations with participants conducted over the last few years. We looked at the history of government Information Technology in the UK from its early role automating data processing to the point now where it is arguably an indispensable mechanism at the heart of both the operation of public administration and the relationship between citizens and government.The analysis suggests that the impact and implications of e-Government have evolved beyond improvements to operational efficiency and better service delivery. The outcomes are a number of observations about the way in which e-Government projects have come to be managed and assessed, together with some core questions to be answered by further research and discussion. Specifically questions are raised about the strategic nature of e-Government and how their value has come to be assessed. We ask whether it is helpful for e-Government to be regarded as a strategic aim as opposed to a strategic enabler, and whether the answer the answer contributes to a mistaken view of e-Government's success.

Keywords: e-government, computing, government, public sector, project management

1. Introduction

> ""*The only way to influence the human future is to speak about the past in ways it did not speak of itself.*" Richard Rorty(DeBakcsy, 2015)

This paper seeks to address a paradox. Literature and conferences abound with statistics and case studies describing the high rate of failure in e-government projects, too many to reference here but see my paper to ECEG 2012 for a more detailed analysis. (Keefe, et al., 2012). Yet even a cursory analysis of the delivery of government services across the industrialised world, as featured widely in conference and journal papers, points towards an almost universal adoption of Information and Communications Technologies by governments at all levels, local and national (Schwester, 2011).

In her introduction to the ECEG 2015 mini track "Practice, Theory and Knowledge" Dr Michaelene Cox points out that "most work to date has concentrated on its (E-Government) practice, such as technology adoption and diffusion, policy agendas, impacts"(Cox, 2014). E-government is the current topic and the immediate issues are practical and applied in nature. It is natural to address research and analysis towards those current issues but does this mean that more fundamental questions about the nature of E-government and how they might contribute to current issues are not addressed.

Information Technology has been a factor in government and public administration since WWII when its potential to radically improve the way in which data and information could be managed first emerged, with the first application in the 1950s when computers were used to collate US census information.

The years since have seen many e-government initiatives and projects resulting over time in fundamental changes to the operation and delivery of government. In this paper we ask: what can be learned about delivering digital government from examining what has gone before looked at from the added perspectives which hindsight can provide.

In this paper I will seek to develop a better and fuller understanding of this paradox, if indeed it is a paradox, by looking into the roots and origins of e-government in the shape of the adoption of computing and ICT into government, and to examine that adoption has evolved through integration and development into the situation we find today. The aim is to see if a view from an historical distance can provide a more complete picture of the domain.

The study will focus on the post-war UK government experience but with some reference to the experience of other mature industrial democracies.

2. Definitions

In their article on E-Government as a field of study Grönlund and Horan provide a useful overview of the emergence of E-government applications as well as a valuable set of scoping definitions (Grönlund & Horan, 2004). This paper will adopt the definition used by the European Union as quoted in the Grönlund and Horan paper.

> *"E-Government is the use of Information and Communication Technologies in public administrations combined with organisational change and new skills in order to improve public services and democratic processes" .*

Elsewhere we will try to use the terminology as it was used in the period being described, for example "Computing", "ICT", and "IT" but there is no attempt or claim to any precision in this.

3. Background

E-government is challenged. In a paper delivered to ECEG 2013 the authors argued that the challenges go beyond those experienced in generic IT projects(Keefe, et al., 2012). It may be that they are not project management issues at all but relate instead to the nature of the public administration environment.

The role played by computers and information technology in UK and other Western governments has evolved from a data processing role, through operational support functions and moving into service delivery and regulatory support activities over the last twenty-five years. As the range and scale of IT integration into government has grown, so the range and scale of challenges, problems and failures have also grown. A historical analysis of IT in government suggests that both impact and implications go beyond improvements to operational efficiency and better service delivery, raising questions about their impact on democratic process and decision making.

Conference papers, journal articles, and books describe E-government successes, but also describe struggles and failures. This paper asks whether we fully understand the nature of the task involved in integrating Information Technology into the delivery of government and public administration. In this paper we attempt to demonstrate that there are valuable lessons to be learned from developing better knowledge and understanding of how the role and importance of Information Technology in government and public administration has evolved. The hope in writing this paper is that greater awareness of these wider and more fundamental impacts will aid digital government leaders in understanding the nature of, and resolution to the challenges they must overcome.

4. Research methodology

The study will focus mainly on developments in the UK, but with some reference to experiences in the US, Canada and Australia. The bulk of the research will come from a library search of histories of public administration, supplemented with government studies and reports. It will also draw from discussions with a small number of participants from within the public administration and from facilitating organisations such as management consultancies.

The research methodology underpinning this paper comprises desk research mixed with a range of discussions with a small number of participants from within the public administration and from facilitating organisations such as management consultancies.

5. Findings

5.1 Historical research

This part of the analysis is based upon a number of UK government reports and papers, starting with, and concentrating on, one from 1984 and concluding with one from 2011.

5.1.1 *The 1970s and 1980s - before the internet*

In a 1984 report by the UK National Audit Office looking back over the previous 10 years the authors noted that:

"inadequate project management and insufficient senior staff and user involvement, together with the failure to adopt suitable design and development procedures, were major factors in the difficulties encountered in all the projects reviewed" (Gordon Downey, Comptrollerand AuditorGeneral, National Audit Office, 1984).

The study identified four major computing projects which had hit major problems, but they made the point there were more.

- Health Department. A Local Office support system started in 1977 and abandoned in at a cost of £18million and none of the hoped for benefits. This must surely be a candidate for one of the first E-government failures.

- Manpower Service Commission (MSC) A youth training support system which overshot a budget of £600k by £1.2million and rising while only achieving a quarter of the anticipated benefits;

- HM Stationery Office (HMSO) A publication stock control and distribution support system which was running 3 years late in delivering any of the anticipated £2million benefits

- Lord Chancellor's Department (LCD) A support system for County Courts which was running 4 years late, would at best only deliver £90k of the expected £1.7million savings and which would cease to be cost effective if it encountered any further delays.

There were other computing projects, some of which would now be considered as E-government applications using the EU definition. For example, from1978 the Manpower Services Commission, a government agency tasked with economic planning and management of the national labour force, experimented with automated jobseeker and vacancy matching systems. The First system called CAPITAL was abandoned in 1979 because of looming cost overruns, interestingly the software was sold on to a private sector employment agency who not only completed its development for their own use but also sold it on to other employment agencies in Europe. Again there was a similar pattern, the strategic need for an IT supported service remained and the project was resumed, successfully, within five years.

While the problems and costs may seem familiar, the response from government managers and the analysis by the report authors provides considerable food for thought. In all four cases the Department senior management stated that the experience and cost were far from nugatory. The Health Department and MSC initiated new projects to replace the failures. Both were successful. The LCD and HMSO reviewed their strategy and adopted a new approach to computerising operations based on incremental development of smaller systems. (Gordon Downey, Comptrollerand AuditorGeneral, National Audit Office, 1984)

The report recommendations are interesting in that they did not question the need for the projects, nor did they seek to allocate blame or criticise decision makers. Two aspects of the report findings are of particular interest.

*Management skills and methods.*In all cases the report highlighted issues around the management of the human Computing resources as a primary source of problems, but not to blame computing staff. Instead the report recognised the need to develop management disciplines and methods appropriate to computing as a profession. One outcome was that the Treasury section responsible for computing initiated a number of projects aimed at developing a core set of management methodologies and standards.

*Strategic planning*The report's authors consistently referred to the need for computer supported projects to be planned and managed within a strategic framework, recommendations which were accepted and implemented with some enthusiasm, possible because they were backed by HM Treasury. Computer projects were seen as a

resource to achieve a strategic initiative. Implementing new policy is always challenging, involving learning from experience. It is worth bearing in mind that these activities were taking place at a period when Strategic Planning was the leading management discipline, a discipline which above all required command of information (Mintzberg, 1994; Drucker, 1974).

5.1.2 The 1990s to 2005 - the birth of e-government

Many writers pinpoint this period as the time when e-government as we now think of it was born with the emergence of the World Wide Web together with publicly accessible networking infrastructure (Ho, 2002). In the UK developments in IT coincided with a shift in Government thinking about its relationship with its citizens, mirroring a similar in the business world with the focus moving to quality of service and re-engineering business processes. In the UK this shift manifested itself in moves to make service provision more customer focused and for public servants to adopt a more outward looking approach seeking to build a more open relationship with citizens. Similar shifts in thinking and public sector behaviour could be seen in Canada, Australia and Germany. The tool, if not the driver, was the internet. Other scholars will discuss whether this was part of a wider change in society and government (Ramadhan, et al., 2011), but for the e-government historian there were two significant developments, both related to the concept of transforming government. First was the use of the Web to build a new, more direct relationship with citizenry through the means of online consultations. Second was the adoption of a business process view of public service delivery underpinned by, and dependent upon, Information Technology. A White Paper titled "Modernising Government" described the intention and individual departments then developed strategies and programmes under the Information Age Government banner.

Even before this there was recognition at senior Civil Service levels that the world had changed and that the process of governing depended upon IT. An illustration of this was in 1995 when a department newly formed from the merger of three previous departments created a project to integrate three core office support systems into one, resulting in a single office desktop with 20,000 users serving a workforce of 60,000. The integrated system was a mix of operating systems and office applications. It was inherently unstable and inevitably the day came when the whole thing crashed. It was restored after three weeks at considerable cost. The interesting thing was that the reaction of the Departmental management, official and political, was to say that this situation could never be allowed to happen again in the realisation that even at that date a public facing government department could not deliver its services and meet its obligations without reliable IT support. The result was a strategy and funded programme to build a resilient single departmental IT platform. Fits in with HO situation in US talking about the paradigm shift brought about by the growth of IT in government provision of services. (Ho, 2002)

By the new millennium this had been brought together within a single government wide strategy "E-government – A Strategic Framework for Public Services in the Information Age 2001". This document identified a range of social aims which could be achieved through the use of online facilities, for example social inclusion (e-inclusion) and participation in democracy (e-democracy) among others while public services themselves went through a process of modernisation (e-administration). It was at this point that the paradox referred to at the beginning of the paper emerged. A later report delivered in 2010 describes how a number of these initiatives resulted in dismal and expensive failure. Yet it is undeniable that by 2010 that IT had pervaded most if not all aspects of the provision of public services in the UK, the interface with citizens and the administration behind it.

5.2 The participant experience

The contents of this section come from informal conversations with a range people involved in some way in Government IT projects over the last 50 years. While they cannot be regarded as having been collected using a rigorous research methodology, they are valid as recollections and retrospective opinions from people involved at the time.

A Senior Civil Servant (Grade 5) stressed that it was important to understand that implementing new policy is always challenging, and involved learning from experience as a matter of course. Even without computers, though he had little experience of such a situation, there were always programmes and activities that did not work the first time around, often at great expense. Even though the 1980s were a very difficult period economically and politically, especially in the public sector, there was a certain adventure about using computers, and there were significant advantages. In particular computers provided an opportunity to implement new policies which would not have been considered before because of the need to staff a new

administrative bureaucracy to support them. Computer systems meant new programs could be integrated into existing local and regional offices, though it was often not as straightforward as we had hoped.

Another said:

> *"The great thing about using computers in our work was that they allowed us to do so much more with information. Even if they did not do some of the things we had been promised, they always seemed to open up new opportunities."*

For an IT manager in the 1990s the important thing was not to lose sight of what was important to the Department, essentially the need to satisfy the political will. "The reason they got in trouble (referring to a major IT project which had recently been cancelled) was that the politicians could no longer understand what the project was there to achieve."

An IT manager from an earlier period had a different viewpoint saying that in many ways it was much less complicated in that IT, or Computing, was not part of the main policy and administrative functions. Computing staff were told what was needed and then expected to get on with it. The interviewee described a general situation where there was great pressure on deadlines and budgets but without anyone in a senior operational management position feeling confident or competent enough to tell Computing departments how to do the job. In effect the systems were built and delivered on the basis that front office operations would be adapted to make them fit. This changed during the 90s when computing had to get involved in the business, and the business had to get involved in computing. In comparing the autonomy of these early years with today's more inclusive approach to managing IT the interviewee's opinion was summed up "The end result was much the same."

Finally, a private sector consultant from one of the big four consultancy firms commenting on the process of developing an organisation wide, business led Information Systems strategy observed that in his experience public sector senior managers were much more prepared to tolerate IT failures than their private sector counterparts as long as they could see a way forward in meeting their business objectives. They were also more willing to use IT projects as an arena in which to battle for competing objectives.

Perhaps the most striking thing emerging from these discussions was the feeling of opportunity arising from the introduction computers into working lives.

6. Discussions

So what lessons have been learned from this brief retrospective investigation?

Successive UK governments in those formative decades focused decisions on achievement of political and social aims and appear to have accepted that Information Technology solutions were not always achieved at the first attempt. It might be argued that such tolerance is an expense that cannot be accommodated in the austerity era following the 2007 financial crash, but it is worth remembering that the UK, along with other industrialised countries, was in a similar if not worse economic position during the 1970s and 80s.

The lessons learned focused on the mannerin which Information Technology was managed, with a strong emphasis on developing an IT specific management discipline. As a result both the UK and the US government championed the development of IT professional behaviour, management methods and standards such as PRINCE IT project Management and ITIL standards. Ironically these methods, which have proved their value on a global scale, were picked out as a major cause of IT project failure by the writers of the 2010 Fatal Error report.

In the UK Information Technology was firmly embedded as part of the public service infrastructure by the early 1990s. Threats to quality of service were still an issue, but by the early 2000s the evidence from services such as those delivering online health advice (NHS Direct), and online lifelong learning opportunities (UfI Learndirect) for example was that the newer technology enhanced the quality and scope of public service delivery. Comparison of the experience of local administrative staff in the UK with those described in the admittedly much more thorough study by KerstenGrunden(2012) in Sweden suggests a significant difference of attitude among those having to work with new e-government systems. Grunden describes a situation where office staff lacked confidence and experience in the use of e-government systems, favouring more traditional paper based administrative processes and being concerned that the quality of service would be diminished (Grunden, 2012).

7. Future research questions

Perhaps the first thought is, have we all got it wrong, that there is no such thing as "e-government". Certainly there is "E", the ubiquitous presence of Information Technologies and the Internet within the machinery of government, the provision of public services and the relationship between government and governed; and there is government. But maybe they are two different concepts, one a tool, the other a purpose. Looking back on the evolution of e-government in the UK one might ask how it is that Information and Communications Technologies which were seen as a means for achieving effective delivery of public services, can have become the desired end in themselves. In their article Davison, Wagner and Ma identified a number of governments adopting e-government as a strategic objective rather than a means to achieving political or social objectives. Now it may be that the intention was to identify the strategic importance of e-government in the achievement of wider social, economic and political aims but the suspicion is that government decision makers are confused about this (Davison, et al., 2005), and this could be a potentially dangerous confusion.

Richard Heeks(2006) argues that individual Public Sector organisations cannot have objectives as such, but instead have within them individuals and groups with multiple objectives (Heeks, 2006). This may help explain how and why e-government as we know it today has evolved from its origins as an enabling resource to becoming a strategic aim in its own right, as it may be the best way of ensuring its importance and potential is recognised amongst the many other strategic objectives at play. It does though pose the question whether e-Government has lost sight of its purpose as an enabler, or perhaps the point is that e-Government has come to be so much more than just an enabler that it is indeed a strategic aim to achieve. Whatever the answer, clarity is needed. A question which could be posed is, has a mistaken understanding of e-Government contributed to a change in the way government decision-makers judge success and failure in IT projects? That is, has the viewpoint displayed in the 1980s UK that successful innovation in the use of ICT in government is a process of learning through experience changed to one where the first reaction is to attach the label of failure to the whole project because the "E" element has not lived up to expectations? This question has particular relevance in the UK where several large but challenging projects appear to have been judged on the merits of their IT solutions rather than their progress towards achieving national strategic objectives. The National Health Service "Connecting for Health" is one example where the IT element was certainly projected as the scapegoat for delay and soaring budget, though it does appear that some elements of the programme will be continued.

A further question is whether the judgement of success or failure is based too much on the assumption that e-Government projects are similar in scope and complexity to reputedly successful private sector IT projects. Certainly UK governments have consistently sought to apply lessons and good practice from the private sector but it appears from the reports quoted earlier that until 2011 there was a prevailing view that many government projects sought to take IT into new territory in terms of scale and complexity. The Fatal Error report (Institute for Government, 2011) signalled a marked change in attitude with its recommendations for managing government IT being rooted firmly in the belief that what works for Private Sector IT must work for Government. It is my view, discussed in an earlier ECEG paper (Keefe, et al., 2013), that this is at best a dangerous assumption as it risks losing the value of learning from experience and inhibiting innovation.

Figure 1 summarises findings and demonstrates the historical flow from the introduction of computing into government through to its emergence as e-Government. It finishes with a question mark for the future, asking whether, for the UK at least, innovation and leadership in the use of IT as a transformative tool is on the point of being abandoned and whether IT is now seen as little more than a resource which needs to do better.

8. Conclusions

This brief history of the evolution of e-Government in the UK has identified two themes. The first is the development of IT Strategy within the UK public sector and describes the evolution from a set of enabling and management approaches in support of policy business objectives to the point where the technology has become the strategic aim in its own right. At some point during the emergence of e-Government during the 1990s and early 2000s there has been what Ho describes as a Paradigm Shift in how e-Government is perceived (Ho, 2002).

The second is the attitude towards success and failure where again there appears, with hindsight anyway, to have been a shift, in this case from tolerance of problems as lessons learned, to a position where Government IT, and that includes e-government, is expected to work first time.
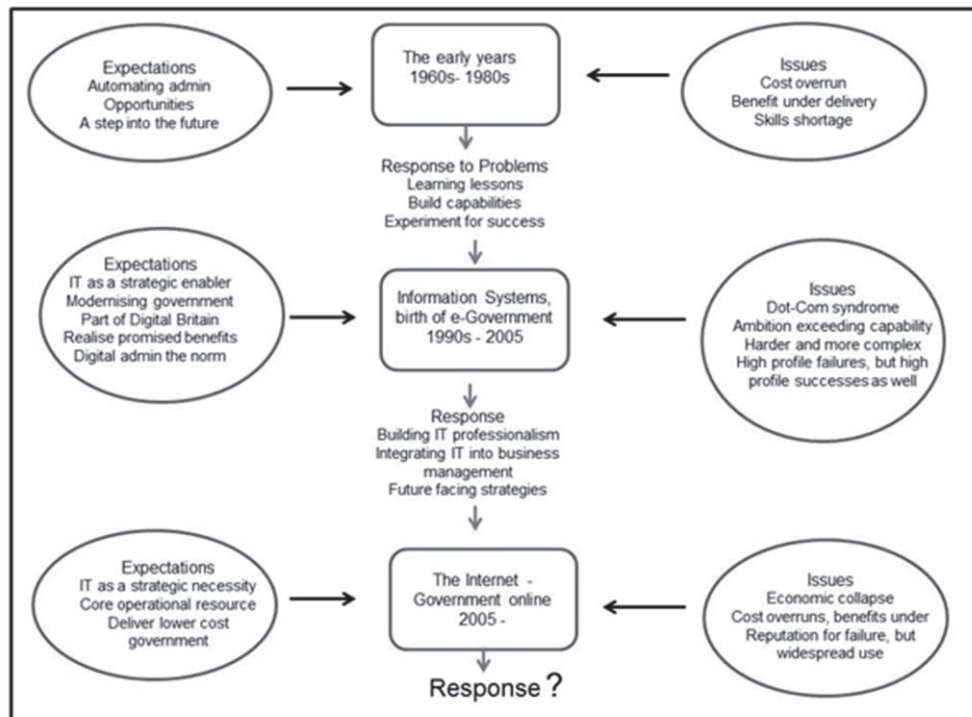
Figure 1: From computing to e-government

There are many questions and issues left to explore, and perhaps very few answers. When starting this paper we set out to see what answers, if any, a short and geographically limited history of this topic could provide. Answers are few. What we believe history has been able to do is identify questions which need to be answered if the full potential of e-Government is to be realised.

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A Model of Secure Interconnection of Registers Containing Personal Data

József Károly Kiss[1], Péter József Kiss[1] and Gábor Klimkó[2]
[1]MTA IT Foundation, Hungary
[2]Budapest Corvinus University, Hungary
mtaita@t-online.hu
kisspeterjozsef@gmail.com
klimko@informatika.uni-corvinus.hu

Abstract: it is a challenge to provide secure interconnection of registers containing personal data when the compilation of personality profiles is strictly regulated by the law. In the paper such a model is presented that conforms to the strict requirement of personal data protection legislation in Hungary. The model is based on encrypted anonymous linking codes, generated and encrypted separately by the operators of different state registers. The encrypted anonymous linking codes are stored in the so-called linking register and interconnections are created via this register. This process significantly reduces the risk of illegal compilation of personal profiles. In Hungary a project is in progress in which basic registers are to be interconnected on the basis of the described model.

1. Introduction

In Hungary legal regulation on personal data protection follows the strict principle that forbids compiling personality profiles based on unauthorized linking of data stored in separate registers. As a consequence, it is forbidden by the law to use a single, universal personal identifier in state registers. Separate registers (e.g. tax, social security or population register) have to use different personal identifiers. Note that there are European countries, where the usage of a single (personal) identification number is allowed by the national law (Centre de Recherche Public Gabriel Lippmann, 2005).

Legal prohibition itself, nevertheless, does not technically restrain interconnecting data in registers which might result in compiling personality profiles. The process of matching, linking and combining records that relate to the same person from different registers is known as "computer matching", "record linkage", "data matching" or "entity resolution" (Regan, 1986), (Fellegi and Sunter, 1986), (Vatsalan, 2014).

There is need for well-defined, secure interconnections between the registers due to the comfort needs of clients as well as to the controlled functioning of the state (Choi, 2013), (Janssen and Wagenaar, 2004), (Laynea and Leeb, 2001), (Otjacques, 2007). Privacy concerns, however, still remain valid (Bellamy and Raab, 2005), (Camenisch et al., 2011), (Pieterson et al., 2007).

A possible way of implementing an interconnection among registers is to use Anonymous Linking Codes (ALCs) (Herzog et al, 2007), (Camenisch et al., 2011), (Vatsalan, 2013). Technically, an ALC is another key of the related record; it is a computed, meaningless personal code that characterizes the person without revealing his/her identity (Otjacques, 2007). ALCs are primarily used in the context of privacy-preserving record linkage (Vatsalan, 2013). However, using *public* (disclosed) ALCs might allow the otherwise legally forbidden linking of personal data. ALCs should be created and manipulated – in principle - only by the operators of the registers and they should never be disclosed. Even the person whose record is identified should not know his/her ALC.

It has to be noted that the controlled capture of data makes the natural personal identifiers (name, birth date and place, name of mother) universal identifiers in the registers. This statement is also true for the biometric identifiers (e.g., fingerprint, vein matching). Were the aforementioned natural personal identifiers be stored in the respective registers (and this is the current practice), then the technical conditions for interconnecting (mapping) those registers are basically given.

2. Problem statement and related work

The risks of internet hacking as well as of the internal abuse are increasing; see the stories on leaking of Swiss bank secrets (Jordans, 2011), (Thomasson and Taylor, 2011), or US classified documents (Christensen, 2014).

There is, therefore, a need for a model of operations that fulfils the strict data protection requirements and is adaptable to state registers. There are full-scale attempts to deal with this problem investigating several aspects of it (Choi, 2013). For the purposes of this paper we deal only with the problem of preventing the illegal interconnection of state registers, that is, to hinder the illegal compiling of personality profiles. Our focus of interest is to show a model of secure interconnection among registers that contain personal data.

Note that this study does not address the necessary data controls for computer networking. We are also not concerned about privacy-preserving record linking (Vatsalan et al. 2014).

Registers on personal data use basically two types of identifiers. The natural personal identifiers as the tuple of <<name>, <birth date>, <birth place>, <name of mother>> are usually stored, together with another system generated, but otherwise meaningless identifier (e.g. social security number, personal tax number), which is also stored. This identifier is the disclosed one in the sense that it is printed in documents.

In Hungary, a legally allowed interconnection between different registers (e.g. between the address register and the tax register) was created on the basis of a permanent ALC. The usage of ALCs led to a limited risk previously, when separate registers functioned in a closed manner and their operators were recruited from dedicated personnel. Unfortunately, the risk of hacking is growing as services based on the state register are offered to the public via the internet. Due to the increasing number of information technology systems it is also more difficult to exclude the possibility of internal abuse. We face therefore a situation when there are a large number of separate registers that use their own identifiers and the risk of making an illegal copy of those registers is increasing. Bearing all this in mind we should cater for such a solution that minimises the danger of the illegal interconnection of registers to an acceptable level, that is, the danger of the illegal compiling of personal profiles.

There are attempts to solve the problem of interconnecting registers in countries where the usage of a universal personal identifier is forbidden. Usually these approaches are based on user authentication.

In the Austrian model, separate sectorial personal identifiers are generated by an application stored on a device, usually on a smart card. The application co-operates with the Central Register of Residents and builds on a public key infrastructure. Although the Austrian approach basically allows various tokens for e-ID, it is focused on smart cards. The privacy implications of the model are at least controversial; illegal interconnection (linking) of different data records is argued to be possible (Schwarz, 2008), (Aichholzer and Strauß, 2010).

In the Portuguese model, the different personal identifiers are to be stored on the same smart card. Five traditional personal card (personal identification card, tax card, social security card, health insurance card and citizen's voting card) were replaced with a single smart card. There is a dedicated application on the smart card that manages the separate personal identifiers separately (Cerqueira, 2012), (Vasconcelos, 2007).

This model, however, deals only with a limited scope of the problem. Taking into consideration the capacity of a reasonable and affordable smart card, it allows the handling of only a limited number of identifiers, but though in principle there should be no such limitation at all.

There is an even more serious practical problem with the need of legal, regulated interconnection of the state register. Smart cards owned by the citizens do not provide a solution for this need, that is, this model does not support the most sensitive issue, the (internal) legal interconnection of state registers.

A further disadvantage of this approach is the assumption that there does not seem to be massive demand from the citizens for such a special device (a smart card), consequently take-up is slow (Aichholzer and Strauß, 2010). These approaches do not cope with biometric identifiers, neither.

3. The proposed model of secure Interconnection

We assume that operators of the separate registers (and their service providers) do not rely on each other, that is, they use different (sectorial) personal identifiers. We shall show such a model in which the otherwise disclosed personal identifiers (e.g. tax identifier, health insurance identifier) should never be used in compiling legally allowed interconnections. Rather, each service provider will use its own, internal identifiers that are never published for the outside world.

We shall present the original model based on ALCs in section 3.1. Then we will show an improved model that interconnects two registers with encrypted anonymous linking codes (EALCs) in the next section. In section 3.3 we shall present our final model where an interconnection among many register can be securely established, with the help of a newly introduced role (the linking service operator).

In the following sections we shall note registers with large capitals, e.g. T refers to the tax register, H refers to the health register, etc. Each register has an operator, called its service provider. Data items and data records (data item tuples) will be indicated between <> signs; e.g. register T contains <<tax ID>; <tax data>>, where <tax ID> is the identifier of register T (or the key of the tax record). Records in the registers always relate to persons. ALCs are noted with small letters, e.g. "r". Each service provider has its own, separate encryption algorithm that is not known by other service operators. An EALC by the operator of a specific register is noted with an underscored small letter, indexed with the respective letter of the register; e.g. "$\underline{r}_T$" is an ALC, generated and encrypted by the service provider of the tax register T.

3.1 Interconnecting registers with ALCs

In the original, basic model a service provider can build interconnections with other registers via ALCs. Let T note the tax register, <tax ID> the tax identifier and H note the health register; the ALC. <r> is a meaningless (technical) identifier of a person, that is known and stored only by the service operator of T and, respectively, the service operator of H. Then in order to build an interconnection between T and H,

> T should contain <<tax ID>, <tax data details>, <r>> and
> H should contain <<health ID>, <health data details>, <r>>.

The model approach assumes an initial upload in both registers where records, belonging to the same person in T and H, are assigned with the same ALC. This is usually is done by joining the natural identifiers of the persons. In this model, both service operators use the same ALCs.

If there is a need for making an interconnection (mapping) between the two registers, e.g. the service provider of T wants to send data to the service provider of H, then there is no need to use neither <tax ID> nor <health ID> but both can refer to (look up) <r>.
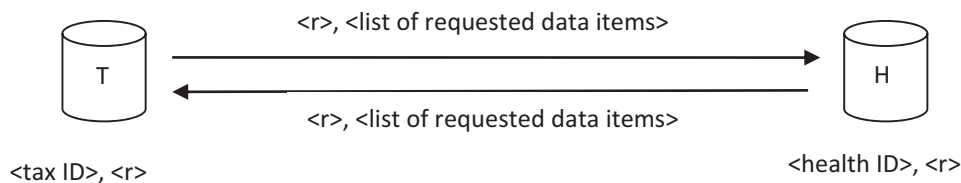
Figure 1: The basic model of interconnecting registers with ALCs

However, this model does not protect against compiling a personality profile if the data in both registers are illegally acquired (copied). On the basis of the copied registers, using the ALC <r> one can interconnect personal data. We can, however, hinder the interconnection of the stolen data if the ALCs are encrypted.

3.2 Interconnecting registers with EALCs

If the service operator of T encrypts its ALCs, than in order to build an interconnection between T and H,

> T should contain <<tax ID>, <tax data details>, <r>> and
> H should contain <<health ID>, <health data details>, <rT>>.

That is, <r> is stored in the tax register; and the tax service provider generates <r> and then encrypts it into <$\underline{r}_T$> to be stored in H. Only the tax service provider is able to decrypt <$\underline{r}_T$> values that are stored in the health register, as the only holder of the encryption algorithm.

When the health service provider sends data to the tax service provider than it will send both the data and its EALC. The tax service provider will be able to decrypt <$\underline{r}_T$> and using the resulting value, will be able to link the records.

The reason that EALC $<r_T>$ is not computed from the <tax ID> is that should the encryption algorithm be compromised then the illegal decryption would result in a meaningless value, <r>.

As above, the improved model assumes an initial upload where records, belonging to the same person, are assigned with <r> and $<r_T>$, respectively. This approach is an acceptable solution for secure one-directional data linking between two registers. Secure data linking in the reverse direction (i.e., in the example when the tax service provider sends data to the health service provider) requires the introduction of a new ALC <k>, generated by the service operator H. The new ALC is to be encrypted by the health service provider with its own encryption algorithm, and the resulting $<k_H>$ should be stored in T.
The improved model is extended this way as

> T should contain <<tax ID>, <tax data details>, <r>, $<k_H>$>> and
> H should contain <<health ID>, <health data details>, $<r_T>$, <k>>.
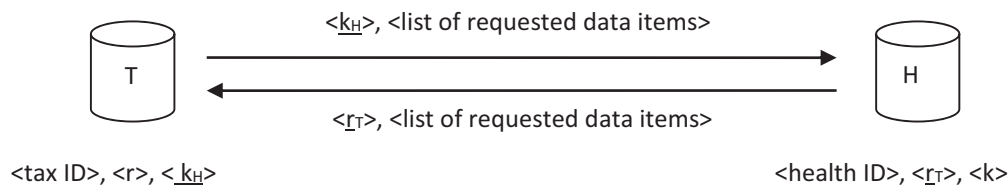
Figure 2: The simple model of interconnecting registers with EALCs

It is important to point out that both the ALCs as well as the encrypting algorithms are proprietary to the respective service provider. This way the tax service provider is not able to decrypt the EALC $<k_H>$, and the health service provider is not able to decrypt the EALC $<r_T>$.

3.3 The final model with the linking register

Though we have achieved an improvement, we still need to face two issues. Firstly, take the case when there are more than two registers to be interconnected (i.e. many-many relationships), which should also have to be handled. Secondly; as time goes by, so grows the risk of compromising of EALCs.

In the case of several registers to be interconnected if we use the model presented in section 3.2, it would lead to a number of EALCs to be stored in each register. This technique would result in a significant implementation and update burden, the initial load up would also be difficult.

This issue is solved by introducing a new register called "linking register", noted by L and its service provider. The linking register contains respective EALCs for each person, created and encrypted by the service operators whose registers then are to be interconnected.

Using the concept of the linking register the previous example would change as follows

> T should contain <<tax ID>, <tax data details>, <r>>
> H should contain <<health ID>, <health data details>, <k>> and
> L should contain <<r_T>, <k_H>>

In this model each EALC is stored by a third independent party. As a consequence, in order to make an interconnection it is necessary to involve the service operator of the linking register. Each register can ask for data from another register by sending its own EALC to the linking register.

During the initial upload of the linking register all EALCS of a person must be collected. This can be done by joining the natural identifiers of the persons stored in the registers (as previously). On the extreme, having uploaded the linking register, all natural identifiers could even be deleted from each register, thereby preventing the illegal interconnection of the registers using them. We will return to this question later.

3.3.1 Requesting data via the linking register

In this model the service operator of the linking register will assist in creating any interconnection between two (or among more) registers. Let us note a data request with its parameters m(<requesting party>, <requested party; <p_1>, …<p_n>). Returning to our previous example, consider a situation when the health service provider requests data related to a person from the tax service provider.

1. The health service operator sends a request to the linking service operator
m(H; L; <transaction ID>, <person=$\underline{k_H}$>, <requested=T>) where the parameters

- <transaction ID> uniquely identifies this request;

- <person=kH> is the EALC of the person whose EALC is requested;

- <requested=T> identifies that register, of which EALC is to be returned by the the linking service operator.

2. The linking service operator looks up the requested EALC <$\underline{r_T}$> corresponding to <$\underline{k_H}$> and returns it to the health service operator
m(L; H; <transaction ID>, <person=<$\underline{r_T}$>)
3. The health service operator, on the basis of <transaction ID> and the received value <$\underline{r_T}$> requests the needed data from the tax register
m(H; T; <transaction ID>, <person=$\underline{r_T}$>, <list of requested data items>) where

- <list of requested data items> describes what data items of the person in case are requested from the tax register;

4. The tax service operator sends the requested data to the requesting health service provider. The health service operator on the basis of <transaction ID> ascertains which person's tax data was requested.
m(T; H; <transaction ID>, <list of requested data items>) where

- <list of requested data items> describes what data items of the person in case are requested from the tax register;
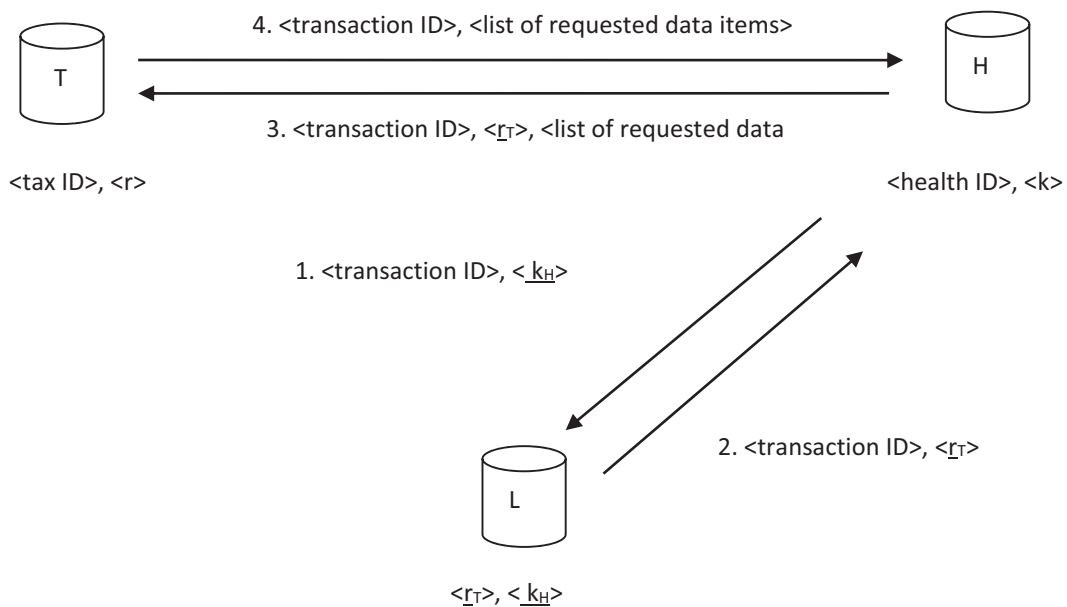
Figure 3: The model of interconnecting registers with EALCs via the linking register

The registers' original own identifiers (e.g. <tax ID>, <health ID>) play no role in the previous example.

3.3.2 Requesting data via the linking register with strict data protection requirements

Setting up an interconnection via the linking register becomes more complex if we do not want to disclose the encrypted linking codes for other parties. That is, an EALC is to be known only by its generating service operator and the operator of the linking register. For example, the EALC <$\underline{k_H}$> should be stored only in H and B.

In this case, in the previous example the process of requesting data by the health service provider from the tax service provider will consist of the following steps

1. The health service operator sends a request to the linking service operator,
m(H; B ; <type of request>, <transaction ID>, <requested= T>, <list of requested data items>, <person=k_H>, <return address>) where the parameters

- <type of request> describes the service to be provided by linking service operator;

- <transaction ID> uniquely identifies this request;

- <requested=T> identifies that register the linking service operator should request;

- <list of requested data items> describes what data items of the person in case are requested from the tax register;

- <person=kH> is the EALC of the person whose data is to be sent;

- <return address> indicates where the answer is to be sent.

2. The linking service operator looks up the EALC <r_T> corresponding to <k_H>, and then forwards the request to the tax service operator
m(L; T; <type of request>, <transaction ID>, <list of requested data items>, <person=r_T>, <return address>)
3. The tax service operator decrypts <r_T>, looks up the requested data in the tax register related to the person and then send this data to the health service operator (the initiator of the original request)
m(T; H; <type of request>, <transaction ID>, <list of values of requested data items>, <return address>)
4. The health service operator, on the basis of <transaction ID> ascertains whose person tax data was requested.
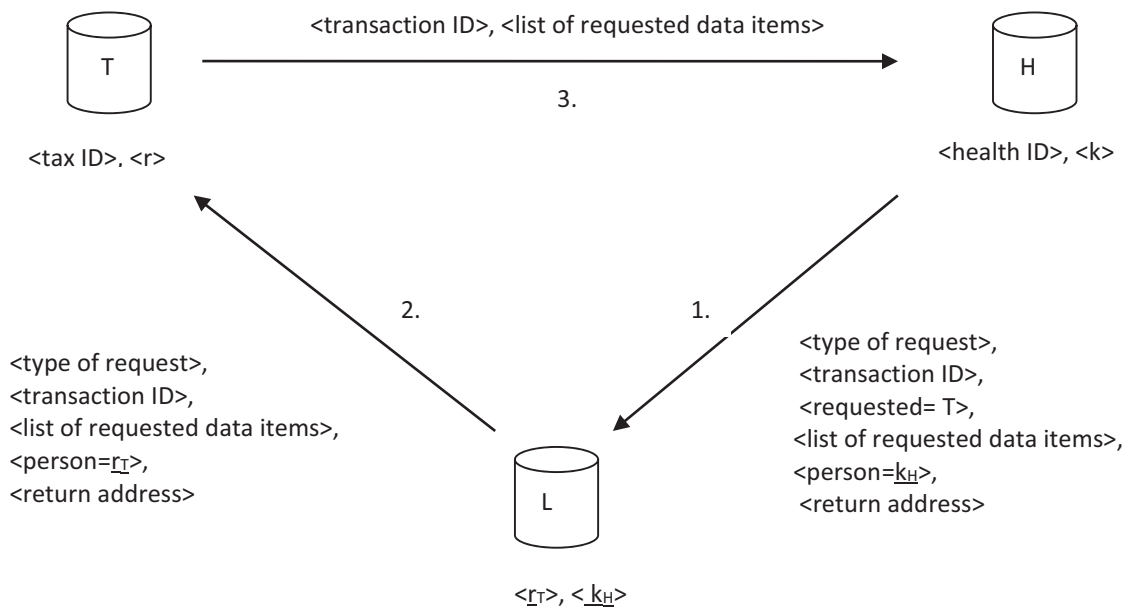
Figure 4: Interconnecting registers with EALCs via the linking register (strict requirements)

3.3.3 Replacement of the EALCs

It is an inherent problem of any permanent identifier that if it is compromised, it is difficult or even impossible to restore the original level of service to the client. For example, if a bank card is lost or stolen, after having revoked its permissions only the provision of a brand new bank card will fulfil the security requirements (with a new card identifier). This is the reason why a stolen personal identifier document is so dangerous, as it can be harmfully used until on-line checks are available.

As EALCs are personal identifiers, they should be regularly replaced. The frequency of replacement depends on the risks posed by the specific registers. Regular replacement and revision of the ALCs as well as the encryption algorithms will provide the necessary security against the illegal mapping of data even if "snap shot" type of data leakage occurs.

Replacement of EALCs, however, requires their uploading into the linking register again.

4. The case of universal personal identifiers

The previously described model is a feasible process for a secure and regulated interconnection of registers containing personal data and fulfils the requirements of personal data protection.

Due to the advancement in information technologies a new problem has arisen that has to be tackled. Previously it was enough to simply forbid the usage of any universal (personal) identifier. Today certain identifiers, due to the controlled capture of data as well as certain identification methods also result in and act as universal identifiers.

4.1.1 Natural personal identifiers

The personal data items of name at birth, place and date of birth, name of the mother in Hungary (and probably in a number of other countries) are universal identifiers, if the data is correct. Therefore, any defence model (mechanism) against the illegal interconnection of registers can only be effective if the registers do not contain all data items that are needed for the identification of persons. That is, registers should not contain the natural identifiers. This can be achieved also with the help of the linking register, as natural identifiers can be stored in a separate register. If N is the register of natural identifiers, that is N contains <<name at birth>, <place of birth>, <date of birth>, <name of the mother>, <l>>) where l is an ALC generated by the operator of N, then the linking register should contain also <u>l_N</u> that is the encrypted from <l> by the service operator of N.

Having done this, there will be no need to store the natural identifiers in the registers (at most the name and the year of birth for checking purposes). When natural identifiers are needed, the service operator could request this data via the linking register. This approach, however, increases computing needs which might slow down operation time.

4.1.2 Biometric personal identifiers

The emergence of biometric identification methods poses an even more serious challenge on data protection. Biometric identification methods have to be differentiated based on the point of their risk. From this point of view, there is a significant difference, if identification can happen

- only with the awareness of the identified person or
- without his/her awareness.

Vein matching (vein pattern recognition) and iris recognition belong to the first group (according to the state of the art of these technologies), as these require the active participation of the person at the time of the initial recording of identification data as well as at the time of authentication. However, recording a fingerprint is possible without the awareness of a client - e.g. a tablet can have such a by-function.

Voice recognition is problematic, too (it is usually easy to get a sample of the target person). Face recognition poses even more challenges, as identification and tracking of persons can be done without any physical contact using street cameras or drones. Face recognition is a great problem in internet searches (especially taking into consideration the habit of younger generations to share their pictures), as it basically equals to a query based on a universal identifier.

A simple legal prohibition is not enough in the case of identification technologies that work without the awareness of the target person. Therefore, the application of the management rules of universal identifiers is appropriate for biometric identifiers, too.

As a consequence, any register that contains biometric identification data should not contain any further identification data of a person, that is, separate biometric data of the same person is not allowed to be stored in the same register. Rather, in our model biometric is data is to be mapped via the linking register, with the help of the proper EALCs.

5. Further possible services based on the linking register

Introducing the linking service operator solves the issue of the many-many relations, and with certain extensions, a fairly comfortable environment could be built. If the linking register is a common element in

managing the identifiers of persons, a significant number of the registers should use its services. This need enforces the usage of a common way of access. On the basis of this common way of access – let it technically be a web service or any other technical solution – other services can be provided that could lead to a significant simplification as well as to more controllable usage and development of applications.

5.1.1 Requesting personal identifiers on the basis of another identifier

An example of advanced level services is the request of an identifier on the basis of another identifier. Though a register is legally not allowed to store different identifiers, there may be a need for a specific identifier at client contact (e.g. when the client visits a help desk).

For example, on the basis of a personal identification document – shown by the client – his/her health insurance number could be queried by a general practitioner. Or, a bank clerk could ask for his/her tax identification number on the same basis. This way, there would be no need to present the different (physical) identification documents of the client (e.g. in Hungary, the personal identification card, the driving licence and passport are all legal identification documents.)

5.1.2 Inclusion of identity service providers

If we extend the linking register to include identifiers used by identity service providers (IDPs), further services could be offered. If identifiers given by IDPs can be stored in the linking register, the client could electronically authenticate him/herself in electronic public administration by using the credentials given by the IDP. Such an advanced service can easily be built on the linking register, however, proper security of the authorization process is indispensable.

Clearly, only those registered and properly qualified IDPs could be included which operate in such a controlled environment where the possibility of illegal use of data can be excluded.

6. Summary and further possible developments

Our objective was to provide a secure model for the interconnection of personal data in separate registers. In the paper we have shown a model that conforms to the strict requirement of personal data protection in Hungary. The process of personal data interconnection in the model is based on periodically replaced, encrypted anonymous linking codes.

In order to implement the model, a new third party player, the service provider of the linking register was introduced. The consistent deployment of the model cuts back the risk of illegal utilization of personal data, whereas the continuously improving technical capabilities can deal with the necessary extra effort (the requirements of encryption and decryption, networking).

In Hungary a project is in progress in which the registers of personal identification documents (passport, personal identity card and driver licence), the basic register of the persons (that includes their primary residential address, too) and the register of social security numbers are to be interconnected on the basis of the described model.

The technique of using regularly replaced encrypted anonymous linking codes, in principle, can be exploited also by commercial market players. Having elaborated on the necessary technical interfaces for connecting, the extent of the state participation needs further investigation.

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A Framework for Simple, Secure and Cost Effective Online Voting System

Rajiv Kumar, Pradip Kumar Bala, Nitin Varma and Abhishek Srivastava
Indian Institute of Management Ranchi, India
rajiv.kumar13fpm@iimranchi.ac.in
pkbala@iimranchi.ac.in
nitin.varma13fpm@iimranchi.ac.in
abhishek.srivastava13fpm@iimranchi.ac.in

Abstract: Voting is a fundamental right of every citizen and to strengthen this fundamental right, it is necessary to provide a facility to each citizen to cast their vote. Due to socio-economic problems people are moving from their native places for jobs and prosperity. It results in inability to exercise the above fundamental right. As reported by the Press Trust of India (2012, April), the Election Commission of India has expressed lack of faith in online voting by citing a number of valid reasons including non-compliance with coercion-protection. This paper while taking care of those and other concerns proposes a framework through which online voting may still be successfully carried out in India or in other such diverse settings. This framework seeks to address key concerns such as security of voters, confidentiality of votes and non-duplication of votes. By conducting online elections as per this framework, there is potential to reduce cost and time drastically. A significant benefit of this framework is that it permits cutting across diversity variables and applies equally to gender, age, literacy, income level and others. This paper describes voter registration, vote casting, and a compatible framework for both computer literate and illiterate users. It also describes use of video surveillance for the conduct of free and fair elections. Latest technology like biometrics is shown to aid voter authentication and to control unfair voting, among others. This paper describes how a parliamentary elections at various levels can be conducted in just a little more than half of the current budget, thereby delivering huge savings on costs alone. The framework proposed by this paper continues to be compatible with existing processes. It also describes how election process can easily be managed with the help of significantly very less number of security personnel and rather few polling staff. In the method proposed by this paper, most Government offices and institutions would not be affected by elections and therefore may continue to work as normal. Use of this framework will release public/private transport from the burden of elections and transportation will not get affected and which will result in no inconvenient to general public.

Keywords: online voting, e-voting, electronic voting, eDemocracy, eGovernance, secure online elections

1. Introduction

The modern Indian state that came into existence on 15'th August 1947 is a Sovereign, Socialist, Secular and Democratic Republic with three levels of government – union, state and local. A fair and efficient election system is the heart of this democracy as well. As per Wikipedia(n.d.),the 2014 Indian parliamentary election, with over 814.5 million registered electorate, over 930,000 polling stations, 1.4 million electronic voting machines used, makes it one of the biggest government events in the world. The year 2014 election required 1.1 million public servants and 5.5 million government employees to manage the election and total budget estimated to be INR 3500 crore(US$577 million), excluding the expenses incurred for security. Given its sheer size, diversity and administrative complexity, elections in India at any level are usually done in phase wise manner. The Constitution of India has accorded the responsibility of conducting free and fair elections to the Election Commission (EC) of India.

In the recently held parliamentary elections of year 2014, the turnout was 66.38%. This is certainly higher than previous elections in year 2009, but it also means that more than 30% of people who are eligible for voting still did not cast their votes. State and Local body elections have similar turnouts. Domestic and International migration due to various socio economic reasons is one of the major factor responsible for people not being physically present in the allotted polling booth at that their native places and hence being unable to cast their votes. While there is a provision for postal ballot, it is restricted to a certain category of Government employees. Various online solutions have been proposed but as we will see in subsequent sections, these have been kept in abeyance due to various reasons. The framework proposed by this paper proposes use of a unique concept of mobile polling booths that not only solves the logistic and security related issues inherent in existing solutions, but also has the potential to substantially decrease the costs of conducting elections.

1.1 Literature review

Review of current literature reveals that most research addresses technical aspects of online voting but none has been able to provide a concrete solution for coercion-protected online voting system. The few papers that explore a coercion-protected solution come with their own limitation(s). Hasan & Farhan(2010, pp. 1-4) have tried to give solution for coercion-free online-voting system providing multiple keys to user, but among them only one key is used as "Real Key" and rest of them are treated as "Fake Key". In case of any attempt to purchase vote by any candidate or force to cast for a particular candidate, a voter can hide the real key and supply only "Fake Keys". Voting by "Fake Keys" is treated as fake voting and results in no update in the database. The database gets updated only when the "Real Key" is used. Grewal, Ryan & Ryan(2013, pp. 367-381) have discussed similar technique. A key limitation of the fake key method is that it requires voting more than one time, increasing the burden of accuracy on often the computer literacy challenged. Saini & Dhar(2008, Vol. 3, pp. 704-708) have discussed a technique involving multiple ballots and a security string - whose few characters are to be remember by voters. This method is suitable where number of candidates does not exceed 'five' and it does presume considerable computer literacy on behalf of the voter.

Gross(2014) of PCWorld brought out that experts have stated, much of the focus on security for online elections has until now focused on securing the network, but vulnerabilities on voters' devices could also cause problems. A secure and efficient front-end protocol for remote Internet voting has been proposed by George & Sebastian(2013, 231-241). It claims the use of a trusted platform module for true and trustworthy authentication of the involved parties and remote machine.

Rura, Issac & Haldar(2022, Vol. 1, pp. 125-129) have proposed a combination of both cryptography and steganography approach in online voting's vote verification design. Further Katiyar, Meka, Barbhuiya & Nandi(2011, pp. 288-291) have presented a method for integrating cryptography and steganography. Their paper proposes a new concept of key image as cover objects for Steganography and as keys for Cryptography. The key image is a Biometric measure, such as a fingerprint image.

A significant problem with online voting system unaddressed by existing literature continues to be the lack of ability to verify through recounting, even if there is some suspicious activity. Some existing research has addressed technology related issues like data communication and modification of votes. Online voting, in general automates the election process, speeds up the process and minimizes the counting mistakes.

Literature has discussed biometric verification of voters but has not been able to give any concrete solution for coercion-free voting. In recent research, Agarwal & Pandey(pp. 1-4) have also discussed online voting system which is AADHAR ID based verification of both voters and candidates. ADHAAR Identity number is unique for every citizen or voter of India. This AADHAAR Identity number has been introduced by the Government of India and this also recognizes the constituency of the voter. Similar technique for voter verification to prevent multiple voting by same voter is discussed by Sridharan (2013, pp. 1-7) . In this, identity card or smartcard is used for verification.

As per Wolf (2010), internet voting systems are already in use to a small extent in the elections of United States, United Kingdom, Switzerland and Estonia. In two separate articles, Singh(2014) and Collins(2014) pointed out that one severe problem in present election process is money power. Election commissions are trying a lot to control the use of money power in election but still many incidences for such activities. It's almost impossible to contest an election without spending huge amounts of money. Apart from technical issues, existing literature is unable to address physical security.

2. Proposed framework

Simply stating, an online voting system requires a client terminal, a central server and a connection between them. Currently with increasing ICT penetration, many voters have access to some or the other device like laptops, desktops, tablets, smart mobile phones with internet connectivity that can be used as a client terminal. So technically it appears that just by having a portal for online voting, it would be easy to migrate the existing voting system to online voting, but the framework needs to be secured, coercion-protected and also economical. This could be done in two ways. The first option could be to allow voters to vote from their own personal devices, but that would lead to a security nightmare. The second option could be equipping around 930000 polling booths

across India with dedicated online voting terminals and internet connectivity – that may not be economically feasible, in a country like India.
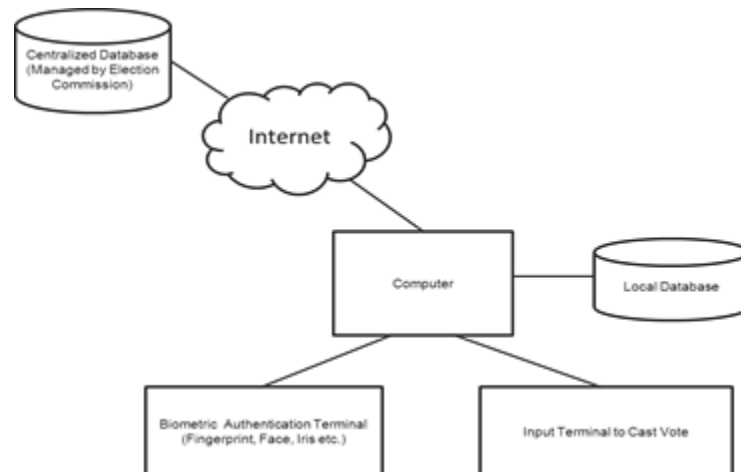
Figure 1: Proposed online voting framework

The framework proposed by us is an alternative to the two options described above for online voting. It is more economical, coercion-protected, secure, robust and also maintains transparency and confidentiality. It also solves the menace of duplicate and fraudulent voting. As we will see in remaining portion of this paper, the proposed solution can in fact reduce election expense to less than half of the current expenditure and will also drastically reduce the manpower required for election process - both of administrative and security personnel.

Mobile polling booth: In the current voting system in India, voting generally happens in a school or any other community building that has been temporally converted into a polling booth. Each voter must be allotted a polling booth within 2 km radius of his/her home address. As per current rules, be it parliamentary election or elections at state level, for each constituency voting must happen in a single day and for this, each constituency is provided multiple polling booths. On Election Day, people walk into a polling centre to cast their vote. In this paper we introduce a concept of mobile polling booth, which means that instead of voters going to a polling booth, the polling booth will come to a voter's place. For this a customized mini bus or matador type Light commercial vehicle can be used. Few sample vehicles for this purpose is shown in figure-2.

Figure 2: Sample vehicles

To ensure that the voting process is robust, transparent and easily monitored, the following are the elements of this proposed mobile polling booth.

- **Vehicle size:** Vehicle should be spacious enough to accommodate a computer terminal; an individual voter even with different abilities should comfortably be able to access it. It should be a closed body vehicle for security and privacy. A vehicle shown in figure-2 can be used for this purpose

- **Computer:** A computer terminal with a touch screen that will provide the voter an interface to cast their votes. Needs to be connected to a central server and also have a local database

- **Biometric authentication device:** to aid biometric identification like fingerprint, face, eyes detection or other such methods which will act as an authentication mechanism for each individual

- **Surveillance camera:** The vehicle will be equipped with one or more surveillance video cameras to monitor and record the activities of surroundings. The surveillance camera must also be capable of streaming it live to designated interested agencies, e.g. election commission

- **Power backup:** Considering the power deficit in most part of India, the vehicle must have a self-sufficient power backup system to provide uninterrupted power for the entire day

- **Input terminal to cast vote:** A terminal with very simple and graphic user interface can be used for providing voters an easy to understand option to cast their vote. A snapshot of the proposed terminal is shown in the figure-3.

Sl. No.	Candidate Name	Election symbol	Select & Press
11	Candidate1	△	Select
12	Candidate2	▭	Select
13	Candidate3	⇒	Select
14	Candidate4	○	Select
15	Candidate5	◇	Select
← Prev			Next →

Figure 3: Input terminal to cast vote

It displays candidate's name and election symbol allotted to him or his political party, and a press button to cast the voting choice. It can display multiple candidates per page and with Next and Previous arrow, it can toggle between screens in case number of contestants is more. Such terminal will solve the lengthy cascading that currently happens in Electronic voting machine, when there are large numbers of contestants in a single constituency. Once the voter's identity has been verified through biometric means, then only this terminal's display will get activated and as everything is automated, only one vote per could be cast. As just one terminal can be used in any constituency and with any number of contestants it saves costs too.

3. Feasibility

3.1 Technical feasibilities

The framework which we have suggested can easily be implemented using existing technical capability of India. Indian IT workforce is one of the largest contributors to ICT sector around the globe and plenty of skilled, well-trained, efficient manpower is available to implement the proposed solution. India currently has the second largest telecommunication network in world, as per the Department of Telecommunications (n.d.). Internet connectivity to such mobile voting booths can be provided using existing broad band or wireless networks which span across the length and breadth of country. India already has proven experience in one of the world's largest biometric verification program through its unique identification project (ADHAR).

The voting terminal required at mobile booth can be made of existing commodity level hardware and can be reused from one election to another with minor changes. This system terminal will be dedicated only for the voting purpose with native pre-installed software and no other software will be installed on it. This arrangement takes care of security concerns mentioned by many literature and experts. As the voting data will be stored at two places- local booth and central server of Election commission, independent of each other, they both would be compared before declaration of result so as to avoid any foul play that could have happened either at booth level or during transmission of data to central server over secured internet. The proposed work flow is shown in figure-1.

3.2 Financial feasibilities

In India parliamentary election takes place in multiple phases and total duration is around one month. The actual duration and phases of Assembly election and local body election vary from state to state. In some states elections are carried out in multiple phases and therefore the overall election can span as much as a month. In some states, elections are conducted in single day. As one mobile polling booth can cover one polling booth in one day, the election can turn out to be prohibitively expensive if held on just one day. Therefore, using the

proposition presented herein, phase-wise election over a number of days can be far less expensive. Here is the mathematics required:

Number of mobile polling booths required = (Total number of polling booth required) / (Number of days in which election is to be completed).

Clearly, from the above formula, number of mobile polling booths required is INVERSELY proportional to the number of days in which election is to be completed.

For the above economics to work, it is assumed that elections will be held on consecutive days. Any gaps in between can change the economics of the election.

The most recent election had 9,30,000 polling booths. Elections could theoretically be conducted in all of these on just one day, or over the next couple of days. The figure-4 shows the range of number of mobile booths required in parliamentary election.
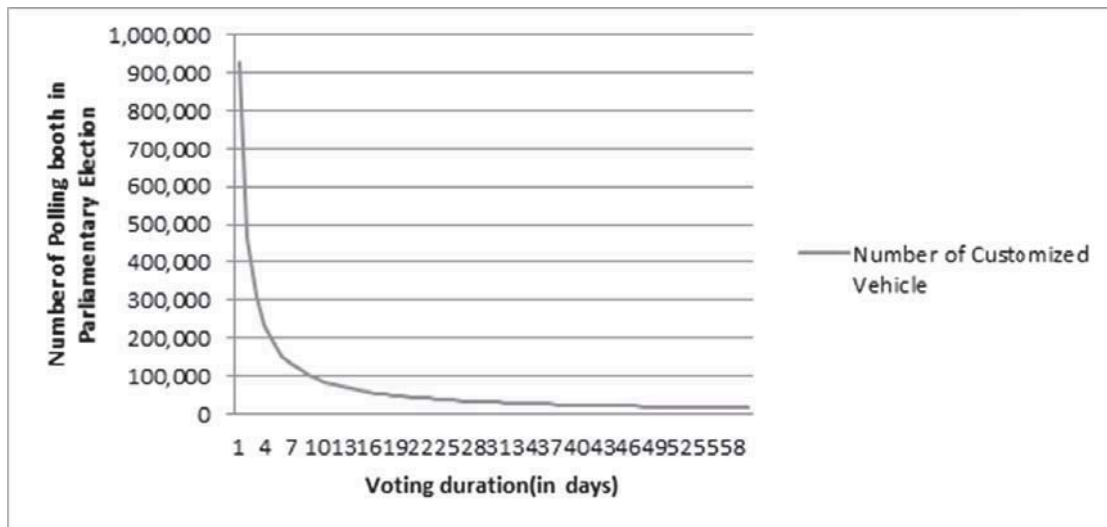
Figure 4: Polling booth vs number of customized vehicle required

In the present scenario, total number of polling vehicles required is 31,000 - to cover all of the 9,30,000 polling centers in 30 days of duration.

Vehicle purchase is a one-time investment and the same vehicle can be used for multiple elections. Considering the life of a vehicle to be 15 Years, a vehicle purchased will cover at least 3 parliamentary elections, three state election of all states and three local body elections. In other way we can say that in 15 years one voter will an option to cast vote for 9 times(3 times for parliamentary, 3 times for state election and 3 times for local body election). Considering cost of customized vehicle with computer, power backup and other devices like surveillance camera and biometric equipment ranges from INR 10 Lakhs to 16 Lakhs.
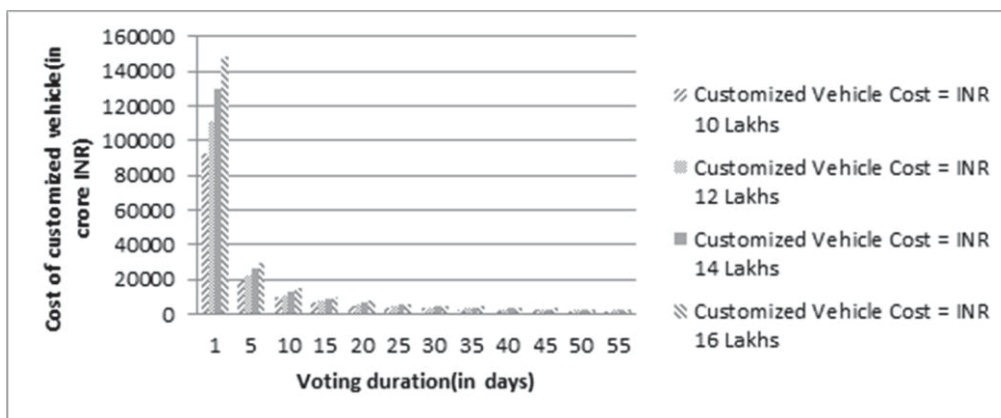
Figure 5: Cost of customized vehicle vs election duration in days
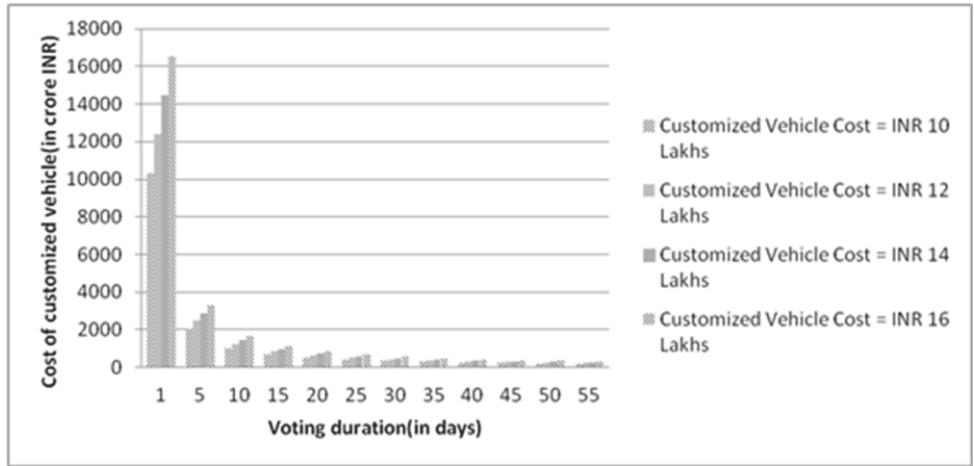
Figure 6: Vehicle cost for single parliamentary election after distributing cost to expected nine elections

Once elections are over, the vehicles can be used for other purpose. Thus, the utilization will go up and their cost justification will be better. If we add return amount while selling the vehicles after end of life, effective cost of this framework will be even less.

The operational cost which includes vehicle fuel, cost for power backup oil, internet, maintenance, food for polling officers and staff, accessories and other miscellaneous may vary from state to state and depends on the market condition. Salary of polling officer and staffs are not included because involvements of other government staff are not required so daily wages have not been calculated. Below diagram shows operational cost to conduct election in each polling booth in parliamentary election under varying conditions.

Figure-7 shows that if operation cost is INR 10,000 per day, total operational expenses to conduct election in a parliamentary election: 930,000(No. Of Mobile Polling Booths) x 10,000 = INR 930 Crore.
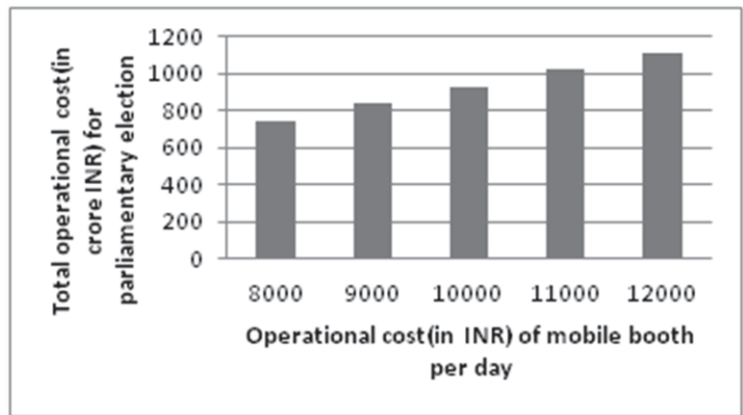
Figure 7: Operational cost for parliamentary election

From figure-5, for a parliamentary election, if cost of customized vehicle is INR 345 Crores and as shown in figure-7 total operational cost is INR 930 crore, total expenditure will be around INR 1275 Crore. This is about three times less than the expenditure in year 2014. Utilization of these vehicles for bye-elections will increase their utilization and will reduce the per election cost further.

4. Process for proposed online voting system

Figure-8 shows the overall voting process. In step 1, voter Provides information and is added by the Election Commission (EC) Local office. An opportunity to register for vote is provided in Step 2. The EC announces election and forms the list of eligible candidates in steps 3 and 4. The EC allocates polling booths to outsiders in Step 5 and then the election begins (Step 6). Voter identification (step 7) precedes Casting of vote (step 8) which is recorded (step 9) in the (i) Centralized database and a duplicate copy is stored in (ii) the Local database. After cross-checking for Reliability of the process (step 10), the result is publicized (Step 10)
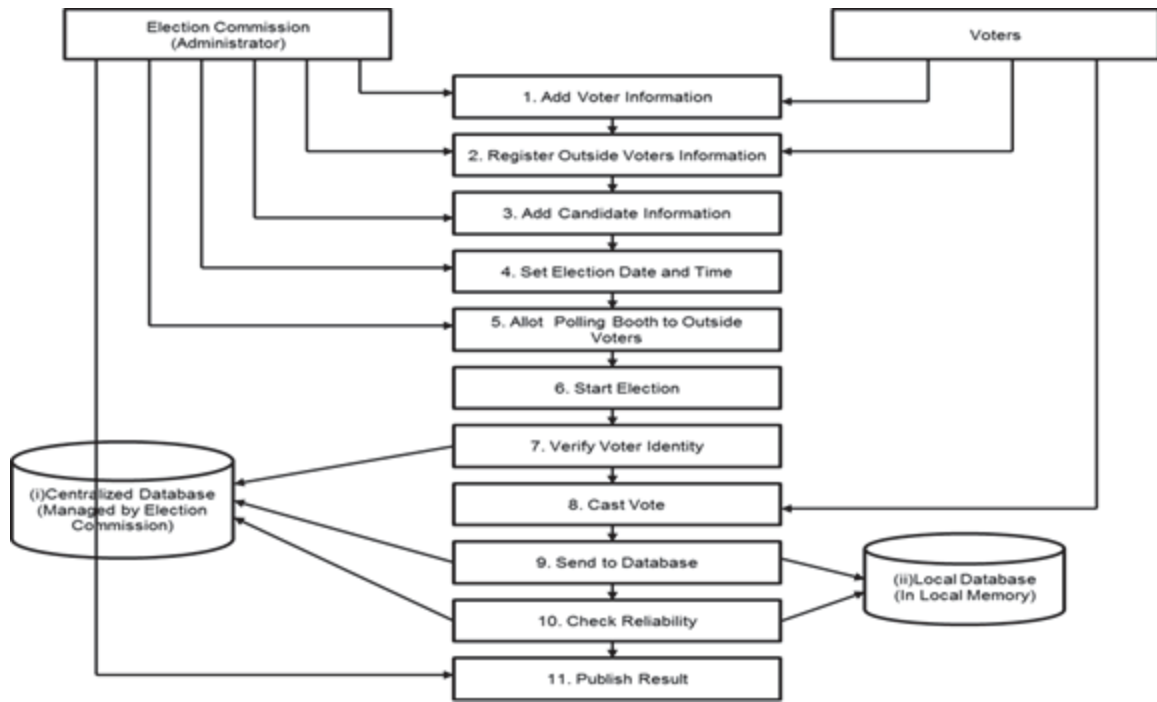
Figure 8: Process of proposed framework

Vote Cast: Outside voters and local voters can together cast their vote in a single mobile polling centre. For outside voters one has to register for a particular mobile polling centre based on his/her convenience. Outside voter can register online or can visit agency recommended by election commission to get registered.

Figure-9 shows details of the voter verification process. In step 1, there is a manual verification of the voters followed by biometric verification (fingerprint etc.) and face recognition (step3). Thus an unverified or duplicate voter, when detected, is taken through a separate process for appropriate action. Once voter is verified through biometric authentication system, it will automatic login the voter to voting portal and input terminal to cast vote will get activated. A verified voter selects the candidate and waits for the computer to acknowledge, then exits. Figure-3 shows an over-view of the input terminal screen with some exciting candidate choices. The same process continues for every voter.
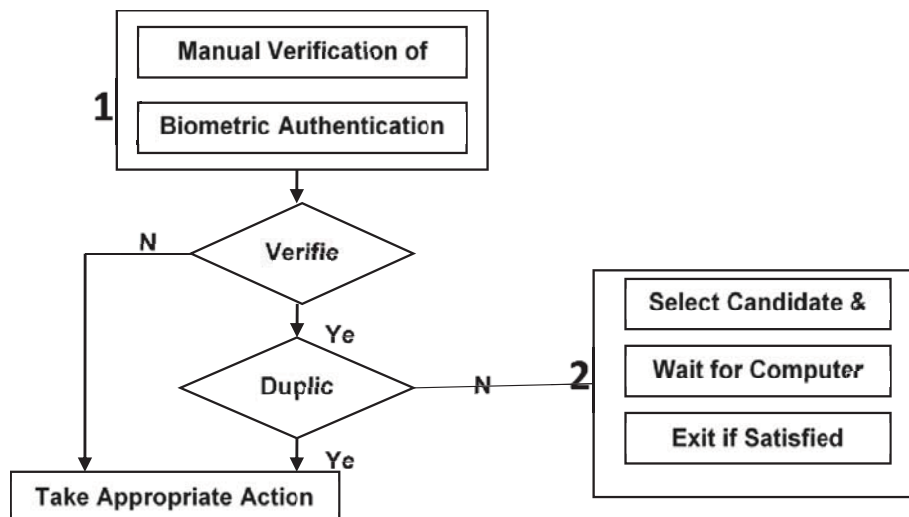
Figure 9: Process of vote casting

Parliamentary Election: In each mobile polling booth outside voters can cast their vote. Input terminal will display the list of candidates with their election symbol to their respective constituency.

State Election & other local body elections: Election commission can schedule mobile polling booth outside native state for different locations based on the number of outside voters. The mobile polling vehicle will be used for this purpose. This can work even when the number of outside voters is sparse.

5. Benefits

Economical: The solution proposed by this paper has the potential to be less than half as expensive as the current system as discussed earlier in this paper.
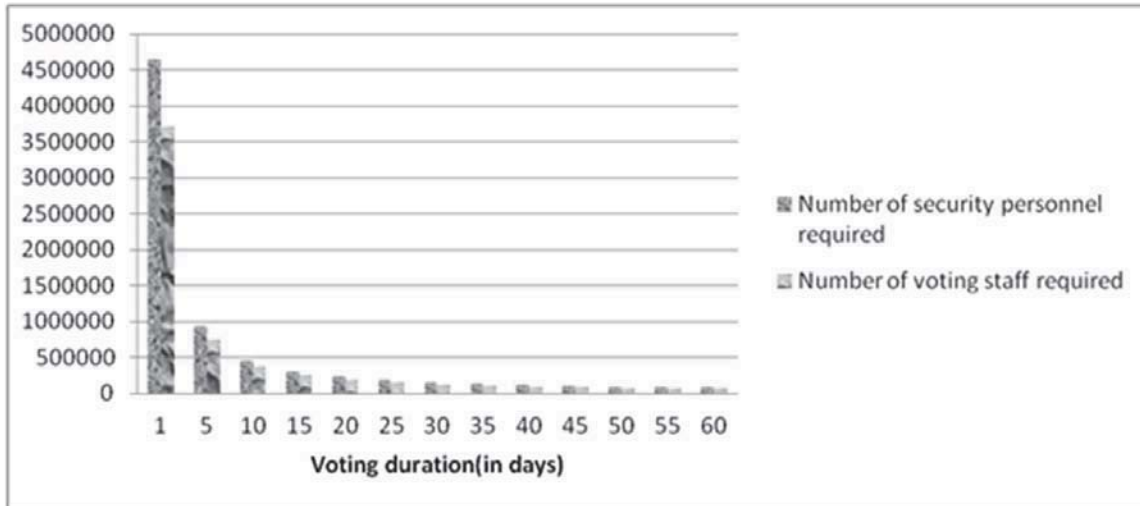
Figure 10: Duration of voting in days vs number of security personal and voting staff required

Less Number of Security Personal Required: Assuming average 5 security personnel for each booth, figure-10 shows voting duration in day's vs total number of security personnel required. Considering a span of 30 days, total security personnel required will be just around 155000, which is much less than the number of security personnel required in the present system. Further, the solution proposed herein will require far less movement of security personnel that are often moved from one corner to another corner of the country in the current situation

Easy to control: Managing all election booths in one day is far more challenging than managing one booth in one day. With elections spread over a number of days, booths will be spread too – making the overall situation far less complex, and therefore easier to manage.

Robust: This system is based on biometric voter identification which could help in preventing duplicate and bogus voting. Video surveillance may help in orderly conduct and in recording any aberrations.

Transparent: Live streaming of the actual election process, with measures taken to assure privacy of voters, will make the process absolutely transparent in real time. Any undesirable influences and effects are likely to be noticed immediately

The Convenience Factor: The mobile polling booth is likely to make it more convenient for those at disadvantage in terms of mobility – the old, the physically challenged and any others that may be even temporarily mobility challenged. It may attract and encourage genuine registered voters that otherwise may not have been interested in casting their vote. This may therefore result in a much higher polling turnout and percentage.

Increase Voting Turnout: This framework is giving opportunities to voters stay away from home to cast vote, which will increase voting turnout.

Far lower training need and costs: Due to far lower personnel required, the training need, training time and training costs are expected to be far lower.

Government offices etc. may continue to work: In the current election system, due to need for significant manpower, government staff from government offices, banks, schools etc. are mandatorily deployed on election duty and therefore are forced to work with reduced staff and are often able to provide only far curtailed services.

In the method proposed by this paper, most such offices and institutions would not be affected by elections and therefore may continue to work as normal. Figure-10 shows the number of staff that will be required to be deployed for the smooth conduct of elections, assuming a staff of four per booth.

Release of public/private transport from the burden of elections: In the current system, public/private transport is burdened with various processes of the election. It causes inconvenience for general public. The method proposed in this paper will obviate the need for involvement of public/private transport

Far More Inclusive: the method proposed by this paper promises to be more encouraging of inclusive democratic principles in at least two ways:

- In the current form of elections, only the rich, or the moneyed, or those who are backed by financiers – stand a chance to contest the elections. With the method proposed by this paper, people with far less money may have a chance to be able to contest elections. Also, since current form of elections requires deployment of far more muscle power, contamination by anti-social elements is only an expected outcome. In the method proposed by this paper, due to transparency and due to need for far lesser muscle power - possibilities of contamination by anti-social elements are far lesser

- It may be a stepping step towards making voting compulsory. It case it cannot cause voting to become compulsory, yet it may result in almost all people voting   .

6. Conclusion

Through exhaustive literature review of the rather limited literature that is available on this topic, this paper establishes the need for the new approach advocated by this paper. In that process, this work brings to fore the problems with current approaches regarding online voting and why those approaches remain rather non-implementable. This work shows that the online voting approach taken by this paper addresses the typical problems of transparency, privacy, security and non-coercion (coercion-protected). While the approach proposed by this paper addresses the so-far known concerns, this paper also talks about challenges in the approach proposed herein, and how those challenges may be met in order to actually put the entire proposition into practice. Lastly, this paper proposes that the solution offered herein may be applied across the world in various similar situations so as to further the cause of democracy, only at less than half the price.

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How to Spread e-Government? A Two-Step Framework to Define Innovation Strategies

Giulia Marchio, Michele Benedetti and Claudio Russo
Politecnico di Milano, Milan, Italy
giulia.marchio@polimi.it
michele.benedetti@polimi.it
claudio.russo@polimi.it

Abstract: The potential of benchmarking as a tool for learning, information sharing, and goal setting or supporting performance management has been recognized since the 1980, but it is mainly from the 2000s that benchmarking in e-Government issue has received growing interest. International e-Government Benchmarks has supported policy makers, provoking valuable discussions, setting new ambitions and identifying countries to learn from. Nonetheless, benchmarking studies in the field of e-Government at international level are mostly based on models measuring online services in terms of availability and sophistication. Hence, after 10 years a transformation would be welcome to set a new generation of e-Government services, since it is important to understand and measure the change in users' needs and how actually governments are exploiting the benefits of e-Government. International e-Government Policies aim at facilitating the transition of current Administrations to a new generation of e-Government projects at local, regional, national and international levels, improving Public Administration efficiency and effectiveness, while maximising the advantages deriving from ICT for both Administration and its users. The aim of the paper is to propose a two-step e-Government maturity framework able first to compare different Countries, Areas or Cities, among defined maturity performances and then to understand the impact of context-specific variables on that maturity, in order to support policy makers decisions. Referring to the first step, e-Government maturity can be summarized through four different dimensions: i) *penetration*, in terms of usage of online e-Government services; ii) *process digitalization*, in terms of Public Administrations ability to produce efficiency and effectiveness in internal procedure and services supply; iii) *user's satisfaction* of online services, both in terms of overall evaluation of the experience and comparing it with expectations and objectives; iv) *standardization*, which means quality of services in terms of usability features, which allows ease to learn of services, minimizing services accessibility barriers. Nevertheless, undertaking an e-Government project, could have different meanings in different contexts and a Public Administration investing in e-Government generally has more medium-term objectives, such as gaining efficiency or increase the quality of services; thus e-Government maturity is affected by different factors and can have different meanings depending on the specific referring context Therefore the second step involves a cross analysis on context-specific factors, in order to understand relative performances of single Administration analysed taking into account exogenous factors in putting those performances in the right perspective. The first performance benchmark is translated into a more specific analysis in order to understand: i) the impact of a specific context on e-Government maturity performances; ii) the differences between context of countries belonging to the same performance cluster; iii) the differences between countries with the same context but belonging to different performance clusters. This in-depth context framework allows to identify relevant considerations and implications, describing the state and the evolution of each life event and the e-Government analysed service. The conclusions, anchored to the high level political priorities, allow each Country (or Areas, or Cities) to identify different policies, specific to their context, to achieve strategic objectives.

Keywords: e-Government maturity, e-Government benchmark, International benchmark, public services, country ranking

1. Introduction

The potential of benchmarking as a tool for learning, information sharing, and goal setting or supporting performance management has been recognized since the 1980, but it is mainly from the 2000s that benchmarking in e-Government issue has received growing interest according to e-Government diffusion and the resulting rise of new opportunities (Chen, 2002).

Internationals e-Government Benchmarking studies has deepen into online service evolution since the early 2000s, at first measuring basic service availability and sophistication. For more than 10 years they supported policy makers, provoked valuable discussions, set new ambitions and identified countries to learn from.

However, after years of online services analysis, a transformation would be welcome to set a new generation of e-Government services, since it is important to understand and measure the change in users' needs and how actually governments are exploiting the benefits of e-Government.

International policies aim at facilitating the transition of current administrations into a new generation of e-Government services at local, regional, national and international levels.

Nowadays benchmarking process should support each single Country, o similar group of Countries, to achieve e-Government projects in order to improve Public Administration efficiency and effectiveness, while maximising the advantages deriving from ICT for both Public Administration and its users.

The aim of the paper is to propose a two-step benchmarking methodology, based on an innovative e-Government maturity framework, able first to compare different Countries, Areas or Cities, among defined maturity performances and then to understand the impact of context-specific variables on that maturity, in order to support policy makers decisions. The final purpose is to identify different policies, specific to each Country, which could suggest different policy makers to achieve relative aims.

2. Literature review

Benchmarking allows to increase and improve self-awareness and assessment, providing solid basis for strategic actions: indeed, the process of sharing and comparing with the goal of self-analysis may increase the effectiveness and efficiency thus reducing resistance to change, since the involvement contributes to the creation of consensus while formulating objectives. In order to provide added value to the analysed processes, and to contribute to the performance maximisation, with regard to the promotion of best practices able to bring optimisation, benchmarking should be characterised by several aspects that, according to the processes specific priorities, would vary in their strength. As stated by Huppler(Huppler, 2009), these aspects or requirements are: relevance, repeatability, fairness, verifiability and economically sustainable. To build a good benchmark, a careful planning of the objectives would be required. The theory of planning and developing key success factors, or KPI (Key Performance Indicators) identifies five criteria that objectives and goals should have (Doran, 1981): specific, measurable, accessible, relevant, time-based.

According to the classical theory of Management Control System (Azzone, 2006), the requirements of the objectives underlying the definition of Key Performance Indicators should be characterized by: long-term orientation, completeness, accuracy, timeliness, measurability, compliance with the specific responsibility, economic sustainability. The potential of benchmarking as a tool for learning, information sharing, and goal setting or supporting performance management has been recognized since the 1980s (Bullivant, 1994), but it is mainly from the 2000s that benchmarking in e-Government issue has received growing interest. Moving to the actual Italian scenario, it seems not to be confirmed by international benchmark studies, which are based on indicators that do not respect principles of benchmarking; therefore these researches cannot support the decision maker in strategic planning.

In e-Government literature there are several studies aimed at identifying the steps of digitalization process in PA, which emphasize different organizational and technological challenges (**Table 1**).First, there are several research on the maturity of the context (*eReadiness*), focused not only on the readiness of the infrastructure, but also on government and citizens' one for e-Government initiatives' introduction (Bertelsmann Foundation, 2001), (Booz Allen Hamilton, 2002), (BT eGovernment, 2000) .Then, there are studies that focus on back-office digitization, analysing the availability and use of ICT, and methods of internal and external coordination in PA (Vintar, et al., 2003), (Nordic Council of Ministers, 2003). In particular, it can be classified from two different observation point: the supply, measured by online presence of the PA (United Nations, 2012),(Vintar, et al., 2003),(Accenture, 2003),(Capgemini, 2004), and the demand, analysed referring on citizen use of online services (BISER, 2002),(European Commission, 2003). Finally, there areadvanced researches analysing economic, political, and sociological impacts of digitization (Booz Allen Hamilton, 2002), (Birch, 2002).Despite these manifold aspects, actually the approaches to e-Government benchmarking are mainly focused on just one of the areas, the digitization of the front-office on the supply side (Janssen, et al., 2004), (Kunstelj & Vintar, 2004).

Table 1: Maturity models

	Online Presence	**Online Interaction**	**Back-office Integration**	**Front-office integration**		**ePartecipation**
Baum and Di Maio (2000)	Presence	Interaction	Transaction	Transformation		
Layne and Lee (2001)	Catalogue		Transaction	Vertical integration	Horizontal integration	

	Online Presence	Online Interaction	Back-office Integration	Front-office integration	ePartecipation
Hiller and Bélanger (2001)	Information dissemination	Two-way communication	Transaction	Integration	Participation
Howard (2001)	Publish	Interact	Transaction		
Wescott (2001)	Internal network / Information dissemination	Two-way communication	Exchange of value		Digital democracy / Joined-up government
United Nations (2002, 2010)	Emerging / Enhanced	Interaction [removed in UN 2010]	Transaction	Seamless	
Moon (2002)	Information dissemination	Two-way communication	Transaction	Vertical and horizontal integration	Political participation
Accenture (2003)	Online presence	Basic capability	Availability	Mature delivery / Transformation	
Siau and Long (2004)	Online presence	Interaction	Transaction	Integration and transformation	Digital democracy
West (2004)	Billboard stage	Partial service-delivery		Integration	Interactive democracy
Capgemini et. al. (2004, 2007)	Information / One-way interaction	Two-way interaction	Transaction	Personalization [added in *Capgemini 2007*]	

3. Background and conceptual framework

International e-Government Benchmarking studies has deepen into online service evolution since 2001, at first measuring basic service availability and sophistication. For more than 10 years it has supported policy makers, provoked valuable discussions, setting new ambitions and identifying countries to learn from.

However, after more than 10 years of online services analysis, a transformation would be welcome to set a new generation of e-Government services, since it is important to understand and measure the change in users' needs and how actually governments are exploiting the benefits of e-Government.

The European e-Government Action Plan 2011-2015(European Commission, 2010) translates the strategic priorities of The Malmo Declaration into concrete policy actions, aiming at maximising complementarity between national and European policy instruments. The overall aim of the Action Plan is to facilitate the transition of current administrations to a new generation of e-Government services at local, regional, national and European levels.

A sustainable e-Government should produce efficiency. Hence, innovation polices objectives should take into account not only the diffusion of online services and the citizen e-Government usage, but also the degree of digitization of the back office, as a proxy of a Country ability to manage e-Government projects in order to improve public administration efficiency and effectiveness through the correct use of ICT.

Moreover, despite investments and efforts in e-Government, the results obtained by some countries do not seem to improve strongly over time and the use of e-Government still remains at a low level.

Nowadays the e-Government benchmark should support policy makers to implement specific actions in order to achieve Action Plan objectives. Hence, new e-Government performance indicators should be taken into consideration.

In order to propose an e-Government maturity framework, it is possible to produce a large amount of absolute indicators able to compare countries among the same defined performance.
In particular, e-Government maturity can be summarized through four different dimensions:

- *Penetration*: diffusion of use of online e-Government services;

- *Process Digitalization*: Public Administrations' ability to produce efficiency and effectiveness in internal procedure and services supply;

- *User's Satisfaction*: citizens' satisfaction of online services, both in terms of overall evaluation of the experience, and comparing it with expectations and objectives;

- *Standardization*: quality of services in terms of usability features, which allows ease to learn of services, minimizing services accessibility barriers.

The objective of e-Government Action Plans are represented in the identified indicators, which ought to provide a benchmark to support policy makers to implement specific actions in order to achieve Action Plan objectives, succeeding in this way in providing learning insight for future policy making.

The policy priority "User Empowerment" refers to implement a User-centric, Trasparent and Collaborative Governance; therefore with user's satisfaction on the one hand and penetration on the other, are able to enhance these aspects.

The policy priority of "Efficiency and Effectiveness" respond to classical objectives of a results-driven government, and in general of every innovation project; in order not to frustrate the efforts, it is essential to keep results monitored, therefore this is a policy priority considered in the proposed framework, in terms of level of digitalization of the process, as a proxy of resources savings.

The policy priority "Digital Single Market and creating pre-conditions", refers to implement a Smart and Seamless Government.

Identified indicators are able to provide a benchmark which can support policy makers to implement on the one handa User-centric, Transparent and Collaborative Governance, and on the other hand to respond to classical objectives of a results-driven government, and in general of every innovation project. In order not to frustrate the efforts, it is essential to keep results monitored, therefore Efficiency and Effectiveness are considered in the proposed framework, in terms of level of digitalization of the process, as a proxy of resources savings.

Even if the strategic objectives remain the same, the operational objectives (and hence the actions to be taken in order to achieve them) can differ from country to country and the benchmark should support each single country, o similar group of countries, to achieve e-Government projects in order to improve Public Administration efficiency and effectiveness, while maximising the advantages deriving from ICT for both public administration and its users. Nevertheless, undertaking an e-Government project, could have different meanings in different Countries and a Public Administration investing in e-Government generally has more medium-term objectives, such as gaining efficiency or increase the quality of services. e-Government maturity is affected by different factors and can have different meanings depending on the specific referring context.

Therefore the country performance benchmark moves into a more specific analysis in order to understand:

- the impact of a specific country context on e-Government maturity performances;

- the differences between context of countries belonging to the same performance cluster;

- the differences between countries with the same context but belonging to different performance clusters.

In particular, context can be described through three main variables:

- e-Government supply in terms of spread of e-Government services: online services availability refers to investments and efforts in innovation, diffusion and quality of services;

- e-Government demand in terms of citizens' willingness to use online services: factors that enable citizens in using the online channel are eReadiness, Awareness and Attitude of citizens;

- Environment in terms of readiness of the background: some exogenous factors specific of each country that should be considered are socio-demographic data, ICT Readiness and Governance structure.

The cross analysis on these factors will produce relative performances of single Countries (or clusters of Countries or Areas, or Cities) taking into account exogenous factors in putting those performances in the right perspective.

4. E-Government maturity model

E-Government maturity can be described through four different dimensions:

- Penetration(Guo, 2009), (Bwalya, 2009)(Daou, 2013);

- Process Digitalization(Katz, 2013);

- User's Satisfaction (Holliday, 2005) (Irani, 2012) (Alawneh, 2013);

- Standardization(Jaeger, 2003)(Sołtysik-Piorunkiewicz, 2013).

4.1 Penetration

The availability of digital public services has definitely risen in recent years, hence, in order to understand the maturity of e-Government supply, the market penetration can be described through the diffusion of online e-Government services(Julian Kirchherr, 2015). Penetration can be measured both as a ratio between usage and total population or just reached population, such as internet users(Guo, 2009).

Furthermore the use of e-Government services can be analysed in different users' clusters, to understand what actions should be taken in order to maximise the penetration and to understand potential improvement in services availability. Users' clusters will be set up through factors such as age, literacy rate, social status; therefore, penetration will be also a proxy of social inclusion(Brandtzæg, 2011), (Carter, 2008), (Al Shafi, 2007), (Saebo, 2008).

e-Government services use will be also compared with citizens' use of others non-governmental online services (eCommerce, Internet banking, etc.) in order to understand the role of the context compared to awareness, findability or accessibility in online services usage(Edmiston, 2003).

In order to achieve complete market penetration, it is fundamental to understand what provokes the lack of penetration:

- on the one hand, it is important to implement long-term strategic policies to improve social inclusion, increasing country eReadiness;

- on the other hand, it is fundamental to carry out medium-term activities in order to decrease the lack of awareness, findability and accessibility of e-Government services.

4.2 Process digitalization

The digitization process and the ICT introduction in Public Administrations cannot overlook efficiency and effectiveness objectives; therefore e-Government maturity is also represented by the Public Administrations ability to produce efficiency and effectiveness in its procedure and services supply(Irani, 2007), (Riley, 2003).

Efficiency can be represented by the ability to anticipate user's activities and needs(Hazlett, 2003), e.g. either the number of interactions between the whole process occurring online, or the number of information users don't have to provide because public bodies can get from other sources.

This variable represent back-office and front-office integration, hence they are able to represent back office digitalization, a proxy of savings achieved through process digitalization.

Instead effectiveness is represented by the online service quality, in terms of added value provided by online services rather than offline ones, e.g. thanks to the reduction of mistakes.

In order to realize an efficient and effective process digitalization, more coordinated policies and plans have to be deployed, to perform a smart approach to innovation through structured tools: investment valuation, business process reengineering, transparency improvement, skills purchase and personal training(Yeo, et al., 2007).

4.3 User's satisfaction

An important indicator to determine whether users will return or continue to use an online service is their satisfaction(Giese, 2000), both in terms of overall evaluation of the experience, and in terms of comparison with expectations and objectives(Edmiston, 2003).

Instead of other indicators, satisfaction should be studied in the perspective of each person, in order to better understand what drives users' satisfaction(Horan, 2006).

In order to improve user's satisfaction it is fundamental to carry out a citizen-oriented approach, e.g. (Wang, 2005), through listening initiatives activities addressed to understand users' needs and plan services able to fit these objectives.

As for penetration, also satisfaction will be analysed in comparison to user's approach with others nongovernmental eServices (e.g. eBanking, social networks, eCommerce), to understand drivers of satisfaction(Irani, 2007),(Weerakkody, 2007), (Choudrie & Ghinea, 2005).

4.4 Standardization

In order to achieve the Single Market objective, each country should first work on supply standardization inside its territory. This standardization need, is pushed on the one hand by technological motivation, but on the other hand also by user's needs to take advantages of learning curves(West, 2004).

The standardization of the online services can be represented by the quality of services in terms of usability(Baker, 2009), (Withrow, 2000), (Choudrie & Ghinea, 2005) features, which allows ease to learn of services, e.g. standardization of websites layouts, authentication mode of different services or of the same service offered by different administrations. Standardization involves also the definitions of protocols and the implementations of solutions homogenous, in order to minimize services accessibility barriers.

Standardization represent a proxy of each country ability to coordinate innovation through the proposed level, thus it has been introduced to verify the proposed model ability to forecast maturity. Growing standardization, in fact, will produce the increase of others indicators(Jianwei, et al., 2008).

5. Step One: The benchmarking model

The e-Government maturity indicators succeed in providing learning insight for future policymaking. The identified indicators are connected between them; therefore it should be possible to combine them in a synthetic maturity index. These are absolute indicators are able to define a ranking in e-Government services maturity, comparing countries among the same defined performance. Nevertheless, it is important to evaluate each country performance with Penetration, Satisfaction and Digitalization indicators (**Figure 1**), to understand which specific action has to be undertaken in order to improve e-Government maturity.
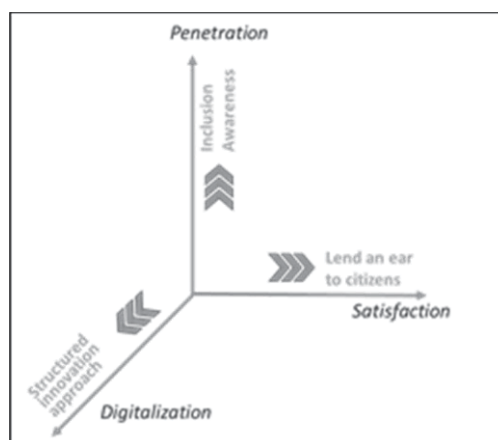
Figure 1: Action to improve e-Government maturity

e-Government maturity is affected by different variables and it is important to understand the impact of each of them to be able to carry out specific e-Government policies. Indeed, undertaking an e-Government project,

could have different meanings in different Countries and a Public Administration investing in e-Government generally has more medium-term objectives, such as gaining efficiency or increase the quality of services. Therefore, to find context specific e-Government policies can be more effective in increase a country maturity, rather than implement strategies, which can be difficultly translated into concrete actions, and frustrating Public Administrations' efforts. In particular, it is possible to highlight the relationship between the proposed variables; afterwards standardization, which is a proxy of each country ability to coordinate innovation through the proposed indicators, will be introduced to verify the model ability to forecast maturity. Comparing penetration with user's satisfaction, it is possible to identify four scenarios, representing a country ability to spread online services which respond to user's need (**Figure 2**):
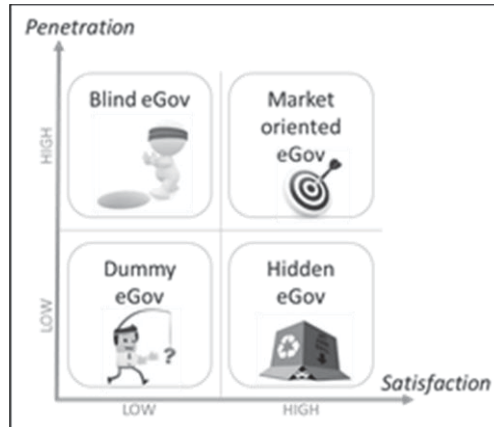
Figure 2: User centricity

- A country with lower level of satisfaction and lower level of penetration shows an e-Government which is heading in the wrong way; significant efforts are still needed to achieve e-Government maturity, more structured policies and innovation plans have to be deployed without overlooking a citizen centric approach (Bullivant, 1994), (Osman, 2014), (Reddick, 2010).

- Lower level of satisfaction with higher level of penetration are the result of a blind e-Government, since citizen use services but they are not satisfied of them; this scenario probably refers to a "digital by default" e-Government policy, and show the importance of taking care of citizens' needs in planning innovation; future actions should involve a more citizen-centric approach.

- Higher level of satisfaction with lower level of penetration prove government ability to offer quality services but it is necessary to understand what provoke the lack of usage, in order to carry out more suitable actions.

- Higher level of both penetration and satisfaction shows an e-Government able to meet users' need, in a market-oriented approach, where citizens use online services and appreciate them.

In order to understand the country ability in ICT exploitation to increase processes' efficiency, it is possible to compare penetration with digitalization. In particular (**Figure 3**):
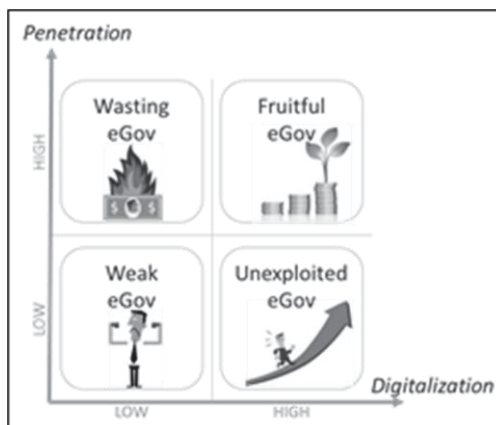
Figure 3: ICT exploitation

- Lower level of digitalization and lower level of penetrations characterized a weak e-Government unable to cope with ICT opportunities.

- Lower level of digitalization means that processes are inefficient in managing resources. This scenario combined with a higher level of penetration, thus high usage of online services, generate waste of resource, therefore it is fundamental to promptly intervene.

- Higher level of digitalization together with lower level of penetration suggest a scenario where innovation process has been carried out efficiently, however the lack of penetration prevent to get the advantages of digitalization.

- Higher level of both digitalization and penetration disclose a successful process of innovation, able to achieve efficiency and effectiveness opportunities provided by ICT.

Comparing satisfaction with process digitalization, it's possible to represent country ability to lead internal innovation process without overlooking citizens' needs, managing an internal vs external equilibrium. In particular **Figure 4**):
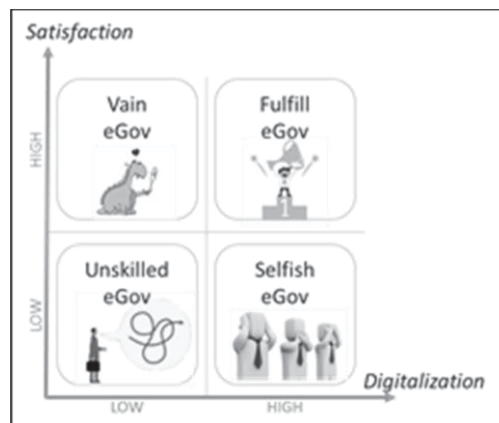
Figure 4: Satisfaction – digitalization scenarios

- Lower level of digitalization and lower level of satisfaction shows an e-Government unskilled, it is fundamental to understand the reasons of those lacks in order to provide more appropriate instruments to achieve e-Government maturity.

- Lower level of digitalization and higher level of satisfaction reveal a high perception of quality of online services offered, which is not supported by an internal process improvement and innovation.

- Higher level of digitalization combined with lower level of satisfaction shows a selfish approach to e-Government, which generated advantages and savings for public sector. However this process have not focused on citizens' experience in facing e-Government services.

- High level of both digitalization and satisfaction represent an e-Government fulfilment, where digitalization process is completed and services offered respond to users' needs.

6. Step Two: Understanding context to derive implications

e-Government maturity is affected by different variables and can have a different meaning depending on the specific referring context. Therefore the country performance benchmark, moves into a more specific analysis (**Figure 5**), in order to understand:

- the impact of a specific country context on e-Government maturity performances;

- the differences between context of countries belonging to the same performance cluster;

- the differences between countries with the same context but belonging to different performance clusters.

Furthermore the performance analysis will be carried out across different years, in order to better understand drivers of e-Government maturity and turn the attention on the countries which have been able to achieve their objective.
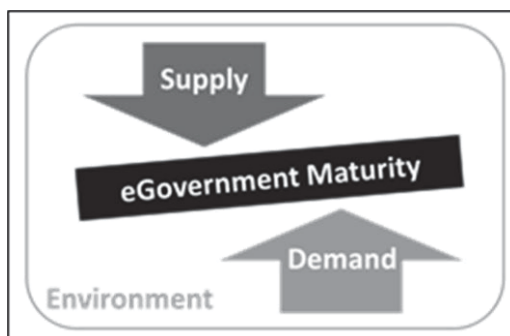
Figure 5: e-Government maturity framework

The analysis would like to produce relative performance of single countries, or clusters of countries, taking into account exogenous factors in putting those performances in the right perspective. The final purpose is to identify different policies, specific to each country, which could help different policy makers in reach relative objectives.

e-Government services maturity is affected by numerous relative indicators of each country maturity, which could be summarized under three macro-categories:

- e-Government Supply variables
- e-Government Demand variables
- Environmental variables

First there is the issue of the spread of e-Government services, in fact online services availability refers to:

- *Investments*: each country performance should be compared with the effort in innovation realized, in order to understand which actions lead to better results; this effort could be represented trough the percentage of Public Expenditure in ICT, or the level of UE funding spent in Public Administration innovation.

- *Diffusion of services*: heterogeneous availability of different services on country area. Availability of e-Government services can be measured with standard statistical indicators provided by statistical institutes and they refers e.g. to the availability of online services, online features availability, interaction level online. New indicators from mystery shopping can be introduced, such as services findability and their accessibility.

- *Quality of services*: added value provided by online services rather than offline, this increase if the whole service procedure is offered online. For comparing service offerings in different Countries in terms of the services availability and their quality, mystery shopping methodology can be used to measure services' usability and the integration of IT enablers in the service delivery chain.

Citizens' unwillingness to use online services depends on four main reasons: lack of awareness, of willingness to use, of trust to use, of ability to use; therefore to increase the penetration, policy makers should consider these barriers, which need more than straightforward communication to be overcome. Explanatory factors that enable citizens in using the online channel are:

- *User's eReadiness*: citizens' readiness is a prerequisite to use e-Government services; this could be observed through use of other nongovernmental online services, such as eCommerce, internet banking, social network. Some others interesting ICT-related variables, representative of willingness to use new technologies could be the number of entertainment media download, the number of mobile app download, or the level of diffusion of electronic money. Finally the user's readiness to e-Government adoption can be also analysed in terms of trust in government as a proxy of propensity of public online services demand.

- *Awareness*: PA which realize online services, should plan intensive communication initiative, in order to inform citizen of services availability; citizens' awareness still represent a barrier to e-Government diffusion.

- *Attitude*: online services should be designed in order to respond to specific users' needs. Perceived benefits of using electronic services/e-Government channels, the preferences of citizens and businesses for future use. That is, if the respondents were to use a service again, how likely is it that they would re-use the same channel for contact or access. The issue of future use is further elaborated by measuring indications on specific barriers to as well as potential motivators for (increased) future use.

Nevertheless, there is also a segment of user which are excluded from Governments' innovation process including both users which don't have tools and skills to use online services, and users who could take advantages from e-Government, but for cultural reasons, are unwilling to use online services.

In order to allow policy makers to implement long-term strategic actions to improve the readiness of the background, some exogenous factors specific of each country, should be considered:

▪ *Socio-demographic data*: standard demographical data including gender, age, educational level, social or professional situation, household income, or geographical characteristic such as number of municipalities, number of metropolitan areas or population density can be integrated with others variables able to consider the country impact on users need and on the propensity to use online services. This sociological aspect can be measured by a corruption index, as a proxy of transparency and information asymmetry of governments, factors able to explain part of resistance to change.

▪ *ICT Readiness*: e-Government maturity depend on country readiness to deal with new ICT opportunities, represented by availability of infrastructure and enabling technologies. In addition to standard indicators such as broadband or free Wi-Fi coverage, number of IT device per capita, adoption of advanced technology standard (e.g. Single Sign On), it's interesting to look at each country effort to improve eReadiness, for example through the percentage of GDP invested in ICT.

▪ *Governance structure*: there is a significant impact on e-Government output generated by the administrative, political, and decisional structure of each country. This aspects refers to ability to legislate which can be measured by average time of laws' implementation, to governance factors represented by the presence of Coordinating Agencies, number of Local Digital Agendas and its renew frequency, or average time to convert International directives. In order to understand government readiness and innovations commitment, it's possible to compare e-Government maturity to other innovation process in Public Administration, such as, in general, time to manage public work, or specifically, in procurement, measured by e.g. the average time to manage a public purchase, the appeal number in public procurement, or in Justice, represented by e.g. the average time to handle civil proceedings.

7. Application of the framework

In order to apply the proposed framework, the following steps should be performed:

▪ Collection of data potentially useful for building indicators

▪ Absolute indicators definition

▪ Performance indicators valorization

▪ Relative indicators definition

▪ Identification, based on the referring context, of homogeneous groups of countries

▪ Identification, based on e-Government performances, of clusters of countries

▪ Countries analysis through relative indicators in order to understand the context impact on performances

In particular, the proposed framework has already been applied to different projects, and empirical evidences will be discussed in future researches.

8. Conclusions

The paper proposes a benchmarking methodology based on an innovative maturity model, which allows to identify relevant considerations and implications, describing the state and evolution of e-Government service in different Country (or Areas, or Cities).

The evidences from the methodology proposed, through the framework's coherency tohigh-level political priorities, allow each Country (or Areas, or Cities) to identify different policies, specific to their context, to achieve strategic objectives.

The two-step methodology allows to identify different policies, specific to each Country, which could suggest different policy makers to achieve relative aims.

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Improving Usability of e-Government for the Elderly

Tamas Molnar
Humboldt-Universität zu Berlin, Berlin, Germany
tamas.molnar@cms.hu-berlin.de

Abstract: Our research focuses on the question of acceptance of current e-government systems by elderly users. It describes how such systems should be designed and offered for this user group in order to provide an acceptable alternative to offline processes. In order to answer our research question, the research was structured into three phases along the development model of the ISO 9241-210. This enabled to identify not only the main factors of acceptance, but also the expectations of elderly users. Our research was conducted in parallel in Germany and Hungary in cooperation with the Fraunhofer FOKUS, the Federal Ministry of Interior, the Bundesdruckerei and the Corvinus University Budapest. The first phase provided results about the expectations and previous experience of the users with e-government systems. Our goal was to acquire information about the general experience of the age group with interactive applications so that a suitable test environment could be selected in the second phase of the research. The results made it possible to select an application in the second phase, which was used as a model in the remaining phases. The selected application was the AusweisApp of the electronic ID card. This was tested with 75 participants and a control group consisting of 20 students of the Humboldt-University. The obtain results allowed us to develop a generalised solution, the IGUAN guideline. This guideline makes a standardised approach to the usability improvement process possible. It contains the special requirements of elderly users, and a catalogue of criteria, which helps to develop an application in line with the set requirements. The third phase of our research was used a proof of concept for the IGUAN. The guideline was evaluated and tested with an iterative prototyping. The successful completion of this phase indicates that the IGUAN can be used to measurably increase the acceptance of e-government systems by elderly users. We could therefore demonstrate that improvements in the interface make e-government application possible which are perceived useful and easy to use by elderly users. These improvements will measurably increase the user motivation and experience. This can however only be achieved with a structured design process, and requires a framework which takes the requirements of the elderly users into account.

Keywords: e-government, usability, acceptance, guidelines, ASQ, usability testing, structured approach, GUI improvement

1. Introduction

Electronic government was created on the example of e-business, or electronic commerce. It is essentially the evolution of the transformation of the public sector, which, as a process has been on-going for several decades, but only reached its critical mass in the last decade. The use of IT in public administration and other branches of government (including parliaments and the judiciary) as support systems, has reached a high level in many industrialised countries, but there was almost no political interest in this on-going and almost invisible process of modernisation of the government for a long time.

The essential difference between offline government and a fully electronic governance, is the goal to reach the ultimate efficiency in processes not only to speed up the exchange of information, but also to create a system which is considered effective by the users, the citizens and businesses. This increase in efficiency can be directly translated into the speed of process execution. Apart from efficiency, another aspect of electronic government, which needs a new approach, is the user-friendliness. Interfaces can contribute to the complexness of the system or help the user by easy access. This issue is not a trivial task; it needs a very different approach in user interface design than any other software. The most difficult but also most important characteristic for this is the narrowing the "digital divide" (Mehra, 2004) to a minimum for the users. This might prove to be a challenge with the complete population as the target audience, even greater than any technical, privacy or security aspect of the systems. This can be translated into the general acceptance of the applications, which combined with the least experienced cohorts of the population, the elderly, will become an imperative factor in electronic government of the future. Additionally, e-government theoretically offers the prospect for identical service quality independently from time, location or age. This ubiquitous access to governmental services would have measurable advantage! In the midst of the current demographic trends in Europe, it would give the elderly an uncomplicated way to access to governmental services and enable this cohorts to be one of the strongest benefactors of electronic services. Contrasting to this, systems have not been designed with these users in mind until recently, and even today, elderly are not considered as prime candidates, with system developers and designers hard to convince otherwise. Decision-makers see the endeavour as questionable before understanding the impact of future demographic changes the governmental infrastructure. These premises made it apparent that the utility of e-government for the ageing population warrants a deeper research project, which should focus on this essential population group. Other research projects have also shown that the use of

e-government can be promoted to older people(Righi, et al., 2011). Additionally, papers also describe the strong correlation between usability and acceptance for older users (Fisk, et al., 2009).

We selected therefore a model which took these results into account and united this with a user-driven approach to determine the requirements of the target group. The basis of our model is the ISO 9241-210 (International Organization for Standardization, 2010) development cycle.

Merging this into the hypotheses describing the user behaviour and the technology acceptance of the elderly enabled to extend the model to better represent our target group and to specify the application environment. This allowed the creation of a hybrid model based on the ISO 9241-210 activity diagram, describing the tasks of the research.

2. Acceptance of electronic government by the elderly

This phase formed the basis of our research, and was designed to give an overview about the requirements and the fundamental issues of the target group. The data gathering for this was based on deep interviews and standardized questionnaires. This step also includes a technology overview, which was fundamentally a generalized expert analysis of the currently offered electronic government systems in Germany, Hungary and on European level.

The systems used in the interviews in this step have been created on a purely theoretical basis, with no actual application serving as a basis. This decision was essential, as any functional system might have influenced the test group with actual and real problems, which consequently would create falsified data based on a single system. This made an analogous approach in both countries possible and centred the scenarios around a theoretical system, which would give the elderly several advantages through improved service quality and efficiency. Along this idea, a theoretical "retiree-card" application was specified, which was based on the concept of typical German university student ID. The scenarios for the research step were constructed around the request procedure for this card and featured the four maturity levels of electronic government systems declared by the European Commission. The data was acquired by the means of a standardized questionnaire, which included multiple questions about the acceptability of the targeted system. The number of participants was 25 for Hungary and 45 for Germany, with a median age of 69.5 years.

This approach guaranteed that the users were confronted step-by-step with more and more electronic components and were not overwhelmed by new concepts, which might have created refusal or other sudden and uncontrolled changes in the attitude of the test candidates. The results from the different levels analysed in accordance with the maturity model of the European Commission support the theory, that there is a threshold in the acceptance of electronic government and probably other systems for these cohorts. The results support that that younger elderly seem to theoretically approve electronic government systems, which offer electronic components up to level 3. Level 4 systems were somewhat more controversial, but even such systems were acceptable for about half of the younger test participants in both countries. Older citizens might not accept present systems beyond level 2; interactive systems seem to encourage a fear of new technology and fuel disapproval in about 50% of the tested participants.

In the subsequent step, the technology available was analysed to create an overview of the available systems, which could serve as a platform for further research.

3. Specify requirements

The results gathered from the first step enabled to identify a system, which could serve as test platform for further research. This system had to maintain the following criteria defined on the basis of the ISO 9241:

- The system had to be user-centred, with a service offered for citizens in a G2C configuration;
- The context had to be relevant for elderly citizens and independent from language, nationality, social, educational or cultural background to make a cross-cultural study possible;
- The quality of the system had to be of a level not to disrupt the tests through incompatibilities, system crashes or other software problems;
- The complexity of the selected service required to be of a certain level. Only systems with medium or high complexity can adequately simulate the usability problems for a later successful generalisation;

- A further requirement was the openness of the application to serve as a platform for the iterative system development;

These criteria led to the selection of a system, which was in line with the efforts of the European Union to create a single Pan-European Identification Solution(Atkins, 2004), and concluded in the selection of the new German eID System, which was introduced in Q3 2010 to the general population in Germany. The client system called "AusweisApp" was therefore used as a basis for every subsequent step of the research. The data collection in this phase of the project was centred on the hypothesis that the system had to be usable for a wide array of citizen to government (C2B) interaction.

4. Methodology

The main objective of the tests in the second phase was to gather data about the usability of systems in an everyday environment with the users of the selected cohort. The tests were therefore based not only the scenarios, but also backed-up by methodology designed for the assessment of the user experience and verified by analogous studies.To completely understand the users' previous familiarity with comparable computer systems, a complex analysis of the experience on an individual level was needed. (Maeda, 2007) This was based on the CLS (Computer Literacy Scale) developed at the Chair of Engineering-Psychology at the Humboldt-University Berlin. (Sengpiel & Dittberner, 2008) This model can assess the computer literacy of the user precisely through a series of questions, creating a matrix from typical tasks on a computer.

The ownership of Internet capable devices, computer, tablet or smartphone was also asked to assess the Internet habits. Additionally a number of questions were set up to gather information about the computer experience and usage of the candidates. This was used to create a broader picture about the experience of the cohort.The actual tests with the "AusweisApp" were conducted according to the data gathered in the 1st phase, and made up the main part of the user tests. They were performed with a "thinking-aloud" method to document the accomplishment of the tasks. The mouse movements on the screen were captured by screen-capture technology. A direct audio or video feed of the tests was not captured, as it would have highly complicated the set-up by creating the need for strict privacy agreements. In addition fear from misuse of privacy relevant data would have made the recruitment process extremely hard to almost impossible for the tests in this case. This deficit was compensated by the application of the RSME (Rating Scale Mental Effort) developed by Zijstra(Zijstra, 1993). The users were asked to indicate the effort they needed to complete the tasks. This enabled, combined with the observations through the "thinking-aloud" method, an overview over the user behaviour in the scenario. During the scenarios, the number of external assists needed was recorded and categorized. The seriousness of the problem was characterized by the frequency (F), the impact (I) on the successful competition of the task and the persistence (P) between individuals. The score (S) of a problem was created with the function (1) and based on Nielsen and Loranger. (Nielsen & Loranger, 2006)

$$S = (F * I * \sqrt{P})/\sqrt{10}$$

The impact of the problems was classified on a scale of three, with minor issues as one and problems with critical outcome for the success of the task with three.

Additional data was acquired by the after scenario questionnaire (ASQ) which was adapted for these user tests. The three questions, which the ASQ is based on, were modified according to the results from the 1st phase, thereby contributing to the comparability of the results. The ASQ itself was based on the work of Lewis J.R. (Lewis, 1991)

> *"I am satisfied with the ease of completing the tasks in this scenario."*
>
> *"I am satisfied with the information and consider this system useful."*
>
> *"I am satisfied with the amount of time it took to complete this scenario"*

The answers were provided through five intervals from strongly disagree (1) to strongly agree (5).

The ASQ method was selected for the evaluation as it is proven and complies with the ISO 9241.The three main aspects of the ISO 9241– efficiency, utility and effectiveness – link the standard with the ASQ, leadingto comprehensive and reproducible results.

5. The test setup

The test environment has been set up for three different iterations of the user evaluation. A pilot-test with a small number of candidates was essential to verify the test equipment and the scenarios. This was conducted with identical premises as later tests. The usability laboratories of the Fraunhofer FOKUS were used for the pilot-tests and for the test runs in Germany. The eight volunteers for the test-run were recruited from the best possible candidates (20-30 year old university students), who had theoretically the highest previous experience with similar systems and would easily accomplish the set out tasks, thereby verifying the measurability and utility of the scenarios. A second run on the finalised setup with additional volunteers also provided reference data for the later tests with the actual test candidates. The control group, consisting of students enabled to set up the ideal course of usage by gathering information on the behaviour of the ideal users. This data was later used as a basis for the tests to be able to create a comparison between older and younger participants and also to have an insight on the complexity of the usability deficits of the system. The methodology used for the trials was identical to the actual tests with the target group. This enabled a merger of the data from the different test runs.

The tests were conducted in Germany and Hungary with a sum of 75 test participants. We used an identical approach for the validity of the results.

Table 1: Results from the ASQ for the 1st scenario

N=95	Ease of use	Utility	Time
Germany $N_G=45$	1.71	3.36	2.02
Hungary $N_H=30$	1.97	3.27	1.77
Control Group $N_C=20$	1.1	3.14	1.4

The data gathered from these tests in Germany and Hungary enabled to build new interface prototypes, which served as showcases for a generalisation of usability rules and practices. This enabled us to formulate a general approach for a usability improvement process for e-government systems.

6. The IGUAN guideline

The main consideration for the new guideline is twofold. It should not only help to develop or redesign applications in accordance with the requirements of the target group, but also provides elderly users with an easy access. In addition, it should offer aid and a visual process for developers, which leads to UI (User Interface) optimised systems. The best-practices incorporated in the guideline therefore do not have to only include the requirements for optimal usability, but also a development cycle and the general criteria, which are considered essential for system acceptability. Our user tests of the AusweisApp were used as a basis for the framework. This draft process was channelled into a more formal and standardised form to formulate a complete set of guidelines, which result in the planned improvements. This, followed by the contextual design process enabled us to implement the findings into the final application. The generalisation of the research process was possible, as it was considered from the beginning on as the first step towards a standardisation effort.

Reproducibility was also a high priority for the validity of our research, enabling an easy generalisation of the process. The framework was created with the focus on e-government and particularly electronic identification, but the guidelines can be used for any interactive Internet service which has an elderly target group.

The guideline is constructed along the following three main aspects shown in figure 1. These aspects are built upon the general usability improvement methods of Richter and Flückinger(Richter & Flückinger, 2010). The guideline describes how the acceptance of an application can be optimised, and how the separate aspects are interlinked with the acceptance of the Internet service. For controlling the usability improvement, IGUAN provides the three aspects, each forming a dimension of the usability aspects. The structure of the guideline enables to incorporate the internal and external aspects of the usability improvement process by integrating the core requirements of the application design with the requests of the users. This is broken down into functions which can be easily executed for an increased acceptance.

The first aspect of the guideline is the contextual inquiry (Richter & Flückinger, 2010), which provides the fundamental requirements of the target group by categorisation of the needs in three definite groups: functional requirements, design requirements and application requirements.

Processes	Criteria	Context
Domain	Lernability	Functional Requirements
Functions	Efficiency	Design Requirements
Activities	Memorability	Application Requirements
	Errors	
	Satisfaction	
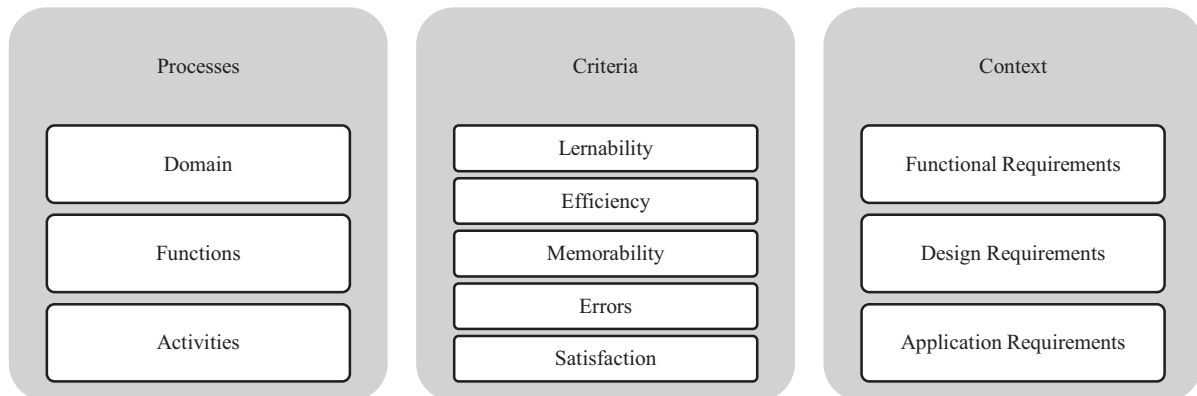
Figure 3: Structure of the IGUAN framework

The functional requirements include general guidance aspects and general configuration requirements. These are set by the objective of the application. These requirements cannot be modified, as they describe the internal functions and processes of the e-government service. The design requirements include generalised design issues. These are derived from the TAM (Davis, 1989) and include as focus the perceptions and attitudes towards the actual system. These have to be declared in relation to the targeted user group.The application requirements include needs which are characteristic for the connection of the target group and the system. An aspect of e-government systems is trustworthiness, representing the citizens' perception of the credibility of the application. In addition these requirements implement factors which are characteristic for the elderly users, such as an increased font size.The second aspect describes the criteria, which control the usability of an application. These have been selected in accordance with the experience from comparable studies in general software usability assessment (Nielsen & Loranger, 2006), (Park & Lim, 1999), (Nokelainen, 2004), and represent a link to the ISO 9126 (ISO, 2001). These criteria are the basic attribute of the interaction between the system and the user. Fisk et al. (Fisk, et al., 2009) define five core factors, which determine the acceptability of a system. These criteria were also used in the early phases of our research into the requirements of the users. The interviews, which enabled an overview about the user requirements, were constructed along them.

The process aspect represents the main aspect of the usability improvement of the application and provides the actual best-practices for the IGUAN. These can split up into the domains, functions and activities, which directly influence the usability.

Domains – The domains describe the improvement process by describing the redesign cycle with four domains. These domains are aligned with the contextual design and the usability improvement sequence cited earlier for the better understanding of system requirements of the elderly. The hybrid flow-model based on the ISO 9241-110 and shown earlier was refined to create the domain model of the IGUAN. See figure 16 for more details.

Functions - The functions are the activities which result in usability improvements by specifying what is to be done to archive a better acceptance for the application. The steps, which guide the process towards the improvement, are modelled by the 23 activities.

Activities - The activities are the direct actions which are required to archive a measurable usability improvement. These can be seen as the execution of the more general functions and allow for a wide customisation of the guidelines for the particular application. The activities also contain the actual methodology of the functions, thereby enabling to use the sophisticated toolset, which the actual usability improvement requires.The functions are grouped by the domains, each domain representing a key component in the usability improvement process.

7. Proof of concept

The IGUAN framework was verified by the final phase of our research. An iterative development cycle along the recommendation formulated in the guideline was used as a proof of concept. This enabled to create prototypes according to the actual needs and concerns of the target group. This concept was based on the success of this method in other projects. (Bailey, 2005)(Tan, et al., 2001)

We based our method on a spiral software development(Boehm, 1986), which combines both design and prototyping phases, thereby bonding top-down and bottom-up methods. A further refinement of this cycle with a usability centred design can be created when using this method along common usability models, thereby improving not only the functional aspects of the software, but also the usability for the target audience. The iterative improvements incorporated into the prototypes were based on the results from the previous phases. The incorporation of small-scale component based usability testing further enhanced this improvement effect. This enabled a deeper understanding of the needs of the target group thereby allowing further usability tailoring of the middle-ware to the actual and measured usability requirements. The formative evaluation of each prototype enabled to visualize usability problems at an early stage by testing with a reduced but still significant number of participants. This allowed for a seamless incorporation of improvements into the final prototype.

This development stage was followed by a summative evaluation of the final prototype in comparison to the results gathered earlier in phase 2. These final tests were conducted in accordance to the previously used analysis and evaluation methods, thereby delivering not only verifiable data, but also enabling a direct comparison with the original middle-ware. This comparison also permitted the isolation of key weaknesses in the original application, and supported thereby a general usability framework. The results from this comparison can be seen in the table 2.

Table 2: Average number of problems encountered by the users – scenario 1

N = 75		Minor (1)	Medium (2)	Critical (3)
Germany N_G=40	AusweisApp	3.21	1.57	1.82
	Prototype 7	1.42	0.5	0
Hungary N_H=30	AusweisApp	3.8	1.63	1.8
	Prototype 7	1.35	0.7	0
Mean	Prototype 7	1.39	0.6	0

We used an identical methodology for the measurement of the usability as in the phase 2. This enable a direct comparison of the results. The conclusion from this multi-level analysis is that the improved interface does increase the ASQ scores significantly. This also indicates that the independent variable (the interface) has significant direct influence on the acceptance of e-government systems and that it is possible to enhance systems so that elderly perceive them as ease to use.

	Perceived Ease of Use	Perceived Time Gain	Perceived Utility
AusweisApp	1.6	1.8	3.3
Prototype 7	3	2.8	3.4
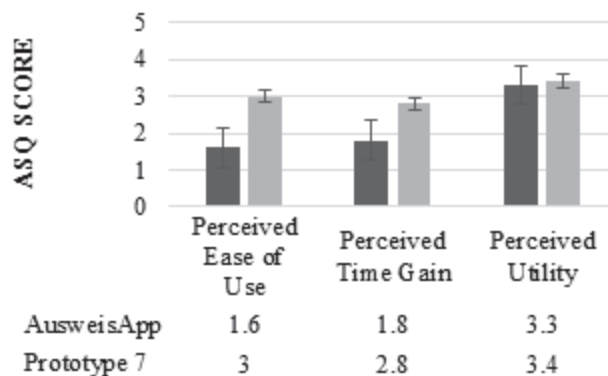
Figure 4: Comparison of ASQ scores N_a = 75, N_p=75

8. Conclusion

The results from the proof of concept have shown that usability engineering along a scenario based guideline such as IGUAN results in improved acceptance of e-government systems for elderly users. This also implicates

that the IGUAN is applicable as a structured approach to the usability improvement process. The visible performance of a user centred approach such as the IGUAN illustrates the possibilities of e-government, which have not been utilised until now. Other research groups throughout Europe (van Velsen, et al., 2009), (Schedler & Summermatter, 2007) have also come to this conclusion. Compared to Lines et al. (Lines, et al., 2007) our research made a further step from evaluation of this statement into development of a possible solution and it offers a tool to translate the evaluated requirements into system design.

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Brazilian e-Government Strategies

Valeria Esther Nigri Musafir[1] and Christiana Soares de Freitas[2]
[1]SERPRO, Rio de Janeiro, Brasil
[2]Public Policies Department, Universidade de Brasilia, DF, Brasil
valeria.musafir@gmail.com
freitas.christiana@gmail.com

Abstract: The goal of this paper is to analyze the strategic direction of the Brazilian e-Government Program from 2008 to 2014 associated with the Brazilian ranking on the United Nations e-Government Survey. Federal government strategic plans from 2008 to 2014 were analyzed based on three categories: e-services, e-administration (interoperability and integration, standardization and structuring systems) and e-democracy (open data, transparency and e-participation). Semi-structured interviews were conducted with fifteen government executives responsible for the planning and coordination of public policies. The research demonstrates that the Brazilian e-Government Program acquired a more important role in the Brazilian political arena after the protests of June 2013. The *"Gabinete Digital"* ("Digital Office") was created and reported directly to the Presidency of the Republic. It has successfully launched many e-government initiatives that were being developed but were not considered as a priority. Another research finding was the emphasis on increasing the supply of e-services. This was explicitly observed in government strategic planning starting in 2011. As a result of those strategies, Brazil moved up 33 positions on the online index of the UN Survey from 2010 to 2012. The last presidential term was more focused on promoting interaction between government and society – through an increase of transparency, the use of open data by the states and municipalities, and providing access to public information. As a result, Brazil rose seven positions on the e-participation index between 2012 and 2014. Despite numerous initiatives, Brazil's e-government index ranking in the UN Survey is advancing very slowly and still didn't reach the 45th global position it had in 2008, mainly because of low scores on the telecommunication infrastructure and the human capital indexes.

Keywords: strategic planning, electronic government (e-government), digital governance, social participation, Brazil

1. Introduction

The reform of the Brazilian State apparatus, the modernization of public administration and the need for greater government efficiency all contributed significantly to the adoption of Information and Communication Technologies (ICT) by the Brazilian Federal Government. Performance, efficiency, effectiveness, transparency, control mechanisms, quality of public resource expenditure and accountability are all issues related to the process of modernization of public management and e-government. Public policies associated with these issues now must include e-government programs (Diniz et al, 2009).

Access to benefits arising from ICT tends to be seen as a right for all citizens and digital inclusion is now perceived as a precondition for the improvement of contemporary democracy, as well as serving as a government guideline document for the so-called Information Society (Silva, 2006). However, the availability of technology itself does not fulfill sufficiently the demands to improve democratic participation. It is important to consider other variables such as education; the presence or absence of civic culture; laws and public policies that encourage participation in government so citizens can be able to participate in political decision making processes (Silva, 2006).

The objective of this study is to analyze the strategic directions of the Brazilian Electronic Government Program during the most recent terms of government (2007-2010 and 2011-2014), using Brazil's position in the "United Nations E-Government Survey" global ranking on the e-Government Development Index (EGDI) to verify a possible alignment of national strategic guidelines with those suggested by the international organization. In order to achieve this goal, both the UN's Online Service Index (OSI) and its e-participation index were analyzed. Several official documents that constituted strategic plans were also studied. The analysis of the perception of government managers - specifically from the Secretariat of Logistics and Information Technology (SLTI) of the Ministry of Planning, Budget and Management and SERPRO (Federal Data Processing Service) - was fundamental to understand the strategies adopted by the Brazilian government to promote e-government.

This paper is divided into five chapters: an introduction; a literature review; research methodology; research results; and finally conclusions and recommendations to improve the public policy on e-government in Brazil.

2. Literature review

This section consists of three parts. First, we introduce the UN methodology and the UNESCO categorization of e-governance. For this research, we categorized the e-government elements under the three UNESCO fields. In the second part, we describe the Brazilian e-government Program evolution and the federal organizational structure and its responsibilities. The final section analyzes e-government strategic planning in both the Federal Public Administration and Serpro.

2.1 Digital governance according to the United Nations

Since 2003, the UN has evaluated e-government in 193 countries using a weighted average of three dimensions of e-government: an online services index - OSI, a telecommunication infrastructure index and a human capital index. The OSI index, in turn, also uses an e-participation index in its composition. The overall ranking is known as the E-Government Development Index – EGDI (United Nations, 2012).

Several researchers use these indexes to evaluate their e-government programs. Celso et al (2012), for example, analyses the EGDI and e-participation index evolution of the BRIC (Brazil, Russia, India and China) countries, while Alshomrani (2012) compares e-government development between Saudi Arabia and USA.

UNESCO categorizes e-Governance in three fields: e-Services - improvement in the delivery of public services to citizens; e-Administration - improvement of internal government processes; and e-Democracy - processes to encourage active citizen participation in political decision making (UNESCO, 2005).

E-Services projects have had great visibility in Brazil in the late 1990s and early 2000s. Municipal, state and federal governments have been investing efforts since the second half of the 90s to use the World Wide Web as a public service and an information channel for citizens and organizations (Prado et al, 2011).

Establishing the integration and sharing of information requires the use of interoperability standards, such as e-PING in Brazil and e-GIF (Government Interoperability Framework) in the United Kingdom (MP/SLTI, 2010). The construction of accessible portals that meet the World Wide Web Consortium standards (W3C) requires, by its turn, the necessary development of patterns of accessibility. The elements of interoperability, integration, structuring systems and standardization – which according to UNESCO's classification would compose the category of e-administration – enable governments to increase the supply of public services.

E-democracy, on the other hand, relates to government initiatives that encourage citizen participation in democratic processes and government decision-making. In participatory democracy, there is a greater integration between the public and the civil spheres, having as a foundation the idea that the direct participation of the population in political processes is beneficial to the improvement of society. Parliaments of several countries have participatory experiences for promoting debate, discussion and creation of laws. In Brazil, for instance, we have the portal e-Democracy, whose main objective is to develop an environment for popular participation in the preparation of laws (Freitas, 2014).

This conceptual division of e-government was also used by Prado et al (2011) and Cunha et al (2011) to facilitate data analysis. However, the boundary between these concepts is not always clear. When government improves its internal processes, modernizing its structuring systems with a concern for interoperability and integration between systems, we obtain cost savings and increased supply of electronic services.

2.2 E-government in the federal public administration

Electronic Government in Brazil officially started in the year 2000 through a Presidential Decree. The Executive Committee for Electronic Government (CEGE) was created to formulate policies, establish guidelines, coordinate and articulate the actions for e-government implementation (Chahin et al, 2004).

In 2003 eight technical committees of CEGE were established under the Ministry of Planning: Free Software Implementation; Digital Inclusion; Systems Integration; Legacy Systems and Software Licenses; Management of Sites and Online Services; Network Infrastructure; Government to Government; and Knowledge Management and Strategic Information (MP/SLTI, 2014).

The Information Technology Resource Administration System (SISP) was created by decree in October 2011 to coordinate the IT resources of the agencies of the Federal Public Administration. One of its purposes is to define the strategic policy of IT management for the Federal Executive Branch (EGTI, 2011).

The SLTI secretariat has – among its main activities – the role of coordinating SISP and planning, coordinating and standardizing the activities of the Electronic Government Program (MP/ SLTI, 2013). Standardization is vital for the provision of e-government services geared to the needs of citizens. In this regard, since 2003, efforts have been made to consolidate the Electronic Government Interoperability Standards (e-PING) in e-gov projects and to establish the Brazilian interoperability framework (MP/SLTI, 2010).

The standard of accessibility, described in the "*Electronic Government Accessibility Model*" (e-MAG) launched in 2005 aims at promoting universal access to e-government services through technical recommendations for building portal websites. In 2007, the e-MAG was institutionalized and its compliance became mandatory on sites and portals of the Federal Public Administration. Finally, in 2010, the "Web Standards in Electronic Government" (e-PWG) was created, which consists of recommendations of good practices grouped in four technical booklets: usability; coding; web writing; design and content architecture developed under the Digital Identity of the Federal Government (Brasil, 2013).

The Open Government Partnership (OGP) – of which Brazil is co-leader – is recognized as an effort of several partner countries to make governments more transparent, effective and reliable through the establishment of Open Government goals included in the agendas of each country. The Government Open Data aims at publishing government data in reusable formats and increasing transparency and greater political participation of citizens, as well as generating several applications collaboratively. The National Infrastructure Open Data (INDA) was built based on a participatory process and its purpose is to coordinate the open data policies (Brasil, 2013).

Apart from the Ministry of Planning, the "General Secretariat of the Republic Presidency" – SGPR (2014) is responsible for policies developed to stimulate and increase social participation. The "Inter-council Forum" – a joint initiative of SGPR and MP – received the United Nations Public Service Award (UNPSA) as one of the best innovative practices of social participation in the world. This initiative encourages society to provide feedback and to monitor the implementation of the Multi-annual Plans (PPA). According to SGPR, in the last Plan, 629 contributions were presented by civil society, of which 77% have been fully incorporated (SGPR, 2014).

The "Secretariat for Social Communication" (SECOM, 2014) of the Presidency is responsible for government communication – which includes the management of the Brazilian Portal (www.brasil.gov.br) and the "Digital Identity of the Federal Government" project – a set of guidelines and standards to be applied to portals as well as to social networks, applications and other digital environments.

In 2014, the Office of the Comptroller General - CGU (2014) launched the Transparency Portal which is intended to allow citizens to track how public money is being used. Another mechanism which allows for greater popular participation and social control of government actions since 2011 is the Access to Information Law (LAI), which granted society access to all information produced by the government not classified as confidential.

The Federal Data Processing Service – Serpro - is the largest public information technology service provider in Brazil. It was established in 1964 under the Ministry of Finance. Its market is indeed the public finances, primarily, the Ministry of Finance, but also works with the Ministry of Planning, Budget and Management, the Civil Office of the Presidency, Ministry of Justice, among others (SERPRO, 2014). The IT agency is responsible for the development of the majority of the structuring systems of the government, understood here as systems that are used by various agencies of the Federal Public Administration and that represent the foundation of government systems.

2.3 Strategic planning of the federal public administration and SERPRO

The Multi-annual Plan (PPA) of the federal government articulates and integrates the main public policies in order to achieve government's goals. In the 2008-2011 plan, a specific thematic program related to e-government was defined under the responsibility of the Ministry of Planning (MP). It was aimed at "coordinating, standardizing and streamlining information and computing resources, ensuring the agencies and entities of the Federal Public Administration had adequate support in ICT" (MP/SPIE, 2007).

In the 2012-2015 PPA – also called "*More Brazil Plan*" – this topic was addressed in another thematic program. These programs were organized under strategic objectives which, in turn, were detailed under goals and initiatives. The alignment of strategic plans to PPA's actions is seen as crucial for government agencies to achieve common objectives (MP/SPIE, 2011).

The MP/SLTI Strategic Planning 2011-2015 is aligned with PPA and the General Information Technology Strategy (EGTI). Their strategic objectives are direct and specifically linked to e-government strategies (MP/SLTI, 2013).

The General Information Technology Strategy (EGTI) is a tool of the Information Technology Resource Administration System (SISP) which defines guidelines to promote the continuous improvement of management and IT governance. Under SISP five versions of EGTI were published in the period of 2008 to 2014 (EGTI, 2008-2014).

During the analyzed period, Serpro produced three long-term strategic plans: 2008-2011, 2013-2016 and 2014-2022. The 2008-2011 plan defined direction in the following dimensions: customer and government; society; technology; people; management and organization.

For 2013-2016, seven strategic objectives were defined, established by the board of director and superintendents. However, in the course of this plan, Serpro developed in 2014 an eight-year strategic plan instead of the usual four-year one. For the 2014-2022 plan, Serpro adopted a new model and only one strategic objective: the institution of the *center for solution and information for the Brazilian government*, with a broader scope, divided into three dimensions (Government and Society, Economy, and Technology) and six strategic guidelines (SERPRO, 2014).

3. Methodology

This research has analyzed the strategic directions of the Brazilian e-Government Program from 2008 to 2014. This period corresponds to the second term of President Lula (2007-2010) and the first of President Dilma's government (2011-2014). The methodological procedures of this research can be grouped into four phases. In the first phase was done a research based on document analysis from the 2008, 2010, 2012 and 2014 United Nations e-Government Surveys (United Nations, 2008-2012). In the second phase, in order to analyze the government strategic planning (mainly from the Ministry of Planning and Serpro), a document research was done to identify strategic objectives, goals, indicators and actions. In the third phase, comparative spreadsheets were elaborated and analyzed to evaluate the guidelines of thirteen (13) selected strategic plans. In the fourth phase, semi-structured face-to-face interviews were conducted with fifteen (15) government strategic executives, nine (9) from Serpro (director, superintendents and strategic coordinators) and six (6) from the Ministry of Planning (executive secretaries, directors and ex-directors from SLTI) in order to evaluate the political context and strategic directions of the federal government from their perspectives. Eleven hours of interviews were done in Brasília, on May 2014.

After analyzing the content of all the interviews, a categorization process led us to the eight categories (Bardin, 2014) which were most often cited: strategic alignment; e-Government Program and IT governance; electronic services; interoperability and integration; standardization; structuring systems; open data and transparency; and social participation. They were identified as key topics by the interviewees. Subtopics were also frequently mentioned – associated to the main eight categories – and were also categorized. This scheme was elaborated in order to deepen the analysis related to the theme of the research.

The qualitative analysis results allowed us to understand the motivations and political context that were not explicit in the documents, besides identifying the influence of the United Nations Report on the government strategic guidelines.

Lastly, from the results obtained in the previous phases, we were able to reflect on the challenges to be overcome by the government to offer more services in the 'connected' level, where they are no longer centered on the government but become citizen-centric services, increasing interoperability between the various government agencies and citizen participation in government decisions.

4. Research results

The research results comprise five sections. First, the UN Report analysis. Second, the Brazilian e-government program evolution and the IT Governance. The last sections named the three e-governance categories: e-Services, e-Administration and e-Democracy.

4.1 United Nations e-government survey analysis

In the first phase of the research, the following elements were analyzed: the evolution of the e-participation index and online service index (OSI) and its influence on the composition of the e-government development index (EGDI) in Brazil, from the collection of secondary data extracted, primarily, from the e-Government Surveys published by the UN.

We can observe from Table 1 that in 2008 Brazil was ranked 45th in the global ranking; in 2010, the country had its worst performance, dropping to the 61st position. In 2012, it moved to the 59th position, and in 2014 went up two more positions, reaching the 57th position.

In the OSI index, Brazil occupied the 30th position in 2008, moving to the 55th in 2010. The country obtained a significant improvement in 2012, reaching the 22nd position. The e-participation index, in turn, presented the same behavior. In this index, Brazil reached the 23rd position in 2008, falling to 42nd position in 2010 and going up 11 positions, reaching the 31st place in the world ranking in 2012. In 2014, Brazil improved by 7 additional positions to 24th.

In the other two indexes that make up the EGDI, we can see from Table 1 that in the telecommunication infrastructure index (TII), Brazil occupied the 70th position in 2010 and dropped to the 77th position in 2012, while in the human capital index (HCI) Brazil went from 83rd to 78th position. Although Brazil has had a very good performance in the OSI index for 2012, in the EGDI index it went up by only two positions, from the 61st to the 59th. In the 2014 Survey, a new "wireless broadband subscription indicator" was included which made the Brazilian TII index increase from 0.3568 to 0.4668. On the other hand, two new components to the HCI index were introduced: "expected years of schooling" and "average years of schooling" that made the Brazilian HCI index descend from 0.8203 to 0.7372. Within these changes, the global EGDI index rose only two positions in this last report, and the OSI index has not kept up with the growth observed in 2012, although the e-participation index has improved considerably.

This demonstrates that Brazil needs to continue investing in online services, but also needs to invest much more in telecommunications infrastructure and human capital in order to leverage e-government. As seen in these two indexes, Brazil's performance in the world falls far short of what is desired.

According to the managers interviewed, the UN report is not used in the preparation of their Strategic Planning. Most respondents said that they were unaware of its content. According to them, the pressure on Brazil's position in the world ranking is not institutional, but an academic, political and social one. A Ministry of Planning executive stated that "Brazil has a good chance of improving the index in 2014 due to the e-gov initiatives released in September 2013, under the "Digital Office*" coordination".

Table 1: EGDI Index, its components and the Brazilian position on the world ranking

	2008	2010	2012	2014
e-Government Development Index (EGDI)	0,5679	0,5006	0,6167	0,6008
EGDI ranking	45ª	61ª	59ª	57ª
Online Service Index (OSI)	0,6020	0,3683	0,6732	0,5984
OSI ranking	30ª	55ª	22ª	----
e-Participation Index	0,4545	0,2857	0,5000	0,7059

	2008	2010	2012	2014
e-Participation ranking	23ª	42ª	31ª	24ª
Telecommunication Infrastructure Índex (TII)	0,2181	0,2538	0,3568	0,4668
TII ranking	----	70ª	77ª	----
Human Capital Index (HCI)	0,8825	0,8837	0,8203	0,7372
HCI ranking	----	83ª	78ª	----

Source: Extracted from the United Nations e-Government Survey 2008-2014 (United Nations, 2008-2014)

4.2 Electronic Government Program and IT governance

The "Brazilian Electronic Government Program" has undergone some changes over time. In the 2008 PPA, the government demonstrated its importance through the creation of the Electronic Government Program. In addition, the government created in 2012 the Improvement of Public Management Program, in order to implement and make available to society the "Brazilian Digital Agenda for Electronic Government"; SLTI also proposed as a strategic initiative an "Electronic Government Agenda" in 2011.

In 2008, in the document which defines the General Strategies for Information Technology (EGTI), SLTI was committed to establishing mechanisms that would reinforce actions of the National Electronic Government Plan. However, according to the MP respondents, the e-gov governance model, coordinated by CEGE and chaired by the Civil Office of the Presidency, was not sustainable because it was too centralized in high executives and there was little coordination among its members. Among the eight technical committees, the only one still active is the Free Software Committee. As the agencies tend to act vertically, a cross-agency e-government Program is very difficult to implement.

In 2010, IT in the federal government became strategic by attending the citizen directly and as a result of this guideline, actions were designed for the participation of IT in strategic planning of the Federal Government. In the following EGTI and in the 2011 SLTI document we see a greater concern from the Ministry of Planning in improving IT governance and strengthening the alignment between IT planning, the organization's strategies, strengthening SISP and the e-gov policy. According to one interviewee from the MP, when you know what the agencies need, it is possible to implement a public policy correctly, linked and monitored with the goals and strategies of the Strategic Planning of the Ministry of Planning along with the EGTI.

The majority of the executives interviewed pointed that the "*Gabinete Digital*" (Digital Office) of the Republic Presidency created after the popular demonstrations in June 2013, represented an important qualitative leap for the implementation of various e-government initiatives, like the Brazilian main portal, the services directory ("*Guia de Serviços*"), the government digital identity, open data and the environment of e-participation. Unfortunately, it lost its political importance only five months later, with the departure of the coordinator of the Civil Office of the Presidency and the transfer of the entire structure to SECOM.

According to some interviewees, in order for e-government initiatives to play a more strategic role in the Federal Public Administration it would be necessary to institutionalize a Digital Government Program with the power to make policies regarding the provision of e-services. Other suggestions include a greater investment in the Program and in training of managers, and improved governance and communication with the main ministries as well as developing cross-agency initiatives.

4.3 E-services

A significant concern for improving and expanding the supply of e-services to society was observed in three government strategic plans starting in 2011. In EGTI (2011), the objective was to "improve continuously the

delivery of electronic services to society". In the subsequent EGTI new elements were added. Thus in 2013 the EGTI´s goal turned into "improving continuously the delivery of electronic services and the *transparency of information* to society". In the EGTIC (2014) the intention becomes slightly different, turning into "improving the delivery of public services, the transparency of information and *social participation* through the effective use of ICT". This strategic goal is aligned with the broader concept of e-gov found in the literature and guidelines stipulated by the UN, not restricted to the provision of electronic services to citizens but also encouraging digital democracy by increasing transparency, democratic participation and accountability of governments.

According to interviewees from the MP, the decrease on the online services index (OSI) in 2010, mentioned previously, did not directly influence the inclusion of this strategic objective in the 2011 EGTI plan. However, the government's concern for improving the delivery of e-services led to a great increase in the Brazilian ranking of the OSI index in 2012.

This explicit concern for offering more e-services was observed in Serpro's 2014 strategic plan in its single strategic objective of establishing a *Center for Solution and Information for the Government*. Serpro also presented two strategic requirements: "provide mobile services for government and society with a focus on being the center of information" and to be "first entry point for government information and services (federal, state and municipal) for government, citizens and businesses". These guidelines directly meet the tendencies for e-gov published by the UN.

4.4 E-administration (interoperability and integration; standardization; structuring systems)

Since the 2008 EGTI the Ministry of Planning has addressed the need to integrate government information systems and to promote the use of standard e-PING for interoperability. The 2011 SLTI document listed the strategic initiative of "strengthening the interoperability of structuring systems of the federal government" (MP/SLTI, 2013).

According to one interviewee from Serpro there is a constant concern at the Ministry of Planning with the interoperability of structuring systems, but it is not very effective. For a more agile and transparent integration it would be necessary to have a *government service integration platform*. This concern is shared by one respondent from MP who said that "we are getting to a level where information already exists but it is not organized ... what we need is to integrate services, generating an environment where people should use the logic of *Portal Brasil*, which is the integration itself".

Although Serpro has had a strong participation on the development of e-PING, the adoption of standards was not explicitly written in the strategic plans of this period and many systems and portals developed didn't follow what were intended to be mandatory standards.

Only in the last Serpro's plan, the concern for improving the structuring systems by modernizing its architecture to facilitate the interoperability could be explicitly observed. The majority of the MP managers agreed that this guideline is a high priority and that the structuring systems should have a cross-agency collaboration.

4.5 E-democracy (open data and transparency; e-participation)

The issue of open data could be seen in the government *agenda* in 2011, in several plans, with the strategic objectives of "implementing the National Infrastructure Open Data (INDA)" and "encouraging states and municipalities to participate in the INDA". The 2014 EGTIC adds the need to "map out active transparency opportunities by opening up the data from the Federal Public Administration".

According to interviewees from the Ministry of Planning, there is a very intense collaboration with the "General Comptroller's Office" (CGU), because much of the Transparency Portal extract data from the structuring information systems provided by the MP. The Ministry also has a very strong presence when it comes to the Open Government Partnership; there is a commitment to encourage states and municipalities to promote the use of open data. However, it was mentioned that it hasn't been easy to meet the OGP goals, because of the difficulty in opening the data in some structuring systems.

Serpro presented two strategic requirements related to open data in its 2014 strategic plan. One respondent from Serpro reports that "from the moment that the Internal Revenue System opens data for the taxpayer, it increases the level of responsibility of the agency, but, in return, it is more transparent and friendlier to taxpayers in general".

The theme "Social Participation" could be observed on the agenda since the 2012 PPA with the strategic objective of "increasing dialogue, transparency and social participation in Public Administration, in order to promote greater interaction between state and society". The goals concerning the creation of new forms, languages and instruments of social participation, as well as the creation of a proposal for a National Social Participation System were set out. This guideline can also be observed in the 2014 EGTIC with the strategic action to "encourage the use of *participa.br* virtual environment for e-participation".

From the beginning, President Dilma's government has shown interest in encouraging greater citizen participation. The MP interviews reinforced the view that the e-participation theme was already in vogue, but gained political importance from the 2013 popular demonstrations, speeding up the launch of the virtual environment *participa.br*. There is a great partnership between the MP and the General Secretariat in this initiative. It is no longer necessary that each agency has its own site with its policy of social participation as *participa.br* will spearhead these policies.

5. Conclusion

The evolution of Brazil in the UN e-Government Survey can be observed through the e-government development index (EGDI) and online services index (OSI). In 2010, both the OSI and the EGDI indexes had a sharp drop, but in 2012 Brazil's position in the global ranking with respect to the OSI index rose 33 positions while the EGDI moved only 2 positions. In the e-participation index, Brazil dropped 19 places in 2010, but rose eleven ranks in 2012 and seven more positions in 2014. By the 2014 Report, Brazil had not yet recovered its 45th place in EGDI achieved in 2008.

Research has shown that the UN E-Government Survey is little used by the Brazilian federal government as a reference for the development of public policies of e-gov. However, the concern to increase the supply of electronic public services, observed in government strategic planning since 2011, resulted in a great improvement in the Brazilian e-services world ranking. Nevertheless, the global EGDI index has advanced very slowly, mainly because the telecommunications infrastructure and human capital indexes that compose EGDI, score very low.

We observed a major concern with the adoption of interoperability standards. Although they are theoretically mandatory many systems do not follow the recommended standards. The same happens with the standard for the construction of e-government portals.

Government strategies in the 2011-2013 period have shown significant concern with the promotion of greater interaction between government and society, stimulating mechanisms that generate more public transparency by encouraging the use of open data by states and municipalities and providing access to information produced by the government. The expansion of social participation had already been a government strategic direction since 2012, but gained political strength from the influence of social movements. It was found in this study that IT and e-government public policies are closely related. It can be concluded that the Ministry of Planning is responsible for the direction of IT policies and Serpro for giving support to the government in such policies. From the survey results it was observed that the government needs to act more across-the-board, with cross-agency collaboration.

Currently, innovation plays a central role within governmental strategies. Despite the existence of some innovative solutions in government, a culture of innovation has not yet been institutionalized in the agencies of the Brazilian federal government. It is not enough to develop mobile applications, but innovating through the modernization of the government structuring systems – facilitating interoperability and openness of its data – seems to be the most significant strategic action required.

This research is intended to support the improvement of public policy on e-government in Brazil, and as a consequence, advance it in the world ranking of the UN e-Government Survey.

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Cybersecurity Challenges to American State and Local Governments

Donald Norris, Anupam Joshi and Timothy Finin
University of Maryland, Baltimore County, Baltimore, Maryland, USA
norris@umbc.edu
joshi@umbc.edu
finin@umbc.edu

Abstract: In this paper, we examine cybersecurity challenges to American state and local governments. In particular, we address the extent and magnitude of cyberattacks against these governments, the problems these governments face in preventing attacks from being successful, the barriers internal to their organizations that make cybersecurity difficult to achieve, and actions that they believe should be taken to improve cybersecurity practice. Our research method consisted of a focus group of information technology (IT) and cybersecurity (CS) officials from one American state. Among other things we found that cyberattacks, mostly in the form of malicious emails, are constant, 24/7/365, and can number in the tens of thousands per day (at least among state government and larger local governments). The participants in our focus group noted that while they weren't perfect at it, they felt that for the most part they had the technical side of cybersecurity under good control. These governments' biggest cyber challenge is human error; that is, end users who (mostly by mistake and without malice) open an attachment or click on a link in a phishing email that then allows an attacker into the government's IT system. We also found that the probability of a successful phishing cyberattack is relatively high. These governments face several barriers when attempting to prevent cyberattacks and when endeavoring to mitigate successful ones, including: insufficient funding and staffing; problems of governance (namely, lack of control over all actors within a governmental unit due mainly to the federated nature of government); and insufficient or under-enforced cybersecurity policies. Our participants also noted that there are several common sense ways that state and local governments can improve cybersecurity. Among others, these include: frequent vulnerability assessment, continual scanning and testing, securing cybersecurity insurance, improving end user authentication and authorization, end user training and control, control over the use of external devices (flash drives, etc.), improved governance methods, sharing information about cyberattacks and cybersecurity policies and practices among governments, and, finally, creating a culture for cybersecurity in governmental organizations. Areas for further research into state and local government cybersecurity include: the types of cyberattacks that state and local governments typically face; the types of actions that these governments should take to prevent the attacks from being successful and to mitigate the results of successful attacks; gaps between these governments' need to prevent and mitigate cyberattacks and their ability to do so, including barriers to effective state and local government cybersecurity and best cybersecurity practices; and recommendations for improving state and local government cybersecurity.

Keywords: cybersecurity, cyberattack, local government, state government

1. Cybersecurity challenges to American State and local governments

The issue that we examine in this paper is that of cybersecurity at the state and local government level in the United States. This is an increasingly important issue for at least the following reasons. First, there are 50 state governments in the U. S., and according to the U S. Census Bureau (2014), there are more than 90,000 units of local government in United States, including nearly 39,000 general purpose governments (of which 3,031 are county governments, 19,519 are municipal governments and 16,360 are town or township governments. Nearly all of these governments have critical information technology (IT) systems and cumulatively spend billions of dollars each year to support them. Second, these IT systems are vulnerable to cyberattack and, indeed, many, especially those in state governments and larger local governments, are under constant attack, experiencing in the order of 10,000 attacks per day or more (Focus Group, 2013). Third, the IT systems in these governments, especially the larger ones, contain large stores of personally identifiable information or PII as well as other sensitive information and, of course, access to governmental funds.[1]

Fourth, in 2014 alone, cyber criminals succeed in penetrating the websites and roaming around in the IT systems of large private sector organizations in the U. S. like Home Depot, Target, JPMorgan Chase, AT&T, Yahoo, E-Bay, Google, Anthem and numerous others. In addition, public sector organizations like the U. S. Central Command, the U. S. Postal Service, the White House, the National Oceanic and Atmospheric Administration and the University of Maryland, College Park also suffered successful cyberattacks. In some cases, millions of individuals were affected as elements of their PII (name, address, drivers' license number, credit card numbers, social

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[1] Today, cyber criminals seek PII perhaps more than any other single item in order to impersonate individuals whose identities have been stolen and then to use those stolen identities to steal money and goods

security numbers, health information and the like) were stolen. Even worse – undercover police officer information, jail information. Moreover, the number of cyberattacks grows annually.

Fifth, cyberattacks have moved from being a nuisance to something very serious and are deployed by only by state actors, but also by sophisticated transnational, non-state actors such as terrorists and financial criminals. Finally, cybercrime is very costly to the U. S and world economies. McAfee (2014) estimated that cybercrime costs the world economy more than $400 billion annually, and the cost of cybercrime continues to increase.

The World Wide Web presents one of the most commonly used vectors for attacks. This attack vector can be divided into two major components. One is the fact that many companies and governmental organizations set up web sites to provide information and services online. In some cases, especially for government, this information is legislatively mandated. For governments also, web presence is tied to e-governance -- providing citizens with online access to information, government services, and interaction with government personnel. Such web sites, which will typically have data driven backends (hard drives, servers, and the like that contain the organization's data) and forms to accept input, can be attacked using a variety of "injection" attacks, where cyber criminals attempt to place malware or malformed input into a backend to cause it to run specific code. A good example of this is SQL injection attacks, where the database of the government that contains its information is attacked.[2]

The second major attack vector component is the use of Internet enabled technologies, especially social media, email and mobile apps. To attack specific targets, "spearphishing" is increasingly used. Publicly available information (from websites, social media sites like Facebook, and even public records) is gathered to build the profile of a person, and then email messages are crafted that are very specific (for example, from a person's college friend talking about a proposed reunion and providing a link). These tempt a person to click on that link, which in turn installs malware on their computer.

For these reasons, it is important to understand the cyber threats that state and local governments face, their current efforts to both protect their IT systems from attack and to mitigate after a successful attack and the barriers they face in mounting these efforts. This understanding will allow us to make recommendations for improved local government cybersecurity.

2. Method

In order to begin to address the issue of cybersecurity among American state and local governments, we conducted a focus group in late 2013 that included information technology (IT) and cybersecurity (CS) professionals from the state government and several local governments in our home state of Maryland. These included the Chief Information Officer (CIO) of the state of Maryland (pop. 5.8 million), who had also been the state's Chief Security Officer(CSO) and the CIO or the CSO of the City of Baltimore (pop. 631,200), and the Maryland Counties of Baltimore (pop. 806,100), Howard (pop. 288,500), Montgomery (pop. 975,600), and Prince George's (pop. 865,600). Thus, we had access to IT and cybersecurity professionals who literally are on the front line of fighting cybercrime in one American state. As we will show throughout this paper, their knowledge, expertise and experience were incredibly valuable to our research.

Four of the local jurisdictions represent the greatest concentration of population in the state, and two of them (Howard and Montgomery Counties) are the wealthiest in the state and among the wealthiest in the nation. This is important to note because research over at least the past four decades on information technology in local government has revealed that adoption of information technology, especially innovative technology, is related to local government size and resources (Norris and Reddick, 2013; Coursey and Norris, 2008; and Norris and Kraemer, 1996). Although the sample of governments in our focus group is too small and unrepresentative for us to be able to generalize from it, the findings are nevertheless heuristically valuable and have formed the basis for further cybersecurity research that we are currently conducting. In the following pages we discuss the most important findings from this focus group meeting.

3. Findings

We asked the participants a number of questions, beginning with the extent and magnitude of cyberattacks that they experienced, and also included questions about the problems they face in preventing attacks from being

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[2] SQL stands for Structured Query Language and is the standard language for managing relational database systems (Wikipedia, 2015).

successful, the barriers internal to their organizations that make cybersecurity challenging, and actions that they believe should be taken to improve cybersecurity practice at the state and local level.

4. Attacks

We asked the focus group participant show frequently their sites were attacked. In response, they asked us what we meant by attack. There ensued a discussion among the group and the researchers that led to a consensus that today most attacks are made against a government's public facing website or via email; most attacks involve social engineering and phishing rather than direct attacks on firewalls; and attacks number in the tens to hundreds of thousands or more every day.[3] This is a 24/7/365 event. However, as one participant noted, "…but, you know what? We've come to the point where we don't characterize those events as attacks. They're routine."

We asked the participants if the technical side of cybersecurity was especially problematical for them. They said that, while they weren't perfect at it, they felt that for the most part they had the technical side of cybersecurity under pretty good control. As one participant said: "We know that we block a huge amount. We know that some of the things we block, our users want to have come through and some of the things that we would like to block come through anyway." Another participant estimated that in his county, about 40 percent of emails were blocked. And this means that "…you're in the hundreds of thousands if not near a million a month that we're just blocking and [are] not even making it to the end user."Recent studies (Securelist, 2014) estimate than over 65 percent of all email is spam. While much of it is merely unwanted advertising, a significant fraction is sent as an attempt to get the recipient to open or download a malicious attachment or to be enticed to provide valuable personal information such as account information.

The participants unanimously agreed that the end user is the principal problemthey face in being able to maintain a high level of cybersecurity. One participant said: "And our biggest struggle now is…the human being, our weakest link." The crux of the matter is that inevitably, a member of their organization will download an attachment or click on a link sent in an email phishing attack and that allows an attacker into the local or state government's IT system. This happens mainly as a result of human error – the end user should have known better than to click on the link, but clicked anyway. Participants also noted that the phishing attacks are getting more sophisticated and less easy to readily identify as such. They also reported that malice occasionally occurs among end users, for example, in which one end user would attack another end useron the system or an end user would engage in fraudulent activity within the city or county government's IT system.

In one case reported by a participant, two government employees out of 10,000 inadvertently opened a malicious URL. And, as this participant noted, while two out of 10,000 is statistically impressive, the damage was nonetheless done as the attacker got into the system. According to Verizon's2013 Data Breach Investigations Report, the likelihood of a phishing attack succeeding is quite high.[4] Here, the report asked how many email messages would it take to get a single user to click on a malicious attachment.

> *It's pretty easy to see why [phishing]…is a favored attack…and the answer to our question is "three." Running a campaign with just three e-mails gives the attacker a better than 50% chance of getting at least one click. Run that campaign twice and that probability goes up to 80%, and sending 10 phishing e-mails approaches the point where most attackers would be able to slap a "guaranteed" sticker on getting a click. To add some urgency to this, about half of the clicks occur within 12 hours of the phishing e-mail being sent (p. 38).*

We also asked who the perpetrators of the attacks were and the participants told us that attacks come from across the globe. However, as the 2013 Verizon report found, most attacks come from within a relatively few nations, with China (30 percent), Romania (28 percent), the U.S. (18 percent), Bulgaria (seven percent) and Russia (five percent) totaling 88 percent of identified attacks.

Next, the participants noted that most of the attacks are automated. "These people are literally setting up complex systems and letting it just hit global to see what they can get." Additionally, they agreed that the attackers mostly were criminals rather than, for example, young people breaking into systems for sport, political

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[3]Phishing is use of email in which the attacker, posing as a trusted source – someone the victim knows personally, attempts to gather PII and other sensitive information. The attacker's phony email will contain a link that the attacker wants the intended victim to open, thus allowing malware to enter the victim's computer and harvest information.
[4]http://www.verizonenterprise.com/resources/reports/rp_data-breach-investigations-report-2013_en_xg.pdf

activists or terrorists. One participant put it this way: "The perpetrators are looking for opportunity…Primarily it's financial opportunity. These people are thieves." The participants said that the attackers want PII in order to impersonate their victims for financial gain. One participant agreed, saying: "So, yeah, there's a lot are other causes for it, or there is lots of other motivations. There is espionage, there is notoriety, there is revenge, but money is on the top of the list and it is the lion's share of why this occurs."

Participants noted that other risks from cyberattacks, including three of particular concern. First, there is a risk of having an agency's computers compromised and subsequently used as part of a botnet controlled by the attackers, which can then be used to launch attacks on other computers.[5] A second risk mentioned was that a compromised computer or account in one agency can be used to try to gain access to a related agency that may have valuable information or control important assets. For example, a compromised computer in a county parks department might be used to launch an attack on a state database and from there try to gain access to a federal computer system. Fourth, some local and state agencies are responsible for maintaining critical cyber-physical infrastructure systems such as traffic and water utilities. Attackers who gain access to these could potentially do a great deal of harm.

5. Barriers

We next asked about the barriers that state and local governments face in the area of cybersecurity. The major barriersthat they reported included:

- insufficient funding and staff
- governance and federation (executive, legislative and judicial branches and divisions within the executive)
- insufficient or under-enforced cybersecuritypolicies

Funding and Staffing: Insufficient funding and staffing are closely related. Without adequate funding it is difficult for state and local governments (or any organization) to provide the needed level of cybersecurity protection and to hire and retain qualified IT and CS staff. Lack of funding and staff are also among the top barriers reported in surveys of IT and e-government among U. S. local governments since the 1990s (Norris and Reddick, 2013; Coursey and Norris, 2008; and Norris and Kraemer, 1996).

One participant noted that the IT budget in his county equaled

> "…less than two percent of the overall budget. Less than two percent. Yet 100 percent of the people in [the county] are using IT. So, you know, you're right, you know, we don't have the resources, we don't have the manpower. [We]… try and use our money the best way we can and…you're right, sometimes things can be solved with money.

Insufficient funding has increasingly led local governments to investigate alternative ways of handing cybersecurity, including outsourcing. One county represented on this focus group reported that its programs and data were already 90 percent running on cloud computing infrastructure. This transfers much of the responsibility of securing the data and services to the cloud service providers for whom it is a central part of their business. Others noted that they are beginning to view cybersecurity as a commodity or a service that they purchase on the market. One of the advantages of this, in addition to potential cost savings, as one participant put it, is: "Google has 2,000 security engineers…I've got four."

On somewhat of a discouraging or pessimistic note, the participants agreed, however, that even with greater funding and more staff, their systems will continue to be attacked and will probably, eventually, be a victim of a successful attack. Therefore, there is a need not only to continually harden the IT infrastructure, but also to have in place a recovery plan in the event of a successful attack. This is so because, in case the systems go down, there is the need for continuity in government.

While this is certainly true, a different participant cautioned that overdoing recovery plans might not be such a good idea after all. He put it this way: "So but what would happen to us if our system went down. I mean the

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[5]A botnet is a collection of computers connected to the Internet that have been infected with malicious software that allows them to be controlled remotely. Botnet can be exploited without the knowledge of their computer's owners for many illegal purposes including sending spam email, engaging in click fraud, launching distributed denial of services attacks, bitcoin mining or stealing private information (Stone-Gross, et al., 2009). The U. S. Federal Bureau of Investigation (FBI) estimated that the GameOver Zeus botnet comprised over one million computers in 2014 (FBI, 2014).

world is not going to end. We are not Amazon. We're not Google…That [the IT system] is not the crux of our business." The business of local government, to which he was referring is service delivery, most of which would continue in spite of a loss of IT services. Moreover, several participants said that they were not terribly worried about having their information exfiltrated since most of it is public data.[6]

Governance: One of, if not the main, reason for the governance problem with respect to cybersecurity is that state and local governments are federated among executive, legislative and judicial branches. The IT department (ITD) or function is typically located in the executive branch but it has no authority over the legislative and judicial branches, which are constitutionally and legally separate in the American system of government.[7] As one participant put it: "I've got responsibility over all three branches of government. However, I can't legally enforce policy, due to the pesky constitution, over the legislative and judicial branches. But I am responsible for their security."

A second important governance issue is that, even within the executive branch, there are often departments or units that have "special protection" and remain outside of the purview of the ITD. Police departments and other units were mentioned as entities that were the "favorites" of elected executives and, therefore, were granted special dispensation from oversight by the ITD and its cybersecurity policies and regulations.

A third governance issue is differences among departments within the executive branch. One participant put it this way:

> "And well, even within the executive branch we've got 35 different departments, each with varying levels of risk tolerance. So being able to enforce a policy on department X versus department Y is vastly different depending upon what their leadership thinks is important to them. And what their mission is. Recreation feels like they have to provide services for ball fields and for swimming pools, etc., etc., that's what their mission is but then…you start thinking about the millions of dollars that they get in credit card transactions every year and that then becomes a big potential security risk."

A fourth governance issue, noted by another participant, is that at least in some governments there are multiple networks to manage. In this participant's government, "… there are eleven, I stopped counting at eleven, different data networks, eleven different data networks. Over the years, well-meaning people patched weird connections to them that we may or may not understand and we're trying to untangle that…"

Policy: Many cybersecurity vulnerabilities originate with the risky behavior of an users, such as choosing insecure passwords, failing to keep their computer's software updated, downloading attachments from unknown email correspondents and publishing personal information online. Organizations combat these problems by training their workforce on cybersecurity best practices, defining security policies and implementing procedures to enforce them. As one participant put it: "There has to be someone in charge [and]…there has to be policy…the rules of the road." Unfortunately, not all state and local governments or units within them have appropriate cybersecurity policies and not all implement the policies that they have well. A common example is not enforcing rules that require users to get cybersecurity training. "Well, as far as security awareness is concerned, our struggle it getting it to be mandatory." Another participant, however, noted that in his county, "The county executive backed it up. People had to come to training centers." The take away here is that governments need rigorous cybersecurity policies, especially around user training and the dos and don'ts of user behavior and those policies need to be stringently implemented and enforced.

6. Actions to improve cybersecurity

Finally, the participants listed a number of actions that they believed should be taken to improve state and local government cybersecurity, including:

- Assess vulnerabilities–We asked whether these governments did, in fact, formally and continually assess their cybersecurity vulnerabilities and the response was that most did so, but only on an on ad hoc basis, and conducted more of an audit than a formal assessment.

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[6]In cybersecurity contexts, exfiltration is the unauthorized release of data from within a computer system, typically done by malicious software that has been installed on the system.

[7]In certain types of county governments and in council-manager forms of municipal government. The executive and legislative functions are combined. However, the judicial branch of government remains separate.

- Consider cybersecurity insurance – Cybersecurity insurance is intended to mitigate losses from cybersecurity incidents such as data breaches, business interruption and network damage (DHS, 2014). One participant noted that local governments across the nation are beginning to buy such insurance and commented that, at least as of the date of the focus group meeting, this insurance was relatively inexpensive. Acquiring such insurance also affords a local government the opportunity to conduct a formal risk assessment, because doing is part of the insurance application process for these programs.

- Two factor authentication and authorization -- This is also a policy issue and would require all users to have to enter two separate factors in order to sign on to the IT system, say a password and a pin. Some participants strongly supported "two factor auth" (as it is often called), but other noted that it was expensive and intrusive on users who don't like it.

- User training and control– See above discussion about the end user problem.

- Control over external devices – Users inadvertently upload dangerous files to the governmental unit's IT system through personal flash drives, tablets, smart phones and the use of Dropbox. Policy lags behind the use of these devices and needs to catch up.

- Overcome the governance/federation problem – Here policy and practice need to address the separation of powers and provide appropriate authority to IT and CS officials to enable them to exercise control over all IT assets for which they are responsible.

- Create a culture for cybersecurity – This would be a culture in which all parties, especially end users, but also elected officials, understand the need for excellent cybersecurity, are trained in it, practice it, and are held accountable. As one participant noted, it is about being aggressive, not passive, toward cybersecurity.

- Continually scan and test– This was really the only technical recommendation made by the participants and it means to be constantly aware of cyber threats, to scan for them continually, to scan for vulnerabilities and to test the capabilities of the system to prevent and recover from cyberattacks.

- Share information among organizations – Here participants noted that there is a lot of information about cybersecurity, especially information about threats and best practices. Indeed, there is so much information, one participant noted, that the sheer amount could be overwhelming. Therefore, he suggested the creation of a clearinghouse would be able to collect information, triage it and would know how to and to whom to circulate it.

7. Conclusion and future research

The results of this focus group with expert state and local government IT and cybersecurity practitioners in one American state found that the computer systems of their governments are under constant cyberattack and that attacks range in the tens of thousands or more per day. Indeed, cyberattacks are now so common that they viewed by these practitioners as "routine." We also found that at least some cyberattacks will inevitably be successful, if only because of the sheer number of attacks and the high mathematical probability of their success.

A particularly important finding of this research is that it is not the technology side of the cybersecurity equation that is most problematic for state and local governments. Instead it is the human element – people are the weakest link.[8] By this, the participants meant that either because of carelessness, lack of training, lack of attention to training or (rarely) malice, some government workers will inevitably take actions that will compromise cybersecurity. The most common among them is to open a dangerous URL or file attachment.

Barriers to more effective cybersecurity among these governments included principally money, staff, governance and policy. There is insufficient funding for cybersecurity and for sufficient cybersecurity staff among the governments represented. Hence, they find it difficult to provide the levels of cybersecurity that this challenge demands. Governance is an issue because of the federated nature of state and local government where one unit within a government may have responsibility for cybersecurity but not the commensurate authority to mandate cybersecurity. Additional governance concerns included departments with special

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[8]Two of the authors of this paper (and leaders of the focus group) are computer scientists and the third is a political scientist. All three of us entered into preparation for the focus group meeting with the assumption that the principal cybersecurity problem would turn out to be the technology (hardware and software). The computer scientists can be forgiven this assumption. This is the world in which they live. The political scientist cannot be forgiven for this assumption, however, because his own research and a great deal of social science research into IT and government, have shown the critical role that "orgware" (the people and processes within organizations) play in IT use, success or failure. So, the best he can do is to apologize for this lapse and promise to remember it in future research.

protection, varying levels of risk tolerance and large numbers of networks to be managed. Finally, policy is a challenge because many governments wither have poorly developed policies or are unable to implement the policies that they have, including policies mandating end user training and policies preventing untrained users from accessing IT assets.

Last, the participants identified nine different recommendations to improve cybersecurity at the state and local government level. Since we discussed these in the previous section, we will not repeat them here. However, we will note that all but two of the recommendations (assess vulnerabilities and continually scan and test) were directed toward the orgware versus the technology side of cybersecurity.[9]

As we noted earlier, because this focus group was conducted among a few IT and cybersecurity officials (albeit expert practitioners) in a single American state, our findings cannot be generalized. However, based on comments made by the participants, we suspect that these findings will resonate with state and local IT and cybersecurity officials around the nation if not also around the world. These findings also suggest the need for further and more in-depth research into state and local government cybersecurity, which based on our review of the literature, is currently not the subject of many systematic studies. Further, such research should be directed to at least the following areas:

- The types of cyberattacks that state and local governments typically face and, thus, the types of actions that these governments should take to prevent the attacks from being successful and to mitigate the results of successful attacks;

- Gaps between these governments' need to prevent and mitigate cyberattacks and their ability to do so, including barriers to effective state and local government cybersecurity and best cybersecurity practices; and

- Recommendations for improving state and local government cybersecurity.

Such research could be undertaken using several different methods, including surveys, case studies, additional focus groups, and the quantitative analysis of large sets of state and local cybersecurity data, if and when such data sets may become available. We urge researchers, however, not to worry a great deal about methods at this point, but to get with the task of conducting state and local government cybersecurity research that is theoretically sound and of practical use to state and local governments.

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[9] Orgware consists of the people and processes in an organization that interact with the technology (the hardware and software).

E-government, e-Governance and e-Administration: A Typology of Corruption Management Using ICTs

Emmanuel Okewu[1] and Jonathan Okewu[2]
[1]Centre for Information Technology and Systems, University of Lagos, Lagos, Nigeria
[2]Department of Visual and Creative Arts, Federal University Lafia, Nassarawa State, Nigeria
okewue@yahoo.com
jonathan.okewu@gmail.com

Abstract: There are growing concerns among development experts and researchers about Africa's transition from agrarian economy to industrial economy. They argue that the continent's ambition of being the new economic frontier and preferred destination for foreign direct investment is being threatened by faulty leadership predicated on corruption. In any case, this corruption postulation needs to be grounded in scientific evidence and data. What is clear in the literature is that investors, foreign or local, are not likely to play in an atmosphere of uncertainty. Among other variables, a stable democratic setting is a sine qua non for investment inflows. Apparently, democracy remains the best form of government as it guarantees inclusivity of the leaders and the led in the governance process. In recent memory, Information and Communication Technologies (ICTs) have been reshaping political development and democratization globally. And Africa has its slice of the pie. ICTs as a knowledge tool empowers the led with information about governance procedures for them to in turn hold their leaders accountable for actions and inactions with a view to reducing corruption-induced social tensions. Focusing on Nigeria as case study, this paper measures corruption using statistical model and discusses e-government, e-governance and e-Administration as a typology of managing corruption using ICTs. The expected research outcome is an information system blueprint for a democratic structure that promotes developmental politics and attracts foreign direct investments. This way, Africa's dream of being the next preferred global investment destination will scale up to reality.

Keywords: corruption, democracy, e-administration, e-government, e-governance, ICTs

1. Introduction

Little did Africa's founding fathers know that years down the line the continent would be gasping for breadth for socio-economic development and growth, giving its abundant natural and human resources. Their optimism of a great Africa and a future economic frontier began to fade soon after many countries gained independence in the 1960s - corruption fuelled by poor leadership had contributed to this downward spiral. Studies have shown that corruption thrived mainly because transparency and accountability were lacking in governance - lack of participatory social accountability. Leaders were more egocentric than people-centric. And in this scenario, state resources were plundered for vested interest leaving sour legacies of poor infrastructure, weak institutions, and low-skilled human capital. Clearly, such a business landscape is unattractive to investors let alone becoming a global economic frontier. To realise the dreams of the founding fathers, the need to put systems in place for managing corruption in Africa cannot be overemphasized. On our part, we proposed an e-Democracy system that implements a transparency process in Africa's democracies. We provided a typology of technology-based corruption management which promotes government of the people (e-Government), government by the people (e-Governance) and government for the people (e-Administration). Though there are many aspects of ICTs application in socio-political development, the scope of discussion in this paper is limited to the design and development of the e-Government, e-Governance and e-Administration components of the e-Democracy System.

As expected, countries within the continent share a lot in common in terms of identity, culture, custom and history, but still have their peculiarities. Equally, there are similarities and peculiarities across governments ministries, departments and agencies (MDAs) coupled with complex administrative and operational bureaucracies. This scenario suggests that a reuse-based approach to modelling and developing software that will be relevant to several countries and MDAs would yield considerable benefits. Component-based software engineering (CBSE) is a reuse-based model of developing software where certain recurring requirements are individually abstracted, and implemented or sourced as standalone components. The application of CBSE for developing the e-Democracy systems is promising because of the following reasons (Pressman, 2009; Debayan, 2011; Sommerville, 2011; Crnkovic and Larsson, 2003):

- The complexity of e-Democracy software system requires an approach that simplifies the process of development.

- Using components from tested and trusted vendors promotes trust and confidence of end-users in the system.

- The fact that we do not have to build from scratch but reuse existing reliable components implies that software can be built more quickly.

This paper reports a study of the use of CBSE for developing an e-Democracy system for the political domain in Nigeria. It empirically investigates the claims of endemic corruption in Africa that some authors have alluded to in the literature (Bamidele, 2013; Tom and Attai, 2014; Raymond, 2008). We observed that not many reports on empirical application of e-Government in Africa have been found in the literature. Some e-Government researchers and practitioners argue that the e-Government research community is in need of more industrial experiences and empirical studies. In addition, the calls for papers of the foremost International conferences in the area of e-Government such as the *European Conference on e-Government (ECEG)* have in recent memory, stressed the need for more case studies in e-Government. Thus, as a contribution, this work seeks to enrich the universal knowledge space of e-Government, by reporting on a unique industrial experience of e-Government from Nigeria. This is particularly significant because rarely does one come across reports of empirical studies of application of technically sophisticated software engineering concepts such as CBSE in the development of an e-Government system that originates from the African region. The remaining segment of this paper comprises the following: section 2 gives the background of study and related work; section 3 presents the methodology and the selected case study; section 4 focuses on results and discussions; and finally, the paper is concluded in section 5.

2. Background and related work

2.1 The e-democracy system

Africans seemed to have resigned to fate that corruption is a way of life. The masses are at the margins of the African political story whose lives are affected by the decision of those who are much more powerful than them - their leaders. Once revered for its vast natural resources, there is now a growing understanding that Africa's wealth lies in its people. Paradoxically, the people who are supposed to be collective source of wealth are impoverished mentally and economically as a result of endemic corruption in the political sphere. At a time when technology is permeating all facets of humanity, this study investigates the application of technology to institutionalising transparency and accountability in the democratic process for optimal utilization of scarce resources for the wellness of the electorate. Using component-based software engineering (CBSE) reputed for scalability, reusability and adaptability, we built an e-Democracy System with key components such as e-Government, e-Governance and e-Administration in line with the traditional definition of democracy: government of the people, by the people and for the people. e-Government promotes government of the people by ensuring that information on public policies, programmes, projects and services from government Ministries, Departments and Agencies (MDAs) is readily made available to the masses online real-time. The interactive e-Democracy system equally ensures that the people can voice their concerns for or against government proposals. e-Governance strengthens government by the people by empowering citizens to make proposals online real-time on public policies, programmes, projects and services and forwarding same to concerned government MDAs for consideration. In e-Administration, government for the people is galvanised by ensuring that information on social services (education, health, etc) rendered by the government in line with electoral promises and social contract is adequately communicated to the electorate for them to verify the authenticity of service offerings and report back.

2.2 Corruption incidence and measurement in Africa

In order to manage corruption successfully in Africa, there is need to understand its depth and breadth. The menace is real and of monumental threat to the socio-political and socio-economic development of the continent. Against the backdrop that measuring corruption will enable us to manage it more effectively and efficiently, we measured corruption incidence in Africa for a period of 3 years (2012 - 2014) relying on data from the global corruption perception index by the global corruption watchdog, Transparency International. Our findings indicate that Africa is the poster child for corruption and poor governance. Of the 175 countries measured for the 3-year period, data clearly indicates that vast majority of African countries were at the bottom of the table, a segment classified as highly corrupt. To corroborate these statistics and global perspective with

ground-level perspective, virtually all institutions in Africa ranging from legislature to judiciary are under the yoke of corruption and mismanagement of public resources. A case in point: despite the pervasive poverty in African countries like Nigeria and Kenya, the cost of governance is high. In a comparative study, Tom and Attai (2014) provided statistical evidence (Table 1) comparing the emoluments of legislators and their minimum wages in six countries, Nigeria and Kenya inclusive.

Table 1: Comparison of legislators' pay in six countries

Country	Legislators' pay monthly	Legislators' pay annually	Minimum wage monthly	Minimum wage annually	% of legislators' pay that is minimum wage
Nigeria	Senate N15.2m Reps N10.6m ($69,533)	Senate N182m Reps N127m ($834,402)	N18,000 ($118.15)	N234,000 ($1,536) inclusive of 13th month salary	0.13% 0.18%
India	N305,058 ($1,999)	N3.7m ($23,988)	Varies from state to state, sector to sector	-	-
US	N2.2m ($14,500)	N26.5m ($174,000)	N191,667 ($1,257)	N2.3m ($15,080)	8.6%
UK	N1.3m ($8,686)	N15.9m ($104,228)	N283,333 ($1,883)	N3.4m ($22,597)	21.68%
Sweden	N1.2m	N14.1m	Set by annual collective bargaining deal	-	-
France	N1.02m ($6,754)	N12.3m ($81,951)	N275,433 ($1,805)	N3.3m ($21,664)	26.73%
Kenya	N2.2m ($14,543)	N26.7m ($175,000)	N10,534 ($6,917)	N126,413 ($830)	0.4%

It is alarming, if the excerpt above is anything to go by, that politicians in Africa (Nigeria and Kenya) compared to their counterparts in developed societies have positioned themselves to get stinkingly rich while the masses get impoverished by poverty. It is instructive to note that only 0.47% and 0.13% (0.18%) of legislators' pay constitute minimum wage in Kenya and Nigeria respectively. Since these pay structures don't reflect the economic realities of these countries, it is safe to say that politics in Africa favour political officials to the detriment of the masses. Little wonder then that would-be political office holders would do anything, including corrupt practices, to secure position at all cost. To substantiate the sentiment in some quarters that corruption has assumed the status of a culture in Africa, both the highly and lowly placed citizens engage in the practice with impunity. Overtime, the weakening of institutions has made things worse as prosecution of offenders is now a mirage. Nonetheless, the judicial system, home and abroad, has been instrumental in bringing to book some high profile corruption cases in Nigeria. After a meticulous study of the trend that cuts across both the public and private sectors in Nigeria in recent years, we tabulated our findings in Table 2 below.

Table 2: High profile corruption cases in Nigeria in recent times

SN	Sector	Looter	Position	Amount involved	Status	Date convicted
1.	Public	General Sani Abacha	Former Head of State	458 million dollar	Court convicted in US	US 5/3/2014
2.	Private	Mrs Cecilia Ibru	Former MD/CEO, Defunct Oceanic Bank	191b naira	Court convicted and jailed in Nigeria	8/10/2010
3.	Public	Mr. Tafa Balogun	Former Inspector-General of Police	13b naira	Court convicted and jailed in Nigeria	4/4/2005
4.	Private	Mr. Festus Akingbola	Former MD/CEO, defunct Intercontinental Bank	165b naira	Court in London ordered found him guilty and ordered him to return the money	31/7/2012
5.	Public	Chief James Ibori	Former Governor, Delta State	250m dollar	Court convicted and jailed in UK	17/4/2012
6.	Private	Mr. Francis Atuche	Former MD/CEO, defunct Bank PHB	80b naira	Court trial in progress	Trial ongoing
7.	Public	Chief Diepreye Alamieyeseigha	Former Governor, Bayelsa State	in two parts – N1.4bn and $1.3m	Court convicted and jailed in Nigeria	26/7/2007

SN	Sector	Looter	Position	Amount involved	Status	Date convicted
8.	Public	Chief Bode George	Former Chairman, Nigerian Ports Authority	N84b	Convicted and jailed in Nigeria	25/10/2009

This situation calls for urgent measures to get Africa out of the woods. One of such measures we proposed in this study is the technology approach (e-Democracy) which provides a technique of corruption management using e-Government, e-Governance and e-Administration.

2.3 Information and communication technologies (ICTs)

Information and communication technologies (ICTs) include any communication device—encompassing radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. This research study revealed that the application of ICTs in the political domain has popularized the concept of e-Government as both a developmental agenda and academic discipline. The pervasive nature of ICTs and its use for all-round development has equally popularised the concept of ICT for Development (ICT4D). Consequently, governments, NGOs, international organizations and individuals have advocated the use of ICTs for improving living standards, particularly in developing economies.

2.4 Related work

Some of the previous efforts that are related to ICTs and corruption management in the literature are presented as follows. Raymond (2008) warns of the negative impact of corruption on foreign investment in Africa. He perceives corruption as a dent that can dwindle investors confidence and therefore derail the dream of Africa emerging as the new economic frontier of the world. As a curative measure, he advocated sustained investment in institutions, legal structures and civil service reform. Though he drew a link between corruption and the downward investment trajectory in Africa as well as suggested curative measures, his approach did not include the use of ICTs as a tool and technique for fighting corruption, the main motivation for this work. ICT4D in Africa (2014) and The Transformation (2014) focused on harnessing the power of ICTs in Africa. They hinted that over the last decade, the ICT access in Africa has increased immensely. As access increases, opportunities arise to leverage ICT to extend timely information and services to previously underserved populations, and to increase productivity and innovation in the public and private sectors. Examples of this are the increase in the number of people who are able to acquire mobile phone service, improved disease monitoring and vaccination planning and m-banking services using the mobile to extend access financial services to populations that never before had a bank account. Nonetheless, they observed that despite dramatic ICT improvements made, significant access gaps are still there. They however were shy of mentioning that ICTs could be used to curb the rampaging corruption menace in Africa. Other instances of ICT implementations in Africa and other continents that have been mentioned in the literature include Heeks and Molla (2012), Development Informatics (2014), Transparency International (2014). Although most of these efforts highlighted the benefits, costs, challenges, and implementation scenarios of ICTs in the African context, the emphasis were not the use of ICTs for managing corruption.

Summarily, it was observed from the literature that none of the previous studies had focused on the implementation of an e-Democracy system in an African context using CBSE approach with a view to curbing corruption, which is the main motivation for this work. We are also motivated by the fact that transforming the African political and business landscapes will make it investors' delight and pave the way for its emergence as the new global economic frontier.

3. Methodology - CBSE for e-democracy system

We used Nigeria as a case study amid established concerns that political developments in Nigeria represent in microcosm happenings in Sub-Saharan Africa. It is made up of a Federal Government, 36 State Governments (including the Federal Capital Territory, Abuja) and 774 Local Government Areas with a population of over 170 million people (Figure 1).

Using the objective-methodology mapping in the Table 3, we embarked on the CBSE lifecycle activities to actualize the proposed e-Democracy system as a corrective measure in anti-graft effort in the polity.

Figure 1: The geopolitical space called Nigeria (Source: Google)

Table 3: Objective-methodology mapping

SN	Objective	Methodology
1.	To provide online real-time information on proposed public policies, programmes, projects and services by government for approval and feedback of electorate	Design and implement an e-Government sub-system
2.	To provide online real-time information on proposals by citizens on people-oriented policies, programmes, projects and services for government's consideration	Design and implement an e-Governance sub-system
3.	To provide online real-time information on services offered by government for the wellbeing of citizens	Design and implement an e-Administration sub-system
4.	To provide integrated information system for transparency and accountability in governance for purposes of curbing corruption in the Nigerian body politic	Integrate e-Government, e-Governance and e-Administration sub-systems to get e-Democracy system

3.1 Requirements analysis and specification

In this section, the requirements for the e-Democracy system are analysed. The requirements were gathered by interview, observation and studying existing processes and systems. The functional requirements (Table 4) include add information, access information, edit information, and delete information while the non-functional requirements include quality requirements that span performance, security, usability, aesthetics, availability, reliability, scalability, fault tolerance, modifiability, portability and interoperability. The e-Democracy system incorporates mechanisms that respond to these requirements. The mechanisms include components of e-Democracy: e-Government, e-Governance and e-Administration.

Table 4: Functional requirements

Requirement ID	Requirement	Brief Description
R01	Add Information	The system shall allow every user to add proposals on public policies, programmes, projects and services
R02	Access Information	The system shall allow every user to retrieve and view information on public policies, programmes, projects and services
R03	Edit Information	The system shall allow users to edit information on public policies, programmes, projects and services
R04	Delete Information	The system shall allow users to delete information on public policies, programmes, projects and services

Use Case modelling was used (Figure 2) to galvanise requirements analysis in a bid to comprehend the core functionalities and usage scenarios associated with the identified requirements. Use case diagram captures the functional aspects of a system by visually representing what transpires when an actor interacts with the system (Aggarwal and Singh, 2008).
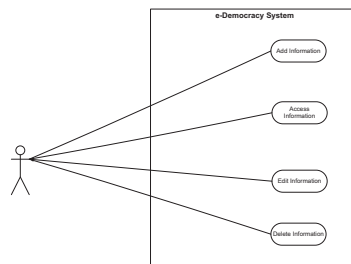
Figure 2: Use cases for e-democracy system

3.2 System and software design

Component reusability and distributed computing are closely linked in an enterprise application. To leverage on this relationship, we designed the n-tier enterprise architecture in Figure 3 for the proposed e-Democracy solution incorporating mechanisms that respond to user requirements.

Figure 3: E-democracy system multi-tier architecture

The interfaces between the respective e-Democracy components are captured in the component diagram in Figure 4. The role of component model (COM+) in this architecture is critical as it provides standards and support services to components though they are not represented physically in the software architecture in line with best practice (Gorton, 2011).
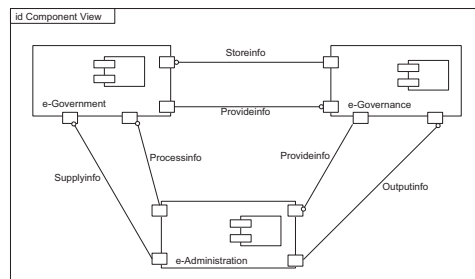
Figure 4: E-democracy component diagram

The e-Democracy reusable components (e-Government, e-Governance, and e-Administration) were subsequently built from Microsoft SharePoint using standard components such as Document Library, Custom List, and Tasks and are explained in Table 5.

Table 5: E-democracy components

SN	e-Democracy Components	Description	Function Points
1.	e-Government	Useful for accessing, editing, storing, and deleting information on government inputs or proposals on policies, programmes, and projects that will socially and economically transform the lives of the people.	addGovernmentInputInformation(), accessGovernmentInputInformation(), editGovernmentInputInformation(), deleteGovernmentInputInformation()
2.	e-Governance	Gives the user the right to access, edit, store, and delete information on citizens inputs or proposals on policies, programmes, and projects that will socially and economically transform the lives of the people.	addCitizensInputInformation(), accessCitizensInputInformation(), editCitizensInputInformation(), deleteCitizensInputInformation()
3.	e-Administration	Empowers political stakeholders to access, edit, store, and delete information on social services designed to transform the lives of the people.	addServicesInformation(), accessServicesInformation(), editServicesInformation(), deleteServicesInformation()

The class diagram for the e-Democracy system is given in Figure 5 below.
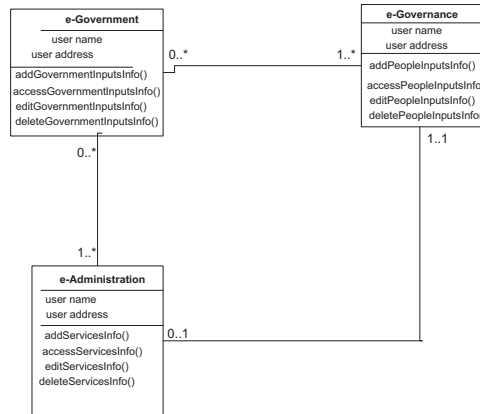
Figure 5: E-democracy class diagram

Other design tools we used include collaboration diagram, sequence diagrams, class diagram, analysis class, design component and elaborated design class, class elaboration, algorithm, composite (appropriate) interfaces, and elaborated deployment diagram (Pressman, 2009; Martin, 1998). The researchers used deployment diagram to represent the location of key packages or components of the e-Democracy system (Pressman, 2009) as illustrated in Figure 6 below.
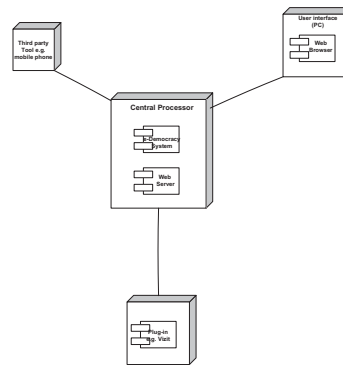
Figure 6: E-democracy deployment diagram

3.3 Implementation and unit testing

This study used Microsoft SharePoint as the development platform for the tailor-made e-Democracy system. SharePoint is a web-based enterprise development tool that makes components available for reuse, the components are called services. It is a component platform that uses Microsoft COM+ as the component model. It provides an integrated development environment (IDE) and its core components are Document Library, Custom List and Tasks, which are not only independent but are distributed (Gorton, 2011). The development of the e-Democracy system was achieved using incremental approach. The minimal e-Democracy system to start with was the e-Government module. Other modules were added on incremental basis. As testing of component-based system is different from normal software testing, the authors used black box testing as it is more suitable in component based systems (Sirobi and Parashar 2013).

3.4 System integration

With e-Government as minimal e-Democracy system, regression test was conducted as more modules were interfaced to ascertain that there were no interface errors. Else, if they existed, debugging took place before adding another module. In the final analysis, e-Government was the most tested component in the e-Democracy system. It is the most referenced component in the proposed system. Test cases were developed and used to test the various components (Table 6) prior to integrating them. Then we used system test cases at the point of integration for regression tests. As typical of component-based systems, black-box testing was performed for all components (Beydeda and Gruhn, 2003). Table 6 shows components and their function points.

Table 6: Component testing (e-Democracy function points)

SN	Component	Function Points
1.	e-Government	addGovernmentInputsInfo(), accessGovernmentInputsInfo(), editGovernmentInputsInfo(), deleteGovernmentInputsInfo()
2.	e-Governance	addCitizensInputsInfo(), accessCitizensInputsInfo(), editCitizenInputsInfo(), deleteCitizensInputsInfo()
3.	e-Administration	addServicesInfo(), accessServicesInfo(), editServicesInfo(), deleteServicesInfo()

3.5 System verification and validation

We verified and validated the process-correctness and requirements-compliance of the e-Democracy architecture by examining the various software representations - requirements documents, design documents and program code. Our concern was to ascertain that user requirements had been well catered for in each software representation in the build-up process just as we ensured that the software product met both operational needs of users and emergent properties.

3.6 Operation support and maintenance

A number of both technical personnel and end-users were trained to test-run the application. While the end-users operated the software, the technical staff provided sustained support.

4. Results and discussion

The e-Democracy site was created as a community site using Microsoft SharePoint enterprise development platform. As the name suggests, it is a site where political community members discuss topics of common interest. Behind this software engineering is the political message that in the absence of transparency, corruption thrives. We set up an experimental design in University of Lagos, Nigeria precisely at the Centre for Information Technology and Systems and test-run the system from near (Lagos environs) and remote locations, including Lafia in Nassarawa State and Abuja, all in Nigeria as shown by broken arrows in Figure 7 below. By this act, the researchers used an n-tier web-based e-Democracy system to mimic the sensation of sustained dialogue between the led and leaders in a political setting.

Figure 7: E-democracy experimental corridor - Lagos, Abuja and Lafia (Nassarawa)

The simulation experiment confirmed that ICTs could bridge the gap between the governed and their governors and more importantly entrench transparency and accountability in conducting government business. The subjects who participated in the experiment concurred that the outcome of the experimental survey was a seamless and robust online real-time communication among political stakeholders on topical public policies, programmes, projects and services that are people- and result-oriented. The bottom line is that the e-Democracy dialogue framework engendered a sense of transparency procedure capable of reducing corruption to the barest minimum. Though we experienced platform-dependent and hardware-dependent challenges particularly testing from remote locations (Lafia and Abuja), this only suggested that more robust infrastructure was needed for wide-scale implementation.

C. Evaluation Threats

There is the possibility that an expanded evaluation of the different components of the e-Democracy system could unearth new perspective of things. In any case, the subjects (who are Nigerians) that participated in the experiment survey have the required experiential knowledge of the Nigerian political domain and its governance challenges - corruption, weak institutions, poor infrastructure, low-skilled human capital and unfavourable

investment climate. They equally had sufficient practical engagements with the e-Democracy system. This offered them good basis to make objective comparison between the old way of information exchange between political actors and the new e-Democracy model of interactions. Therefore, there is sufficient reason to take their views seriously.

Equally important is the fact that only two classes of users were involved in the evaluation - one representing government while the other represented the masses, which could in a sense limit the statistical significance of the outcome. However, the result of the experiment clearly indicates that both parties who incidentally are the stakeholders in any political space were adequately represented and were functional in the dialogue on acceptable service levels . This is considered to be a good result because at this juncture in the project, the core objective is to gain a first impression of the degree of transparency and accountability injected into governance by the e-Democracy system. Therefore, despite the constraint of using a limited number of evaluators, there is sufficient grounds to conclude that there is a positive and preferential disposition to the e-Democracy system as a tool for curbing corruption. It means optimal utilization of state resources as a consequence of transparency and translates into wellbeing of the citizenry. We can thus generalize that the CBSE developed e-Democracy system is effective for managing corruption.

5. Conclusion

Corruption tends to be endemic and most detrimental in African states that are transitioning from one form of governance to another or fragile from violent conflict. New ideas and approaches on how to tackle corruption are being developed on sustained basis. These approaches span from helping to establish good governance to incorporating the power of civic involvement. As part of our contribution, this study used the ICTs approach to entrench transparency and accountability in governance through online real-time interaction between government and citizens on public policies, programmes, projects and services. The component-based approach to e-Democracy system adopted in this study offers benefits to political stakeholders - government, citizens, among others. First, the output of the study is an enterprise software that has practical and commercial value to the governance context in Africa. For the governance process, it will help to inject transparency and accountability. Also, the free-flow of information between government MDAs and citizens on public policies, programmes, projects and services means better utilisation of state resources for the wellbeing of citizens. Yet another benefit is the fact that the incidence of corruption will be greatly reduced as studies have shown that corruption thrives in the absence of transparency and accountability. Hence, the combination of e-Government, e-Governance and e-Administration provides a typology of corruption management. This will in turn promote developmental politics, socio-economic enhancements and attract foreign direct investments as Africa looks forward to becoming the next preferred global investment destination. Finally, the e-Government research community has been presented with a new case study report of the application of e-Government, which adds to the existing body of knowledge in this field.

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Curbing Insecurity in Sub-Saharan Africa Through ICTs for Development (ICT4D)

Emmanuel Okewu[1] and Jonathan Okewu[2]
[1]Centre for Information Technology and Systems, University of Lagos, Lagos, Nigeria
[2]Department of Visual and Creative Arts, Federal University Lafia, Nassarawa, Nigeria
okewue@yahoo.com
jonathan.okewu@gmail.com

Abstract: This paper presents figures to significantly gauge insecurity levels in Sub-Saharan Africa. A topic of growing debate globally is insecurity. And Sub-Saharan Africa has its fair share, ranging from the ebola virus disease (EVD), climate change vulnerability, environmental risk, food insecurity to terrorism. Insecurity has reputation for depleting socio-economic activities. The social contract between government and the governed makes it mandatory for any responsible and responsive government to avail its citizens socio-economic transformation. Researchers, practitioners and captains of industry have concurred that tackling insecurity requires a multi-prong approach spanning political, economic, technological and military solutions. Though the mechanics of insecurity may seem the same across climes, the same cannot be said of the ideology. Studies have shown that insecurity in Africa is hinged on poverty and ignorance. Using secondary data and modelling, this study applies Information and Communications Technologies (ICTs) in combating poverty and ignorance in Sub-Saharan Africa through e-Education, e-Health, e-Agriculture and e-Social Security. The research study provides empirical data for substantiating poverty-driven insecurity. It also outlines guidelines for designing and implementing ICTs policies, programmes and projects for sustained and sustainable development within the framework of Africa's economic status quo. The expectation is that these measures will engender social transformation and security.

Keywords: e-agriculture, e-education, e-health, ICTs, insecurity, socio-economic transformation

1. Introduction

This study was necessitated by concerns over growing insecurity in Africa and its negative impacts on the socio-economic lives of its people. To address this problem, a technology-based solution for curbing insecurity on the continent was developed. An Information and Communication Technology for Development (ICT4D) system was developed using component-based software engineering (CBSE) approach. We considered that an ICT4D system that drives conversion between government and citizens on the equitable utilization of state resources through service offerings will suffice. Though ICT4D is a vast field of applying ICTs to virtually all developmental initiatives, the scope of discussion in this paper is limited to the design and development of an ICT4D system that focuses on e-Agriculture, e-Education, e-Health and e-Social Security. Whereas e-Agriculture, e-Education, and e-Health are concerned with providing government and its citizens an electronic platform for online real-time exchange of information on social services in tandem with electoral promises and the social contract, the e-Social Security drives conversation between government and the vulnerable segment of the society on social benefits.

Besides improving access to accurate and timely information, an ICT4D system enhances the confidence of the electorate in the political process; provides the people opportunity to criticize service offerings by government; empowers citizens to make inputs into public policies, programmes and projects; promotes transparency and accountability in governance; guarantees optimal utilization of state resources for socio-economic transformation and in the ultimate analysis guarantees peace, prosperity, social justices and security. According to Paime (1992), there is a correlation between security and survival. While survival is an essential condition, security is viewed as safety, confidence, free from danger, fear, doubt, among others. Therefore, security is 'survival-plus' and the word 'plus' could be understood from the standpoint of being able to enjoy some freedom from life-determining threats and some life choices (Booth, 2007). Therefore, making available social services in a transparent and accountable manner is a developmental agenda that channels the energies of people into national development.

Typically, government ministries, departments and agencies (MDA) as organs that translate policies into services share a lot in common in terms of structure, practices and operations, but still have their peculiarities. This scenario suggests that a reuse-based approach to modelling and developing software that will be relevant to several MDAs would yield considerable benefits. Component-based software engineering (CBSE) is a reuse-based model of developing software where certain recurring requirements are individually abstracted, and implemented or sourced as standalone components; thereafter, the identified components are used to

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accomplish wide-ranging capabilities across many aspects of a developed system. The goal of CBSE is to engage the integration of loosely coupled components to realize a working system or software products. Usually, the objective is to develop reliable systems and gain some advantage in terms of time and cost of development. The application of CBSE for developing ICT4D systems is promising in view of the following reasons (Pressman, 2009; Debayan, 2011; Sommerville, 2011; Crnkovic and Larsson, 2003).

- The complexity of ICT4D software system requires an approach that simplifies the process of development.

- Using components from tested and trusted vendors promotes trust and confidence of end-users in the solution.

- The fact that we do not have to build from scratch but reuse existing reliable components implies that software can be built more quickly.

This paper reports a study of the use of CBSE in building a solution that takes into cognisance the political peculiarities of Africa. As a pilot project, we designed and developed an ICT4D system for the Nigerian socio-economic domain in an effort to curb poverty and insecurity. The work empirically investigates the impact of online real-time exchange of information between government and its people on social services rendered and its implication for transparency and accountability in the application of state resources for the greater good of the greatest number of people. It equally x-rays specialised services rendered to the vulnerable groups of the society as an integral component of the inclusive innovation ideology of ICT4D. The authors observed that not many reports on empirical application of ICT4D system for socio-economic transformation in Africa have been found in the literature. Some ICT4D researchers and practitioners argue that the ICT4D research community is in need of more industrial experiences and empirical studies. To corroborate this, the calls for papers of the foremost International conferences in the area of ICT4D such as the *International Conference on Information and Communication Technologies and Development(ICTD)* have in recent years, advocated the need for more case studies in ICT4D. Hence, as a contribution, this work seeks to enrich the existing body of knowledge in information and communication technologies for development in particular, by reporting on a unique practical experience of ICT4D in Nigeria. This is particularly significant because rarely does one come across reports of empirical studies of application of cutting-edge and technically sophisticated ICT4D system based on software engineering concepts such as CBSE that originates from the African region.

The remainder of this paper comprises the following: Section 2 gives the background of study and related work; Section 3 presents the methodology and the selected case study; section 4 focuses on results and discussions; and finally, we make recommendations and the paper is concluded in section 5.

2. Background and related work

2.1 The African continent

In view of concerns that Africa inspite of its huge natural endowment is plagued with insecurity, there is need to take a critical look at how its affairs have been managed. Harry (2013) is of the view that Africa's population is the youngest among all the continents; 50% of Africans are 19 years old or younger. It is disturbing that it has not been able to harness this demography for economic dividend. Instead, the scenario is that Africa over-relies on natural resources without strong investment in human capital which has led to its dwindling economic fortune. Highly skilled labour is required in manufacturing and services which today put other continents ahead of Africa. Low economic activities majorly engineered by corruption has led to slow pace of socio-economic transformation. The after effect is social tension that manifests in terrorism, kidnapping, vandalism, child labour, human trafficking, just to mention a few. According to Sandbrook(1985), though Africa has abundant natural resources, it remains the world's poorest and most underdeveloped continent, the result of a variety of causes that may include corrupt governments that have often committed serious human rights violations, failed central planning, high levels of illiteracy, lack of access to foreign capital, and frequent tribal and military conflict (ranging from guerrilla warfare to genocide). The United Nations' Human Development Report in 2003 corroborated this stance as it emphasized that the bottom 25 ranked nations (151st to 175th) were all African. A Harvard University study (Juma, 2010) indicates that Africa could feed itself by transiting from importer to self-sufficiency. The study reiterated that there is need for Africa to focus on agricultural innovation as its new engine for regional trade and prosperity.

2.2 Insecurity and poverty in Sub-Saharan Africa

The perceived intractable nature of Africa's poverty defies modern economic theory, leading to debate concerning its root causes. Sustained warfare and unrest, widespread corruption, and tyrannical regimes are both causes and effects of the continued economic problems. The decolonization of Africa was met with instability aggravated by cold war conflict. Since the mid-20th century, the Cold War and increased corruption and despotism have also contributed to Africa's poor economy and insecurity. According to the Global Overview 2014 by The Norwegian Refugee Council's Internal Displacement Monitoring Centre, there are over 21 million internally displaced persons (IDPs) in Africa. Our study examined the ongoing Boko Haram insurgency in Nigeria and acknowledged the sect has been recruiting members of the vulnerable groups (unemployed, disabled, women and rural poor) for nefarious activities in Nigeria (Table 1). They are brainwashed, hypnotised and engaged, particularly as suicide bombers to detonate improvised explosive devices (IEDs).

Table 1: Engagement of vulnerable groups in Boko Haram insurgency

SN	Vulnerable Group	Insecurity mission
1.	Persons with disability	Used as suicide bombers to detonate IEDs
2.	Unemployed young women	Used as suicide bombers to detonate IEDs
3.	Unemployed young men	Engaged as foot soldiers for gorilla welfare and as suicide bombers

In his contribution, Nwagboso (2012) scrutinized the security challenges in Nigeria and the extent to which the insurgencies of different militia groups as well as the prevailing internal insurrections across the country have adversely affected the Nigerian economy. The Nigerian experience is a reflection of security threats across Africa such as Arab Spring (Egypt, Libya, Tunisia), civil wars (South Sudan, Central Africa Republic), insurgencies (Somalia, Niger, Nigeria), among others.

2.3 Corruption and poverty perceptions indices

Transparency International, the global coalition against corruption, says the Corruption Perceptions Index 2013 serves as a reminder that the abuse of power, secret dealings and bribery continue to ravage societies around the world. The Index scored 177 countries and territories on a scale from 0 (highly corrupt) to 100 (very clean). Although no country had a perfect score, about two-thirds of countries scored below 50 and African countries are reputed for falling within this bracket. This indicates a serious, worldwide corruption problem. To underscore corruption levels in Sub-Saharan Africa, this study statistically modelled corruption prevalence in select countries (Table 2) whose social security schemes were examined in this work.

Table 2: Corruption rankings of select African countries (Source: Transparency International)

SN	Country	Year 2013 Score (over 100)	Ranking (out of 177 countries)
1.	Nigeria	25	144
2.	Gambia	28	127
3.	Mali	28	127
4.	Ghana	46	63
5.	Uganda	26	140
6.	Burundi	19	172
7.	Tanzania	33	111
8.	Kenya	27	136

To provide a sense of the impact of corruption on poverty levels in Africa, we relied on scientific evidence from Global Multidimensional Poverty Index. The Global Multidimensional Poverty Index (MPI) Interactive Databank presents data on acute poverty in 108 developing countries around the world. It is a measure of poverty and human development and ranks for multidimensional poverty and destitution. After connecting Table 2 (above) and Table 3 (below), it became apparent that there is a strong link between corruption and poverty in Africa and by extension, insecurity.

Table 3: Population in multidimensional poverty (source: Oxford Poverty and Human Development Initiative (2014) Global Multidimensional Poverty Index Databank. OPHI, University of Oxford

SN	Country	MPI Poor (%)	Destitute (%)	Population living on less than $1.25 per day (%)
1.	Nigeria	20	30	65
2.	Gambia	58	0	30
3.	Mali	88	0	50
4.	Ghana	17	8	25
5.	Uganda	50	25	30
6.	Burundi	40	40	80
7.	Tanzania	43	22	65
8.	Kenya	45	0	43

A way of measuring the extent the trio of insecurity, poverty and corruption have affected the people of Africa is to use the barometer called Human Development Index (HDI). We present a reflection of the level of human capital development in Africa by profiling African countries by Human Development Index (HDI) for the year 2013, published in 2014 by the United Nations Development Programme (UNDP): Of the 52 African countries measured, only 5 had high HDI, 12 had medium HDI while a whooping 35 had low HDI. The data corroborates the assertion that Africa is dominated by low-skilled human capital. And this certainly is not good for socio-economic growth and development.

2.4 ICTs for development (ICT4D)

Information and communication technologies for development (ICT4D) refers to the use of information and communication technologies (ICTs) in the fields of socioeconomic development, international development and human rights. The philosophy is that more and better information and communication expedites the development of a society. Besides its reliance on technology, ICT4D also requires an understanding of community development, poverty, agriculture, healthcare, and basic education. For the purposes of this work, ICTs comprise electronic technologies for information processing and communication, as well as systems, interventions, and platforms that are built on such technologies. Development includes, but is not restricted to, poverty alleviation, education, agriculture, healthcare, general communication, gender equality, governance, infrastructure, environment and sustainable livelihoods.

2.5 Inclusive innovation and vulnerable groups in Africa

Inclusive innovation defines the characteristic of new goods and services that are created for those who are denied access from the development mainstream—most especially lowest incomes and/or the poverty line. These new technologies are for the lowest ladder in the social hierarchy – which includes: Information and Communication (like mobile phones, mobile services and telecentres); Agriculture (better seed varieties); Healthcare (vaccines); and etc. Quiet a number of countries are increasingly using inclusive innovation in various sectors and fields, like China, India, Indonesia, Thailand, and other national governments. Some African governments have engaged ICTs to directly empower the less privileged across Africa (Matous et al.,2014, Bhavni et al., 2008, Masiero 2013) just as Okewu (2013) reports that a number of social security schemes have been put in place, targeting the vulnerable groups. However, as a result of corrupt practices in the schemes, this study advocates the integration of biometric system into the proposed ICT4D system. Biometrics will ensure that only genuine beneficiaries are handed social benefits.

2.6 Related work

Some of the previous efforts that are related to ICT4D and insecurity in Sub-Saharan Africa in the literature are presented as follows.

Hilbert (2012) popularised the ICT4D Cube Framework. The emphasis is that the goal of ICT-for-development (ICT4D) is to make use of transformation by actively using the enabling technology to improve the living conditions of societies and segments of society. He pointed out that in social transformations, the resulting dynamic is an interplay between an enabling technology, normative guiding policies and strategies, and the resulting social transformation. He sees this as a three-dimensional interplay and depicted it as a cube (ICT4D cube framework). In line with the Schumpeterian school of thought, the three factors enabling socio-economic transformations are technology (infrastructure, generic services and capacities/knowledge), social services (education, health, business, government) and policies (regulation and incentives). When ICT practices are

applied in a regulated and incentivized manner to scale up productivity in the social sectors, we have improved social services variants like e-government, e-business, e-health and e-education with positive implications for transformation and development. Though the study presented an integrated view of social services, it did not state how insecurity in Africa could be tackled headlong using ICT, the core motivation for this work.

Redid (2011) and Trucano (2010) studied ICT for education (ICT4E) and concluded that it is a subset of the ICT4D thrust. Globalization and technological change are one of the main goals of ICT. One of its main sectors that should be changed and modified is education. ICTs greatly facilitate the acquisition and absorption of knowledge; offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others who live in the poorest countries, is their sense of isolation. The new communications technologies promise to reduce that sense of isolation, and open access to knowledge in ways unimaginable not long ago. Nonetheless, the study focused only on education sector and did not mention how security related challenges could be managed in Africa. In contrast, we are using ICTs to scale up the capability of the governed to dialogue with government on suitability or otherwise of services offered for social equity and security.

Okewu (2013) studied the use of ICTs in enhancing the livelihood of the vulnerable groups in Nigeria through social security schemes. He observed that unwholesome practices in the delivery of social benefits to the less privileged could be nipped in the bud by incorporating biometric systems into social safety net programs. The study went a step further to provide a blueprint for the design and development of the biometric system. Inspite of the security consciousness of the study, it was confined to social security services alone. In addition, he did not specify the software engineering approach to be used.

Other examples of ICT implementations in Africa and other continents that have been mentioned in the literature include Batchelor et al., (2003), Graham (2011) and Gunawardene (2007), African Economic Research Consortium (2014), Heeks (2011), Karanasios & Burgess (2006), Chetley (2006), McNamara (2007), Narsalay et al., (2012), Okojie (2014), Natsa (2014), Motes (2014) and Matous et al., (2014). Although most of these efforts highlighted the benefits, costs, challenges, and implementation scenarios of ICTs in various social service sectors, the emphasis were not the use of ICTs for curbing insecurity in Sub-Saharan Africa.

In a nutshell, we observed from the literature that none of the previous studies had focused on the implementation of an integrated ICT4D system in an African context using CBSE approach with a view to curbing insecurity through participatory social accountability, the main motivation for this work.

We therefore commissioned a study that fulfilled these criteria. Whereas the underlying logic is to ensure transparency and accountability in the application of state resources through information sharing between the electorate and political leaders, the strategy is an ICT4D system that covers e-Agriculture, e-Education, e-Health and e-Social Security services. It provides online real-time information on public services and was developed using component-based software engineering (CBSE) approach.

3. Methodology - CBSE for ICT4D system

Nigeria accounts for about 25% of Africa's population and remains the most populous black country in the world. The authors considered that an integrated n-tier ICT4D system that provides a dialogue framework for government and its people to negotiate how state resources are put into use with special attention paid to the needs of the less privilege will not only entrench transparency and accountability in the polity, but guarantee socio-economic transformation that mitigates/eliminates insecurity. We used CBSE approach to guarantee reusability, sustainability, scalability and adaptability of the solution in other African countries. With sense of modesty, the authors posit that socio-political and socio-economic trends in Nigeria are, to a reasonable extent, quiet representative of trends on the continent. Hence, the choice to use Nigeria as a case study (Figure 1).

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Figure 1: The socio-economic space called Nigeria

Guided by the objective-methodology mapping as captured in Table 4 below, we embarked on CBSE lifecycle activities to actualize the proposed ICT4D system.

Table 4: Objective-methodology mapping

SN	Objective	Methodology
1.	To provide interactive online real-time information on services offered in the agricultural sector by government to citizens for background check to match budget/plan with deliverables.	Design and implement an e-Agriculture sub-system
2.	To provide interactive online real-time information on services offered in the educational sector by government to citizens for background check to match budget/plan with deliverables.	Design and implement an e-Governance sub-system
3.	To provide interactive online real-time information on services offered in the health sector by government to citizens for background check to match budget/plan with deliverables.	Design and implement an e-Health sub-system
4.	To provide interactive online real-time information on specialized social security services offered vulnerable groups by government for background check to match budget/plan with actual deliverables.	Design and implement an e-Social Security sub-system
5.	To provide integrated information system for transparency and accountability in rendering public services for purposes of curbing insecurity in the polity through socio-economic transformation	Integrate e-Agriculture, e-Education, e-Health and e-Social Security sub-systems to get ICT4D system

3.1 Requirements analysis and specification

The functional requirements of the proposed system include interactive online real-time information on service offerings by government to citizens in the agricultural, educational, health and social security sectors. The non-functional requirements include quality requirements like performance, security, usability, aesthetics, availability, reliability, scalability, fault tolerance, modifiability, portability and interoperability. The ICT4D system incorporates mechanisms that respond to these requirements.

3.2 System and software design

Component reusability and distributed computing are intricately intertwined. Consequently, to cash in on this relationship, we designed the n-tier enterprise architecture in Figure 2 for the proposed ICT4D solution incorporating mechanisms that respond to user requirements.
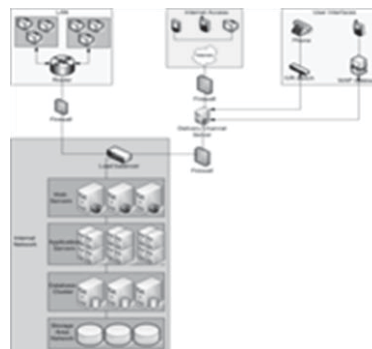
Figure 2: ICT4D n-tier enterprise architecture

The interfaces between the respective ICT4D components are captured in the component diagram in Figure 3. The role of the component model (COM+) in this architecture cannot be overemphasized as it provides standards and support services to components in architecture, even though best practice demands that they are not represented physically in software architecture (Gorton, 2011).
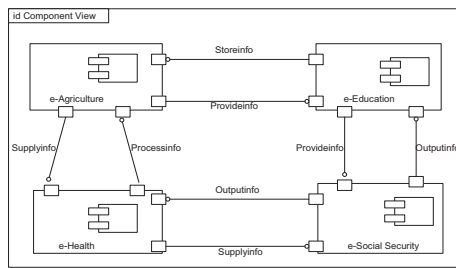
Figure 3: ICT4D component diagram

3.3 Implementation and unit testing

We used Microsoft SharePoint as the development platform for the tailor-made ICT4D system. SharePoint is a web-based enterprise development tool that makes services (components) available for reuse. It is a component platform with Microsoft COM+ as the component model. It provides an integrated development environment (IDE). Its core components are Document Library, Custom List and Tasks, which are not only independent but are distributed (Gorton, 2011). Test cases were developed and used to test the various components prior to integrating them. The cross-cutting functions among the ICT4D system components (e-Agriculture, e-Education, e-Health and e-Social Security) are addServicesInfo(), accessServicesInfo(), editServicesInfo() and deleteServicesInfo(). The abstractions of these cross-cutting concerns of the tested system are given in the ICT4D algorithm design outlined as:

```
Procedure addServicesInfo()
 ServicesInfo ← " "
 while (not endOfServicesInfo())
 servicesInfo ← addInput()
return(servicesInfo)
```

```
Procedure accessServicesInfo()
 while (not endOfServicesInfo ())
 getInfo(servicesInfo)
return
```

```
Procedure editServicesInfo()
 while (not endOfServicesInfo ())
 getInfo(servicesInfo)
 editServicesInfo()
return(servicesInfo)
```

```
Procedure deleteServicesInfo()
 while (not endOfServicesInfo())
 getInfo(ServicesInfo)
 deleteServicesInfo()
return(servicesInfo)
```

3.4 System integration

With e-Agriculture as minimal ICT4D system, regression test was conducted as more modules were interfaced to ascertain that there were no interface errors. In situations where errors exist, debugging took place before adding another module. In the final analysis, e-Agriculture was the most tested components in the ICT4D system. This is also a very important functionality in the proposed system as 70% of Nigerians have rural livelihood and depends majorly on agriculture. We used system test cases at the point of integration for regression tests.

3.5 System verification and validation

We verified and validated the process-correctness and requirements-compliance of the ICT4D architecture by examining the various software representations - requirements documents, design documents and program code. Our concern was to ascertain that user requirements had been well catered for in each software representation in the build-up process as well as ensured that the software product met both operational needs of users and emergent properties.

3.6 Operation support and maintenance

A number of both technical staff and end-users were trained for the software experiment. While the end-users operated the software, the technical staff provided support.

4. Results and discussion

In a bid to extract information and measure outcomes of this study objectively, we used software experiment. We also evaluated possible threats to our results.

4.1 Results of software experiment

With the development server located in Lagos (University of Lagos),Nigeria, we tested for both remote and local access. Though accessing the ICT4D development server from remote locations cost more response time than local access, the basic user operational needs of adding, accessing, editing and deleting information on social services were successful. To achieve the cardinal objective of a dialogue platform between government MDAs and citizens, the proposed ICT4D system was built as a community site. For this experiment, some users posed as government while others were citizens and the platform enabled both to make postings on social services that cut across agriculture, education, health and social safety net. Users accessed the system from three locations - Lagos, Abuja (the Federal Capital Territory) and Lafia in Nassarawa State as graphically illustrated in Figure 4 below using broken arrows. While access in Lagos was within and outside the University of Lagos network, access from Abuja and Lafia were thousands of kilometers away from Lagos, the development environment. Though access from Lafia was difficult, the same could not be said of Abuja. The difficulty in accessing from Lafia is a subject for further investigation.

Figure 4: Broken arrows show ICT4D experimental corridor - Lagos, Abuja and Lafia (Nassarawa)

Outcomes of the test-run clearly indicate that both government and citizens could deliberate on services rendered with the ultimate goal of ensuring that state resources are judiciously utilized for overall socio-economic development. The subjects who participated in the experiment alluded to this claim and concurred that this way, the wellbeing of the masses is guaranteed leaving little room for negative human activities that culminate in insecurity.

4.2 Evaluation threats

It is quite possible that an elaborate evaluation of the different modules of the ICT4D system could throw up new perspective of things. Nevertheless, the subjects that participated in the survey have the required practical knowledge of Nigeria's socio-economic challenges - corruption, insecurity and unfavourable investment climate. They equally had sufficient practical engagements with the ICT4D system. This offered them good basis to make objective comparison between the old way of doing things and the ICT4D way of government-citizens interactions. Therefore, there is sufficient reason to take their views seriously.

In addition, only 2 classes of people were involved in the evaluation - one representing government while the other represented the masses, which could in a sense limit the statistical significance of the outcome. However,

the result of the experiment is quiet representative since the major stakeholders in any political space were adequately represented and were functional in the exchanges on acceptable service levels . This is considered to be a good result because at this point in the project, the core objective is to gain a first impression of the transparency and accountability injected into governance by the ICT4D system. Therefore, despite the limitation of using a limited number of evaluators, there is sufficient ground to infer that there is a positive and preferential disposition to the ICT4D system as a tool for curbing insecurity through optimal utilization of state resources as a consequence of transparency in governance. We can thus generalize that the CBSE developed ICT4D system is effective for curbing insecurity in Sub-Saharan Africa.

5. Recommendations and conclusion

5.1 Recommendations

Based on our findings on implementing ICTs in Africa, we recommend the following guidelines for designing and implementing ICTs policies, programmes and projects for sustainability and scalability.

- A re-usable, scalable and adaptable software development approach should be used when application development is involved. This will reduce cost, among other benefits; a factor so germane in a low-income society like Africa

- Target groups should be involved in project design and monitoring.

- Attention should be paid to infrastructure requirements, local availability, training requirements, disposal and technical challenges when choosing the technology for a poverty intervention project.

- Existing technologies such as telephone, radio, and television should be incorporated as they convey information less expensively in local languages, and to larger numbers of people than newer technologies can.

- ICT projects that reach out to rural areas should be prioritized as they might contribute more value than projects based in urban areas.

- Financial sustainability for projects should be factored in.

- Projects that focus on ICT training should include a job placement component.

5.2 Conclusion

In the final analysis, Africans must be able to trust their governing institutions and governing institutions should in turn provide the security and services that people need. Equally, individuals, organizations and governments have crucial roles to play in addressing corruption and establishing good governance in order to prevent conflict and strengthen African regional security. On our part as concerned Africans, we have in this study proposed a technology procedure for strengthening good governance. In this paper, authors have presented the design and development of a tailor-made ICT4D system for the African polity. The target users are government MDAs and citizens. We set out to build a reliable, affordable and adaptable integrated ICT4D system using CBSE approach. Equally important is the fact that the authors have made two contributions: first, the output of the study is an enterprise software that has practical and socio-economic value to the political context in Africa. Second, the information and communication technologies for development research community has been presented with a new case study report of the application of ICT4D, which adds to the existing body of knowledge in the area. In future work, we shall seek to realize other important governance modules of the ICT4D System such as e-Finance using component-based software engineering (CBSE) approach.

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Electronic Petition and Democratic Participation in Nigeria

Aderonke Oni, Charles Korede Ayo, Samuel Oni and Moses Duruji
Covenant University, Ota Nigeria
aderonke.oni@covenantuniversity.edu.ng
charles.ayo@covenantuniversity.edu.ng
samuel.oni@covenantuniversity.edu.ng
moses.duruji@covenantuniversity.edu.ng

Abstract: Citizen's participation in decisions on how the country is governed is crucial in a democratic polity. In Nigeria however, credible platform for citizens input in major policy decisions that affect their lives hardly exist. The Nigerian State is faced with the crisis of democratic legitimacy and accountability. Governance in Nigeria is characterized by corruption, display of contempt and disregard for the people, deteriorating political institutions, disrespect for human dignity and state-society disconnect. Hence, a growing sense of public cynicism and disenchantment towards the government. It is on this premise that this paper proposes e-petition as a simple, convenience, effective, affordable mechanism for citizens' democratic engagement. Using case study design and literature search, this paper reviews e-petition system and practice in advance democracies and develops an e-petition framework for integrating citizens input into public decision making across all levels of government in Nigeria. With the growing acceptance and usage of Internet and mobile technology in Nigeria, this paper argues that e-petition has the potential of reducing barriers to citizens 'participation in the democratic process. The adoption of e-petition will provide wider platform for the masses to raise issues of public concerns with public authorities and as well, a mechanism for resolution of grievances or demonstration of support for popular policy. With e-petitions therefore, political malaise and the crisis of democratic accountability and legitimacy is forestalled in Nigeria.

Keywords: ICT, petition, participation, democracy, decision-making, Nigeria

1. Introduction

Democratic decline caused by citizens-representatives disconnect is a major problem across the globe (Miller, 2009; Wright, 2012, Webb, 2013). The agenda of the elected representatives in many democratic polities often fail to reflect the needs and aspirations of the general public, leading to a feeling of disenfranchisement by many citizens (Stewart, Cuddy and Silongan, 2013).

The level of citizens' involvement in the political process in Africa and particularly, Nigeria do not seem to have improved significantly (Segers, Dessein, Hagberg, Develtere, Haile and Deckers, 2008:109, Abiona and Bello, 2013). There is a growing disengagement from the new institutions of democratic governance as evidenced in lower voter's registration and voter's turnout. Citizens are particularly disenchanted by failed promises of corruptly elected representatives and the limited opportunities to challenge them. Due to the limited opportunities offered by the dominant formal models and institutions of political participation, there has been growing citizens' political engagement in a range of informal activities within villages and communities such as social and protest movements, trade unions, networks, cooperation and variety of civic organizations at the grassroots level which are often inadequate platform for citizens participation in the mainstream politics (Onazi, 2012). While it is important that citizens, in democratic polity, contribute to decisions on how the country is governed, in Nigeria, credible platform for citizens' input in major policy decisions that affect their lives hardly exist. Integrating public opinion in public decision making is paramount to the success of representative democracy. Contrarily, the legislative institutions of Nigeria, the primary representative organ, are lacking in effective interaction with their constituents, hence, a growing sense of public cynicism and disenchantment towards the government (Edigheji, 2006; Oni and Oni, 2014). The declining rate of political participation in Nigeria therefore, raises the question of what credible, inclusive and transparent channel that can be adopted for citizen's engagement in democratic institutions so as to counter the growing sense of political alienation in the country.

In order to increase accountability of the elected representatives and promote citizen's political participation, world governments have made tremendous efforts to enhance citizens and government relationships through electronic channels. Countries in advanced democracies such as Scottish Parliament, UK House of Lords and House of Commons, US Federal Government and National Assembly of Wales have adopted a range of formal petition systems, combining paper and electronic petition system based on the wide acceptance that a robust petitioning system enable citizens' voice to be heard and in turn, help underpin the legitimacy and functioning of representative institutions (Bochel, 2013; Stewart, Cuddy and Silongan, 2013). Electronic enhanced petitions

(e-petitions) is thus at the forefront of official, fully operational participation opportunities provided for citizens, particularly in liberal democratic polities (Miller, 2009; Lindner and Riehm, 2011; Wright, 2012).

In spite of this growing recognition of the power of Information and Communication Technology (ICT) and numerous initiatives to promote political participation, Nigeria is yet to take full advantage of technology to foster citizens and government relationship. In fact, the website of the Nigeria's national parliament merely provides information about paper petitions submitted to its public petition committee while platform for online submission of petitions, citizens' interaction and inclusiveness in the petition process does not exist. The question of a simple, convenience, effective, affordable e-petitions framework for citizens' democratic engagement in Nigeria thus constitutes the thrust of this research. We argue that such e-petitions framework will provide a wider, credible, inclusive and transparent platform for citizens' political engagement and a mechanism for increased public, transparency and responsiveness of the Nigerian representative institutions thereby, countering the growing sense of political alienation in the country.

2. Literature review: Public petition and democratic participation

Petitioning has long been a popular and the most common means of political participation used by citizens to communicate their views to their elected representative (Corbett, 2011; Bochel, 2013). Petitions is defined by Lindner and Riehm (2009) as a formal request to a public authority, usually a governmental institution with the purpose of changing public policy, calling for an official statement, or evoking certain acts by a public institution. Corbett (2011) conceives petitions as a mechanism for public direct communication with the parliament to inform it of a particular public issue and to seek parliamentary action to remedy it. In this regards, petition is a form of political participation which enables citizens' involvement in decision making process. A robust petitioning system has been seeing as enabling citizens' voice to be heard and in turn, help underpin the legitimacy and functioning of representative institutions. It enhances the relationship between parliament and citizen (Miller, 2009; Stewart, Cuddy and Silongan, 2013).

Parliamentary petitions system is vital to democratic participation because the legislature is the accredited political institution saddled with the responsibility of serving as intermediary between citizens' concerns and government policy (Fish, 2006; Bochel, 2013; Oni and Oni, 2014). Legislature's responsibilities include informing and listening to the public and making inclusive decisions (Goodin, 2004; Brown, 2006). It involves the diverse elements of authorization, accountability, citizens' participation and resemblance (Oni and Oni, 2014). Accordingly, citizens' contribution to political deliberation on complex political questions is part of political representation in that it helps ensure that parliament promotes the interests of the represented and act in accordance with their demands (Brown, 2006). Bochel (2013) identifies the factors underpinning the greater use of parliamentary petitions system for democratic participation. They include the idea of citizen's empowerment, the trend towards encouraging citizen participation by government, the need to address the declining rates of political engagement, the opportunities provided by ICT in enhancing citizens-governments interactions and the emphasis on improving the policy-making process through greater citizen's participation (Bochel, 2013). Similarly, Lindner and Riehm (2009) identify three main features of petitions that distinguish it from other forms of political participation: petitions are initiated bottom-top by citizens, petitions do not go through complex formal requirement and most petitions are addressed to intermediary institutions and usually are lacking in formal power to take action.

Lindner and Riehm (2009) and Hough (2012) identify the different interrelated political and democratic functions of petitions. For Hough (2012), the functions that petitions perform include building linkages between government and the governed thus, enabling ordinary citizens engage with government and its agencies. For Corbett (2011), linkages between citizens and elected representatives enable public participation which gives legitimacy to the decisions of elected representatives thus, strengthens democracy. Another function of petitions is that parliamentary petitions system avails citizens the opportunity of making known their views on the operation and impact of a particular policy. Government, through petitioning, is informed of the impact of a policy. As noted by Lindner and Riehm (2009), petitions can deliver useful information and perform as political indicators which can potentially contribute to the responsiveness of parliament. In this regards, parliamentary petitions system is one mechanism for expanding and deepening democratic participation and tackling citizen's disengagement from formal democratic politics.

The continuous recognition of the potential capacity of public petitions system to enhance democratic participation has led to an explosive interest in petitions in recent years. Many legislatures now establish mechanisms for public petitioning system (Hough, 2012). Electronic petition (e-petition) is in the forefront among the numerous online participation tools used by government to engage the citizens (Lindner and Riehm, 2009). The impressive uptake of e-petitions by many public entities has made it to advance more than other forms of formal or institutionalized political participation via the internet (Lindner and Riehm, 2009). Mosca and Santucci (2009) identified two type of e-petition; informal and formal. Informal e-petitioning channels are selected from the bottom-up, that is, those channels owned and managed by non-governmental organization and formal e-petitioning channels are institutionalized systems operated by public institutions provided top-down (Lindner and Riehm, 2009). The formal e-petition is a mechanism for enhancing civic engagement across levels of government (Mosca and Santucci, 2009). Formal e-petition is operated by government and usually linked to representative bodies. Formal e-petition can be further categorized into three types: petitions submitted electronically through web interface or email. The second is public e-petitions, that is, a petition in which its text and all information regarding the issue are published on the Internet irrespective of its mode of submission. The third is public e-petitions with additional participatory elements (Lindner and Riehm, 2009). Among the reasons for its gaining much ground is that e-petition empowers and encourages citizens' political participation. It is also borne out of the need to address decline in political participation, facilitate online interaction between citizens and government and greater participation of citizens in policy-making process (Bochel, 2013).

The Scottish parliament in 2000 established the first e-petition system. This was with the intention of using new technologies to influence policy and streamline institutional communication and processes, improve public understanding and awareness of the Parliament's work (Miller, 2009). In 2002, the regional Parliament of Queensland implemented its own e-petition system. In 2005, Germany's Federal Parliament - the Bundestag, started operating e-petitions system. Over a dozen of Norwegian municipalities have been operating e-petitions system since 2005. UK coalition government, Scottish Parliament and Wales National Assembly have implemented e-petition system. The popularity of e-petitions among these countries is based on attempts by government to close the gap between citizens and institutions, using new technologies (Miller, 2009).

In English local government, petitioning has been a common agenda-setting exercise where citizens sign requests to the authority on a variety of local matters such as traffic, parking, libraries, housing, or transportation (Panagiotopoulos, Moody and Elliman, 2012). English local authorities have since 2004 started experimenting with e-petition with Bristol and Kingston-upon-Thames taking the lead (Whyte, Renton, & Macintosh, 2005; Panagiotopoulos, Moody and Elliman, 2012). As at the time of this study, about 337 English Local Governments have operational e-petitions system. The high rate of e-petition adoption among the local authorities was as a result of the 2009 legislation which mandated all LGAs to provide an online petitioning facility hosted within their council web site and design a formal response process for both paper and online petitions (Lindner and Riehm, 2011).

Parliamentary petitioning, though an established tradition in Nigeria's legislative institutions, its full potential to deepen citizen's democratic participation and tackle the perceived citizens' political alienation has not been realized (Abiona and Bello, 2013). The national and states legislative assemblies of Nigeria, like many other legislatures in the world, maintain committees on public petitions. For instance, the National Assembly which comprises the Senate and House of Representatives maintain Senate Committee on Ethics, Privileges & Public Petitions and House Committee on Public Petitions respectively. These various legislative assemblies, through their committees on public petitions are to consider and investigate all petitions from aggrieved or oppressed members of the public and make recommendations on the proper action to take in resolving the matters (Omoleye, 2011).

An analysis of the website of the Senate chamber of the Nigerian Parliament shows that the legislative institutions have an established committee on public petition but the oversight of the committee, activities and their interaction with the citizens are not provided for. The lower chamber (the House of Representatives) also has an established committee on the public petition with the photograph and names of the committee displayed on the institutions' web site. The committee has since 2004 received paper submission of petitions and the same merely published on the website with names of the petitioner, the sponsor and date. It is obvious therefore, that parliamentary institutions in Nigeria still lack efficient and effective online mechanism for interacting with their constituents and there is hardly any credible platform for citizens input in major policy decisions (Edigheji,

2006; Oni and Oni, 2014). The limited opportunities offered by the dominant formal models and institutions of political participation are often inadequate platform for citizens participation in the mainstream politics (Onazi, 2012).

3. Methodology of research

This exploratory research is based on case studies of e-petition systems at different levels of government institution ranging from local government to federal government. The sample is made of Nine (9) e-petition systems: three local government e-petition systems (Bristol, Nottingham and Manchester), two regional e-petition systems (Wales Parliament, Scotland parliament, Queensland Parliament and Tasmania Parliament) and two federal e-petition systems (UK Parliament and US Federal Government). These cases were carefully selected to have a complete view of e-petition implementation across the various levels of government. From the case studies, we identified the design procedures, technical and institutional features that constitute good practice in e-petitions implementation. Case study approach is most suitable for this type of exploratory research because it enables in-depth study of a small number of samples, it give flexibility, prepare the investigator to deal with unexpected findings and help to generate findings of relevance beyond the individual cases (Fidel, 1984; Burnham, 2008). Organizations website and literature search through academic databases and search engines serves as the source of information for the case study organizations. Web content analysis of the e-petition web sites was used to document the design features, operational procedures and guideline for petitioner. The analysis and literature findings were the starting point in developing the proposed e-petition implementation framework for democratic engagement in Nigeria.

4. A framework for e-petition systems in Nigeria

The analysis of e-petition guideline, operational procedure and design features literature findings were the starting point in developing the proposed e-petition implementation framework. The proposed framework summarizes the e-petition implementation process of the countries and legislative institutions studied. The findings are presented below.

4.1 Motivation/objective

This is the motivation for implementing e-petition. The motivation for implementing e-petition by United Kingdom is to provide an easy way for the public to engage with politics in this country. For Wales's National Assembly, a petition is a way of asking the institution to consider any issue, problem or proposal that it has the power to do something about. In the case of Scottish Parliament, petition is a direct way for people to raise a 'national issue' with their Parliament.

4.2 Main institutional procedure of e-petition

Clerical Office: This is usually the first contact office of any electronically submitted petition. The secretarial is usually responsible for checking e-petitions against the terms and conditions defined in the institution's standing order for e-petitions. The office would also contact the petitioner when necessary and is responsible for post e-petitions on the web site. The functions of the clerical office however, vary depending on the institutional procedure guiding e-petition process. In institutions where petitions are submited directly to the clerical office, there is the possibility of an e-petition to be rejected at this office for nonconformance with the specified terms and conditions. In institutions such as Queensland Parliament where the Principal petitioner needs to contact a Member of Parliament or Clerk of Parliament for sponsorship before submitting the e-petition, there is little or no chances of the e-petition being rejected before it is displayed on the e-petition web site. The MP of the Clerk before accepting to sponsor an e-petition would have made necessary correction(s) and contribution on it before its submission. Once an e-petition satisfies the terms and conditions, it is made available on the organisation's web site for supporters to add their signature. An e-petition which its petitioner failed to make amendment and resubmit within the stipulated period is published under rejected petition with reason(s) for its rejection stated.

Guideline and Admissibility Criteria: Petitions must satisfy some conditions. First, it must be submitted in good faith and free of false or offensive words or promoting personal interest. Other reasons that may warrant e-petition being rejected include similarity or overlap with an existing petition within the last 12 months. An e-petition asking for things outside the remit or powers of the respective legislative body may also be rejected. In addition, e-petitions containing statements that amount to advertisements or addressing issues for which

petition system is not the appropriate channel (for example, correspondence about a personal issue) or freedom of information requests (Wales Parliament) may be rejected. All the e-petition systems studied have established terms and conditions or guideline. Establishing a comprehensive guideline prompts petitioners and supporters to what is expected of them and the possible outcome of the e-petition. The e-petition guideline should also inform petitioners and the public about the possible outcomes of petitions.

Petition Committee: The petition committee is a group of members of parliament saddled with the responsibility of determining possible actions to take regarding petitions. The Wales Assembly has a Petitions Committee who considers admissible petitions and decides what action should be taken. The Assembly's rule states that any petition that the Presiding Officer decides is admissible must be considered by the Assembly. The Scottish Public Petitions Committee (PPC) is responsible for considering the admissibility of petitions and the issue raised and for deciding what action to take in respect of each admissible petition (Scottish Parliament, 2012). In the UK parliament and European Parliament, the Committee on petitions is responsible for deciding whether to allocate a debate on the subject of an e-petition. It is also responsible for informing the petitioner on the decision reached.

Signature: Signature is the evidence of support for e-petitions by fellow citizens. Any signatory to an e-petition must provide his/her names, home and email addresses. Based on the institutional procedure, the numbers of signatures on a petition determine its possible outcome as to whether it will get to the petition committee or given consideration in the legislative house. In the case of White House e-petition, a petition must secure a minimum of 150 signatories within 30 days to be searchable on the e-petition website and 100,000 signatories within 30 days to receive a response from the US Federal Government. Table 1 (Appendix A) shows the required number of signatory in sampled legislative bodies.

Sponsor: A sponsor is a Member of Parliament or Clerk in support of an e-petition. In cases where an e-petition requires a sponsor, a petitioner must first contact an MP or Clerk for support before submitting the petition. In Queensland Parliament for instance, the sponsoring MP or Clerk has the right to request changes to the wording of a petition before submission. The Principal Petitioner, together with the sponsoring MP or the Clerk, decides the length of time an e-petition will be open for other supporters to append their signatures. Sponsoring is however, not a common practice. It is only Queensland and England Parliaments that request a petitioner to secure a sponsor

4.3 Design features of e-petition system

All our case studies allow online submission of petitions except Queensland Parliament. Petitions can be submitted by completing the online petition form. A petition, once submitted, is scrutinized in the clerical office to ascertain its compliance with terms and conditions before such petition is displayed online for signature collection.

Personal information supplied by the petitioner includes name, email address, residential address, postcode and telephone number. E-petitions are checked for conformity to grand rules before they are published on the Web. The petitioner is given the privilege to specify duration for the petition. The guiding rule however, recommends four to eight weeks. The status, committee meeting data and decision on the petition are published on the web.

Typically, every petition available for signature also displays the name and address of the principal/lead petitioner, the subject and information on the petition, the date created, proposed closing date and number of signatories. In cases, such as Queensland Parliament, Scottish Parliament and German parliament, where additional participatory channels are provided, petitioners or supporters can discuss on the subject of the petition, email the petition or link it to social media sites such as Facebook or Twitter.

In Scottish Parliament's e-petitions system, a petition can either be open, lodged or closed. An open petition continues to gather signatures from supporters till the closing date for its publicity. A lodged petition is ready to be considered or is under active consideration by the Public Petitions Committee while a closed petition is no longer being considered. Every lodged or closed petition has detailed summary of actions taken on the petition with dates, video (where available) and portable document format of all submissions on the petition published on the web. Total number of signature with names and short address of the supporter is also available for viewing. Wales's e-petitions system, in addition to these, displays the date each supporter signed the petition.

Another important characteristic of e-petitions system which promotes openness and responsiveness to the public and demonstrates the power of Internet for efficient information dissemination is the array of information displayed about petitions after they are closed for signature collection. For every closed petition in Queensland Parliament and Tasmania Parliament, the web site displays the petition's reference number, the subject and closed date, number of signatures collected, the date tabled in the house, the referred minister(s) and the date referred, response due date and the date response is tabled. In several other cases such as Scotland Parliament and Manchester city council of e-petition system, details of legislative actions with corresponding documents are published and are downloadable.

5. Conclusion

Parliamentary e-petitioning system has been adopted as a vital tool for democratic participation in many advanced democracies. The Nigerian National Assembly lacks such efficient and effective online mechanism for interacting with the public and for citizens' involvement in major policy decisions of the institution. A parliamentary e-petitions system for democratic participation is thus imperative for the country. The proposed framework for e-petition system is derived from case study analysis of e-petition systems of advanced democracies. With the unprecedented growth and increasing acceptance and usage of internet and mobile technologies in the country (UNP and IPU, 2012), the proposed framework has the potential to make public petitions more visible, convenient, affordable, accessible and a wider form of political participation by the ordinary citizens. In this way, barriers to citizens' participation in the nation's democratic process are reduced. In addition, such e-petitions framework will provide a credible and inclusive platform for citizens' greater participation in policy process thereby exerting public influence on policy outcomes. As averred by thereby Wright (2012), where citizens are able to influence the decisions of elected representatives, the risks of weakening existing democratic institutions diminish. With the e-petitions framework, citizens have more access to information about the activities of government and are provided with credible platform for expression of their grievances and aspirations, through elected representatives. They have additional platform to voice their opinion or complaints and monitor the actions of the legislature. The e-petition framework has the potential of enhancing citizens' access and interaction with their representatives. The framework thus, has the potential to move e-petitions system in Nigeria from the information provisioning stage to a transparent inclusive process and discursive stage thus increasing public trust in their representative institutions of governance in the country. The e-petitions framework therefore, has the potential of enhancing the publicness, accessibility, transparency, accountability and responsiveness of the Nigerian representative institutions. As noted by Mistry and Jalal (2012 and Hasani & Beleraj (2013), inclusiveness, transparency and accountability of government reduce corruption. With e-petition therefore, the growing sense of political alienation, public cynicism and disenchantment towards the government in the country are abated and with more credible platforms for engaging the elected representatives, political malaise and the crisis of democratic legitimacy and accountability is forestalled.

A successful implementation of e-petition system is however greatly dependent on the political will of the ruling elite to adopt and implement it. The government must therefore be fully ready to embrace e-petitioning system and ensure that e-petitions received are acted upon. In addition, ICT is prone to manipulation and thus a proper safeguard mechanism must be put in place to prevent the system from being manipulated for selfish political ambitions.

Appendix 1

Table 1: Sampled legislative bodies and required signature

	Legislative Bodies	Required number of Signature
1	Scottish Parliament	1 minimum
2	Queensland Parliament	Not specified
3	England Parliament	10,000 Response from the responsible department 100, 000 debate by the backbench committee
4	Wales National Assembly	10
5	US White House	100,000
6	Tasmania Parliament	Not specified
7	Manchester City Council	A minimum of 100 is considered by the council

	Legislative Bodies	Required number of Signature
8	Nottingham City Council	5000 debate at full Council debate; 2,500 summon a senior Council officer to give evidence at a public meeting
9	Bristol City Council	20 minimum; 3,500 attracts council debate

Source: Authors Compilation

Table 2: Main features of e-petition system

	Petition Submission	Other Participatory Element	Previous Action	Signature Collection and Duration	petition Status	Display of Signatories	Display of Legislative Action
Scottish Parliament	Online	Discussion Forum, email, Facebook, Twitter, LinkedIn	yes	Online	- Open - Lodged - Closed	yes	Comprehensive details with corresponding video(s) and document(s)
Queensland Parliament	submission published	Email	no	Online (6months max.)	- Current - Closed	no	Date Tabled, referred minister response due date, response tabled
England Parliament	Online	Facebook, Twitter, LinkedIn	no	Online (1 year max.)	- Open - Closed - Rejected	no	no
Wales National Assembly	Online	non	no	Online, as specified by the Petitioner	- Open - Lodged - Closed – Inadmi-ssible	yes	no
US White House	Online	Twitter, Facebook	no	30 days	- Open - Closed	yes	Response from the concerned department and White House
Tasmania Parliament	submission published	Email	no	Online 6months maximum	- Open - Closed	no	Date Tabled, Referred minister, Response due date, and Response tabled date
Manchester City Council	Online	Email	no	Online 12 months maximum	Current Closed	yes	Detailed action with attached document
Nottingham City Council	Online	non	no	12 months maximum	open close, rejected	yes	no
Bristol City Council	Online	email, Newsgroups, Discussion boards	no	Online 6 month, (could be longer or shorter)	- open, - closed -Lodged - Rejected	yes	no

Source: Authors Compilation

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Electronic Enabled Citizens-Parliament Interaction: Imperative for Democratic Governance in African States

Samuel Oni[1], Charles Ayo[2], Aderonke Oni[3] and Moses Duruji[4]
Covenant University, Ota Nigeria
samuel.oni@covenantuniversity.edu.ng
charles.ayo@covenantuniversity.edu.ng
aderonke.oni@covenantuniversity.edu.ng
moses.duruji@covenantuniversity.edu.ng

Abstract: Pivotal to democratic governance is the legislature which provides a veritable interactive, participatory and consultative platform for citizens' input in the decision-making process. In an era of public disenchantment on democratic institutions, modern democratic parliaments utilize Information Communication Technologies (ICTs) to enhance their accessibility and interaction with citizens for inclusive decision making process. In spite of the unprecedented growth, diffusion, acceptance and usage of ICTs in Africa, legislative assemblies of most African countries are inaccessible and lack adequate meeting facilities to regularly interact meaningfully with the public. This research paper therefore, employs a combination of descriptive statistics of website survey and updated literature search to evaluate the extents of the usefulness of African parliamentary websites to engage citizens in legislative decision-making process. The research findings reveal the capacity of African parliamentary websites to enhance democratic governance such as required by modern democratic parliaments.

Keywords: parliament, legislative assembly, decision-making, democratic governance, Africa, citizens interaction

1. Introduction

Citizens involvement in the legislative decision making process is a central component and process of democratic governance (Johansen, 2003; Saliu & Muhammad, 2010). This is because the fulcrum of legislative activity is expected to be the articulation and aggregation of diverse interests of the represented constituencies into the policy process. Different groups in a society are represented in the legislature which gives those groups the opportunity of articulating and advancing their interests and concerns (Simmons, 2002). The representation function of the legislature provides citizens the opportunity to have a say in governance and thus, enhances the legitimacy of public policy. It reduces alienation and estrangement between government and the governed as well as enhances the stability of the system (Edosa & Azelama, 1995).

Legislators, as noted by Roberts (2002), play dual representational roles. First, they represent their people to government, and second, they represent government in their constituency. This indispensable responsibility creates a two way communication and relationship between parliaments and the public.

In an era of public disenchantment on democratic institutions, modern democratic parliaments utilize Information Communication Technologies (ICTs) to enhance their accessibility and interaction with citizens for inclusive decision making process (Leston-Bandeira, 2007; Papaloi and Gouscos, 2011). All over the world, ICTs have been found to be essential in supporting and enhancing legislative capacities to communicate and interact with the public for an inclusive decision (Inter-parliamentary Union, 2007). It is worth mentioning that there has been unprecedented diffusion, sporadic and exponential growth of Internet and mobile technology acceptance and usage in Africa over the last decades (IPU, 2009; Oni and Oni, 2014). Paradoxically however, the legislative assemblies of most African countries are inaccessible and lack adequate meeting facilities to regularly interact meaningfully with the public, resulting to a disconnect between the legislature and their constituents with a concomitant public apathy and cynicism towards their representatives (Oni & Oni, 2014). The question of the extent to which parliamentary institutions in Africa have utilized ICT to enhance their accessibility and interaction with the citizens for inclusive decision making process is, thus, the concern of this research paper.

2. Theoretical analysis and literature review of the legislature and democratic governance

The idea of democratic governance has been interpreted in different ways not only because it is packed with different variables and dimension, but also because the quality of democratic governance is a politically, culturally and ideologically charged determination (Nahem and Wilde, 2012; Papaioannou, 2012). It is however indubitable that democratic governance is central to peace and development (OECD, 2008; Oyeshile, 2009). According to the UNDP (2010), democratic governance connotes that people have a say in the decisions that

affect their lives and that they can hold decision-makers accountable. It involves citizens' access and participation in development (Rondinelli, 2007), and requires a set of political institutions and processes based on the principles of popular control over public decisions and decision makers, and equality of respect and voice between citizens in the exercise of that control (Tommasoli, 2007). It involves civil engagement and opportunities to participate in decision making (Santiso, 2002). Fundamental to democratic governance is people's involvement in political decision making process of issues that relate to the totality of their well being. One cannot talk of democratic governance if the decision making process excludes the masses (Martinussen, 1996). In this respect, the quality of democratic governance is determined by the extent to which these institutions give room for citizens' inclusive participation or representation and the extent of their accountability, transparency and responsiveness to the citizens (Tommasoli, 2007:52; UNDP, 2010).

The success of democratic governance depends on having strong effective and efficient legislative institution (NDI, 2006). This is because the legislature is the assembly of lay politicians who represent the people and are invested with formal law making power for the advancement and wellbeing of the citizenry (UNDP, 2010). The legislature is seen as occupying fundamental place in democratic governance with the singular purpose of articulating and expressing the collective will, views and wishes of the citizens in decision making processes (Heywood, 2007; Bernick & Bernick, 2008). As a foundational pillar of democratic government, the legislature serves as a link between government and the people and provides a channel of communication that can build public support for the government, thus help sustain the regime and also force government to respond to the demands and aspiration of the public (Carey, 2006). Legislators, in this regards play dual representational roles. First, they represent their people to government, and second, they represent government in their constituency (Roberts, 2002). The legislature is therefore, responsible for representing differences (geography, ethnicity, religion, political identification, gender, or other characteristics) in the society, and for bringing these differences into the policy-making arena (Johnson, 2005). The legislature is thus a mechanism through which the population, its special interests and diverse territory are represented (Bernick & Bernick, 2008; Petersmann, 2013). The legislature provides citizens the opportunity to have a say in governance thereby enhances the legitimacy of public policy, reduces political alienation and estrangement between the government and the governed as well as enhances the stability of the system (Edosa & Azelama, 1995, Simmons, 2002). It is on this note that Poteete (2010) argued that the strength, composition and the state of the legislature is one of the strongest measures and predictors of a country's democratic development and survival. Representative liberal democracy cannot exist without a healthy, lively and credible legislature. This is because the establishment of the legislature rests on the assumption that in the final analysis, political power resides in the people and that the people can, if they choose, delegate the exercise of their sovereignty to elected representatives (Loewenberg, 1995). It is in the light of this, that Smith (1980) sees the legislature as the symbol of power and legitimacy.

3. Electronic parliament imperatives for democratic governance in African States

The quality of democratic institutions and processes is pivotal to democratic governance and is, among others, a requisite to reducing poverty and promoting human development (UNO, 2000). This makes the quality of African parliaments a critical issue. Following the recognition of the indispensability of democratic governance to development, there has been continuing efforts at building and sustaining democracy across Africa in the past decade (ECA, 2012). Despite the progress recorded, the contemporary Africa is beset with poverty, debt, problems of armed conflict, national security crises, electoral irregularities and malpractices and institutionalized corruption (Duruji, 2010; Oni, Chidozie and Agbude, 2013). In spite of efforts undertaken by most African countries in promoting people's participation in decision making processes, a number of them still lack appropriate laws, technical capacity, policies and mechanisms for enhancing citizens' participation in economic, social and political decision-making (Azevedo-Harman, 2011). Democratic governance revolves around accountability, legitimacy and responsiveness, among others, however political life in many African States is characterized by weak and underdeveloped democratic institutions which, often, are lacking in accountability, transparency and responsiveness (Adetula, 2011; Gberevbie, 2014). The political reality in most African countries, with respect to civic participation, is that African parliamentarians only engage the public during election campaign, and once elected, they lose contact with the interest of the electorates (ECA, 2012). Africa's legislature has been depicted as mere institution for legitimizing government policies, recruiting and socializing new elites, and mobilizing public support for political regimes (Thomas & Sissokho, 2005; Oni & Oni, 2014). The concomitance is a disconnect between the legislators and their constituents with the attendant public apathy and cynicism towards African institutions of governance (ECA (2012; Gberevbie, 2014).

The capacity of the legislature to efficiently and effectively perform its representation role continues to be a major concern in many African countries (Nijzink, Mozaffar and Azevedo, 2006; ECA, 2012; Oni and Oni, 2014). There is urgent need for African democratic parliaments to be more visible to and reachable by their communities. African legislatures need to create more open, responsive and effective channels for enhancing citizens' participation and involvement in policy making (Sellers, 2002; Schneider, 2003; Azevedo-Harman, 2011). This will yield citizens trust in government and deepen a peace process by incorporating a wider array of interests and individuals at various levels (Tommasoli, 2007:52).

Access to both ICT networks (not only internet based) and public information via ICTs are fundamental to accomplish the goals of providing access to information, making parliaments visible and reachable and at same time, enhancing citizens and stakeholders participation in the political process (UNDP, 2010). Modern democratic parliaments have found ICT to be essential in supporting and enhancing their accessibility and capacities to communicate and interact with the public for an inclusive decision making process (Inter-parliamentary Union, 2007; Leston-Bandeira, 2007; Papaloi and Gouscos, 2011). The Organization for Economic Co-operation and Development (OECD) submitted that citizens' democratic participation must involve the means to be informed, the mechanisms to take part in the decision-making and the ability to contribute and influence the policy agenda (OECD, 2001). Level of participation considers the extent (what level and how far) to which citizens are actively engaged in politics using ICT (Macintosh, 2004). According to the OECD (2001), government and citizens interaction using ICT is made of three distinct stages:

- Information: This describes a one-way relationship in which the government produces, provides and delivers information for the citizens. Examples include government websites, access to public records and official gazettes.

- Consultation: This describes a two-way relationship that creates an avenue for citizens to provide feedback on issues to the government. The process starts with government pre-defining information on issues for consultation. This is followed by preparing questions and managing the process. Thereafter, the views and contributions of citizens are welcomed. Examples include opinion survey and comment on draft legislation.

- Active Participation: This describes a partnership relation between the government and its citizens. The citizens are actively involved in the policy making process, its process and content. It acknowledges equal standing for citizens in setting the agenda, however, the government is responsible for making the final decisions. Examples include citizen juries and consensus conference.

The implementation of ICT in parliament provides opportunities for wider involvement in decision making. It enables citizens to convey their views to their legislators and the legislature will in turn be empowered to make better decisions based on wider consultation with their constituents. With citizens increased knowledge of government's activities made possible by ICT they are, through the legislature, able to hold government accountable, responsible and responsive (Kingham, 2001).

The ICT growth, diffusion, penetration and acceptance which has continued unabated particularly, in the continent of Africa portends a great potential to revitalize governance and renew democratic culture in the continent (Leston-Bandeira, 2007; Xiudian and Norton, 2007; Word e-Parliament Report , 2012). ICT can therefore, help African parliaments to be more transparent and responsive to the concerns of the citizens and improve their capacity to effectively represent the variety and diverse interests and views of the people and as well provide easy, convenient and wider opportunity for citizen engagement in parliamentary decision making process which are recognize as essential for democratic governance (Bishop, 2002; UN and the Inter-Parliamentary Union, 2014).

4. Methodology and data presentation

A mixed methodology was employed for this research – descriptive statistics of legislative website evaluation, case studies and literature search. Parliamentary websites of nineteen (19) selected African countries are studied in terms of their usefulness in achieving the goals of parliamentary website and the extent to which they are able to achieve democratic participation. Fise, Hrvatin, Vercic and Canik (2012) identified usefulness as one of the key determinants of website performance. Usefulness, according to Kragelj (2003) and Fise, et al., (2012), is the extent to which a web page satisfies all the planned and wanted goals for all parties involved. These planned and wanted goals, according to IPU (2009), include not just providing basic information about the history, functions, membership and documentary of the legislature, but also providing interactive web or tools that encourage two-way communication between members and citizens and inviting them to share their views

and possibly engaging them in the policy process. This is encapsulated in the three distinct stages of using parliamentary website for democratic participation - information provision, ii) consultation, and iii) active participation, prescribed by OECD (2001). The evaluation of the selected cases in terms of their usefulness in achieving the goals of parliamentary websites is carried out using these three stages.

Though a study of all African parliamentary websites would have been the ideal but that would simply not be manageable through our research project. The complementary usage of these designs however helps in the acquisition of comprehensive data and detailed study about the variables under investigation obviously yields added advantage to the reliability of the findings relative to using a single research design.

A substantial number of studies has been conducted on the implication of these new technologies for governance by scholars, academic institutes and regional and global organizations such as the United Nations Agencies. Unfortunately, the results of research output have not adequately impacted democratic governance in Africa as far as building the capacity of African legislators to effectively and meaningfully engage citizens in decision process is concerned (Bwalya, Plessis, and Reinsleigh, 2012; Maphephe, Balkaran and Thakur, 2014; Oni & Oni, 2014).

Most parliaments in Africa have websites (Leston-Bandeira, 2012; World e-parliament Report, 2012; Oni & Oni, 2014). Findings of this study in terms of the extent of the usefulness of these websites reveal the following:

Information provision: Analysis of the Usefulness of Parliamentary Websites in African Countries for providing information according to IPU and OECD revealed that legislative bodies in Africa are open to providing information to citizens on their websites. Table 1 and 2 give a summary of content of information available on seventeen (17) parliamentary websites in Africa based on IPU (2009) guideline for general information about parliament, legislation, budget and oversight.

According to IPU (2009) recommendations, general information to be provided about parliament on the websites span eleven categories as indicated in Table 1.

1. Access to parliament: South Africa, Zambia, Rwanda and Zimbabwe provide information on access to the parliament, including access to the parliamentary building, educational visits and access to plenary sessions. None provided information on seating arrangement in the plenary, virtual 'guided tour' and organization of website.
2. History and Role: History of the parliament was available in twelve of the sampled countries. Relevant information on theme is also available in Nigerian, Angola and Lesotho Parliamentary website. While Nigeria only provides history of the parliament the Angola and Lesotho provide only text of constitution on their websites.

Table 1: General information about parliament

Country	Access to Parliament	History and Role	Functions, Composition and Activities	Elected Leaders	Committees and commissions	MP	Political Parties	Electoral Systems	Administration	Parliamentary Documents	General Links to websites
Nigeria	-	-	-	✓	✓	✓		-	-	✓	✓
Ethiopia	-	✓	-	-	✓	✓		-	-	✓	-
South Africa	✓	✓	✓	✓	✓	✓	✓	-	-	✓	-
Tanzania	-	✓	✓	✓	✓	✓		-	✓	✓	✓
Kenya	-	✓	✓	✓	✓	✓	-	-	-	✓	-
Morocco	-	✓	✓	✓	✓	-	-	-	-	-	-
Ghana		✓	✓	✓	✓	✓	-	-	-	✓	-
Angola	-	-	✓	✓	✓	✓	-	✓	-	✓	-
Madagascar		✓	-	✓	✓	✓	-	-	-	-	-
Burkina Faso	-	✓			✓	✓	-	-	-	✓	-

Country	Access to Parliament	History and Role	Functions, Composition and Activities	Elected Leaders	Committees and commissions	MP	Political Parties	Electoral Systems	Administration	Parliamentary Documents	General Links to websites
Malawi	-	-	✓	-	✓	✓	✓	✓	✓	✓	✓
Zambia	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓
Senegal	-	✓	✓	-	✓	✓	✓	✓	-	✓	-
Zimbabwe	✓	-	✓	-	✓	✓	-	-	✓	✓	✓
Rwanda	✓	✓	-	-	-	✓	-	-	-	-	✓
Somali		✓	-	-	-	✓	-	-	-	✓	-
Lesotho	-	-	-	✓	-	✓	-	-	-	✓	✓

Source: Authors Compilation

3. Functions, Composition and Activities: Ten countries provides information relating to this theme on websites but information on budget and staffing of the parliament, list of international and regional parliamentary assemblies of which any of the parliaments belongs, and statistics on the activities of the current and previous parliaments are not available in any case in line with IPU (2009) recommendations.

4. Elected leaders: The ten parliamentary websites that provide information on elected leaders only do so for the current parliamentary chamber.

5. Parliamentary committees, commissions, and other non-plenary bodies: Seventeen of the countries' parliaments sampled, only Rwanda, Somalia and Lesotho do not publicized the composition of the committee members. However, Lesotho and Somalia published the jurisdiction of activities of the committees. Links to relevant documents of the activities of the committee are also available in most cases. Morocco provides only names of committees. Information on members of the committees, their leaders (called president), parliamentary group of the leaders and their photo and general parliamentary list are not available. Burkina Faso provides agenda for sessions.

6. Members of parliament: Up-to-date list of all legislative members was available in all sampled cases except Morocco. None was observed to link the MPs' information on the parliamentary websites to personal websites. It was a general practice not to include descriptive function of members, trail of legislative activities and status of members. Contacts information such as phone number and email address of MPs can only be found in South Africa, Tanzania, Malawi, Zimbabwe and Rwanda.

7. Political parties in parliament: Only parliament of South Africa provided information on the political parties with contact information, links to the parties' official websites and state of parties in the National Assembly including the number of seats occupied. Malawi provided a list of the parties represented in the parliament with a links but the links were not functional. Senegal gave a list of the parties with respect to legislative elections and Rwanda provided a list of political parties admitted in the Republic of Rwanda.

8. Elections and electoral systems: information on these items was practically missing in the parliaments' websites except in Angola, Malawi and Senegal. Malawi and Senegal provided information on electoral procedures and previous parliamentary election results by seats while Angola published only electoral procedures. None provided link to the electoral commission website or publish current composition of party groups and coalitions.

9. Administration of parliament: information relating to parliament administration can only be found in Tanzania, Zimbabwe and Malawi. While Zimbabwe and Malawi provided detailed information of the administrative offices, Tanzania provided just basic information and contacts of staff in administrative offices. South Africa, Malawi, Zambia, Rwanda, Madagascar and Lesotho however, make provision for vacancies advertisement on their websites. All provide contact information to the clerk of the house.

10. Publications, documents, and information services: parliamentary publications and document were available for download in all the sampled cases except Morocco, Madagascar and Rwanda. Generally, there was no description of the types and purposes of parliamentary documents and publication in the sampled cases. Information on parliamentary library with electronic access is available in Nigeria, Zambia, South Africa, Ghana and Zimbabwe which also published information on information services.

11. General links to websites: Zambia provided links to its electoral commission, links to eleven SADC parliament websites and links to eleven Commonwealth Parliament Websites. Lesotho, provided links to Commonwealth

Hansard Editors and Parliamentary Associations, Inter-Parliamentary Union, Pan-African parliament and SADC Parliamentary Forum. Tanzania provided links to the country's website and profile pages of Ministers and deputy ministers.

The second category on the information content of parliament websites deals with information on legislation, budget and oversight (IPU, 2009). The analysis revealed that information on budget and public financing is most missing in the parliamentary websites (Table 2). Only South Africa and Tanzania publish information relating to budget on their websites. All the parliamentary websites except Morocco provide parliamentary document for download. Table3 gives a summary of the documents available for download on the websites.

Table 2: Information about legislation, budget, and oversight

	Country	Legislation	Budget	Oversight	Activities of Committees	Plenary activities and Documentation
1	Nigeria	-	-	-	-	☑
2	Ethiopia	-	-	-	-	-
3	South Africa	☑	☑	☑	☑	☑
4	Tanzania	☑	☑	☑	☑	☑
5	Kenya	-	-	-	☑	☑
6	Morocco	-	-	-	-	-
7	Ghana	☑	-	☑	☑	☑
8	Angola	☑	-	-	-	-
9	Madagascar	☑	-	-	☑	☑
10	Burkina Faso	☑	-	-	-	☑
11	Malawi	-	-	☑	☑	☑
12	Zambia	☑	-	☑	☑	☑
13	Senegal	☑	-	-		☑
14	Zimbabwe	☑	-	-	☑	☑
15	Rwanda	-	-	-	-	-
16	Somali	☑	-	overview	overview	☑
17	Lesotho		-	-	☑	☑

Source: Authors Compilation

Table 3: Types of legislative publications and documents available for download Source: Authors compilation

		Acts	Bills,	Hansards	Notice Papers	Order papers	Votes and Peoceeding	Minutes of Committee Meetings	Parliamentary Questions	Strategic Plan
1	Nigeria	yes	yes	yes	yes	yes	yes	no	no	
2	Ethiopia	yes	yes	yes	yes	yes	yes	no	no	
3	South Africa	yes	yes	yes	yes	yes	yes	yes	yes	
4	Tanzania	yes	yes	yes	yes	yes	yes	no	yes	
5	Kenya	no	no	yes	no	yes	no	no	yes	
6	Morocco	no	no	no	n	no	no	no	no	
7	Ghana	yes	yes	yes	no	yes	yes	yes	no	
8	Angola	yes							yes	
9	Madagascar	yes	no	no	no	no	no	no	no	
10	Burkina Faso	yes	yes	no	no	no	resolutions	no	yes	yes
11	Malawi	yes	yes	yes	no	yes	no	no	no	
12	Zambia	yes	yes	Standing order	no	yes	yes	yes	yes, ministerial Statement	
13	Senegal	law passed, Official journal, The Codes, Hansard								
14	Zimbabwe	yes	yes	yes			yes			

		Acts	Bills,	Hansards	Notice Papers	Order papers	Votes and Peoceeding	Minutes of Committee Meetings	Parliamentary Questions	Strategic Plan
15	Rwanda		yes	provision was made for other documents but nothing uploaded						
16	Somalia	yes	yes							
17	Lesotho	yes	yes		no	yes			no	no

Consultation: Consultation is a two-way relationship where citizens have opportunity to give feedback on issues (OECD, 2001). The usefulness of parliamentary websites for consultation purposes in the sampled cases revealed a low level of two-way online interaction between citizens and parliaments in Africa. Angolan parliament is the only parliament that implemented electronic submission of petitions and other submissions. Zambian Parliament also implemented a generalized electronic submission platform. Tanzanian Parliament also implemented online submission of question or comment to the speaker. Ethiopia Parliament's website has an online forum but topic can only be created by the administrator. Real Simple Syndication (RSS) feed is also available in Ethiopia as well as in South Africa and Senegal. The parliament of South Africa and Rwanda electronically initiate consultation process by given adequate information on submission and petition but the two participatory outlets cannot be concluded electronically. The Parliament calls for public consultation online but submission is made either to a designated office or via email or fax. In respect to petition, South Africa published the constitutional provision for petitioning the National Assembly and the National Council of Province. Information on the types of petitions, presentation of a petition, how to write and submit petition to either of the legislative bodies is available. Nigeria and Kenyan parliament websites publish and allow searching, viewing and downloading PDF version of petitions but the submission is offline and its process is not published.

Active Participation: There is no evidence of usefulness of the sampled websites for active participation. It is obvious that the websites of the parliamentary bodies studied have not reached the stage of using their websites to consult the public for participation on proposed legislations or public decision making.

5. Conclusion

Our analysis in this paper has revealed that despite the recognition of the imperative of democratic governance and the potentials of it being enhanced by electronic parliament, online interaction between citizens and legislative institutions in Africa is still at the information provision stage. Most African parliaments merely populate their websites with information on parliamentary functions such as Acts, Bills, Order papers, Hansards, committee membership and reports, Votes and Proceedings and make the same available for view and download in portable document Format (PDF). Modern democratic parliaments have seized the opportunities provided by ICT for veritable interactive, participatory and consultative platform for citizens' involvement in the decision-making process. Contrarily, adequate provision has not been made to developing parliamentary websites to the stage of using ICT as tools for consulting, interacting and engaging citizens in public decision making. This further corroborates the findings of World e-parliament Report (2012) that legislative bodies in Africa only use their online presence as a means to disseminate information and allow little or no online interaction with citizens despite the wide establishment of e-government implementation strategy in the continent. With the continuous growth and increasing acceptance and usage of ICTs, citizens and their legislators can be more informed, they can interact more and engage in public decision making process. Parliamentary responsibility of citizens' representative can thus, be more effective and efficient and the crisis of democratic disenchantment can be abated while democratic legitimacy increased. In this way citizens and their representatives become progressive partners in democratic governance.

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How to Foster Prosumption for Value Co-Creation? The Open Government Development Plan

Sabina Potra, Ana-Maria Branea and Monica Izvercian
Politehnica University of Timisoara, Romania
sabina.potra@upt.ro;
ana.branea@upt.ro;
monica.izvercianu@upt.ro

Abstract: The emergence of the Web 2.0 with vibrant online communities has shifted the governmental perspective from an administration with closed doors and one-directional communication to a transparent interaction and two-way communication urge. The challenges of our current society report citizen expectations for open data, e-participation and social media campaigns. The world wide usage of social media tools has opened new possibilities for authorities to engage their citizens in governmental work. In the mean time, citizens prove to be increasingly interested in engaging creatively as prosumers with the governmental agencies as long as they are offered the means to prosume. Like in the business world, they need an open platform which offers knowledge sharing, interaction, and the opportunity for creative initiatives, but these characteristics depend upon the level of governmental openness towards them through adequate tools and a transparency –oriented culture. The literature proposes stage models for developing e-government, but they all lack the connection with the degree of citizen participation and the value it provides for government activities. We must state the fact that there is a difference between usual citizen passive activity, a low involvement degree and prosumer creative engagement, the last demanding an increased organizational effort and loss of power for more valuable outcomes. Therefore, the present paper proposes an open government development plan to foster presumption on different levels of citizen engagement for value co-creation and government innovation.

Keywords: value co-creation, open government, presumption, citizen participation

1. Introduction

All government agencies are producers of services for their specific public. Like in the industry sector, where we face a producer-consumer relationship shift, the traditional role of the producer (government) who is used to have the last word is progressively changing. With the advent of the social Web and the market globalization, organizations are forced to reconsider their closed doors policies and adopt Prahalad and Ramaswamy's (2004) co-creation model, an intelligent partnership between them and their stakeholders. As Potra and Izvercian (2014) argue, the most important stakeholder of any organization is its prosumer, a contributing consumer (citizen), engaged in a process for one's own use or for the use of others.

Social media and especially social media tools have opened up unprecedented opportunities of engaging the public in government work but this change has similar effects on the public's expectations about how government work should be done (Chun et al., 2010). Thus, social media is considered a technical innovation and a transforming agent in generating citizen engagement. The US government encourages government agencies to apply social media in citizen interactions as to achieve the Open Government Directive with its three major mandates: transparency, participation and collaboration (The White House, 2009). Other citizen coproduction government initiatives are: the British government's Big Society program by decentralizing power to people's hands, Singapore's Government You strategy for a close connection with the people, and many others. All envisage the use of social media tools for citizen participation in some degree, without delineating the difference between passive citizens, active ones and prosumers, and the value produced by their level of engagement in government activities.

Therefore, we can conclude that in today's context, government agencies have a certain number of initiatives in the attempt to open borders to the public without resounding success, mainly because these attempts do not take into consideration the citizen participation degree or the barriers which confine creative engagement. This type of engagement is needed for original outputs due to the fact that it transforms citizens into value-providing prosumers.

The process of open government is well debated in literature. Prior studies proposed several models or strategies for e-government and e-democracy development with an emphasis on different progressive steps towards a similar evolution: participative transformation of the governmental sphere. The present paper aims

to build on these models a new open government development plan which responds to current value co-creation needs and takes into account the citizen engagement level required to foster prosumption (the highest degree of citizen participation). With this purpose in mind, the authors are envisaging tools and barriers in prosumer transformation for a gradual rise of government transparency, collaboration and ultimately citizen empowerment in several political and social activities.

2. Citizen participation degree and prosumer involvement

The importance of citizen participation and sustainable communities has been considered an issue of major importance (Bristol Accord, 2005). Therefore the literature has debated this subject for some time. Arnstein's ladder of citizens' participation (Arnstein, 2000)first developed in 1969, impelled scholars to examine and vigorously discuss the subject of citizen participation. Thus, the original ladder of citizens' participation has been widely acknowledged as general practices, a starting point for analysis in participation studies. The nonparticipation level presents accurately several possible barriers to citizen participation, the second and third level of participation state some of the well written open government mandates: informing, consultation, partnership and citizen power delegation. Based on continuous research in this specific area, Gramberger (2001) defined three levels of citizen and authority cooperation:

- Informing – as unidirectional communication initiated by government or citizens;

- Consultation – acceptance by authorities of citizens' feedback after previous informing;

- Active participation – implication of citizens in drafting public policy while the final decision remains with the authorities.

Izvercianu and Branea (2012) refine previous classifications and propose new levels of involvement taking into account the effect those levels have on citizens. The five provided levels (informing, consultation, partnership, citizen control and delegated power) affect citizens in two possible ways: either they are engaged or empowered by government open initiatives. By fully engaging customers in an organizational activity, they are emotionally attached and rationally loyal, becoming the most valuable customers (Appelbaum, 2001). In the same time, consumer creativity deals with solving problems, extremely useful in productive processes. These two characteristics are therefore relevant when assessing the consumer's participation level in any activity. Taking into account Haven (2007)'s engagement metric based on four components: involvement, interaction, intimacy and influence, and Izvercianu and Branea (2012)'s citizen participation levels based on government initiatives, we can envisage a new perspective regarding citizen's engagement degree (Fig.1): a passivity, low feedback engagement, active engagement and fully creative engagement.

Haven (2007) argues that the level of involvement, interaction, intimacy and influence an individual has with a brand over time marks a certain cognitive and affective behaviour. In the same way, government initiatives can trigger one of the following citizen engagement levels, each with different value driven results.
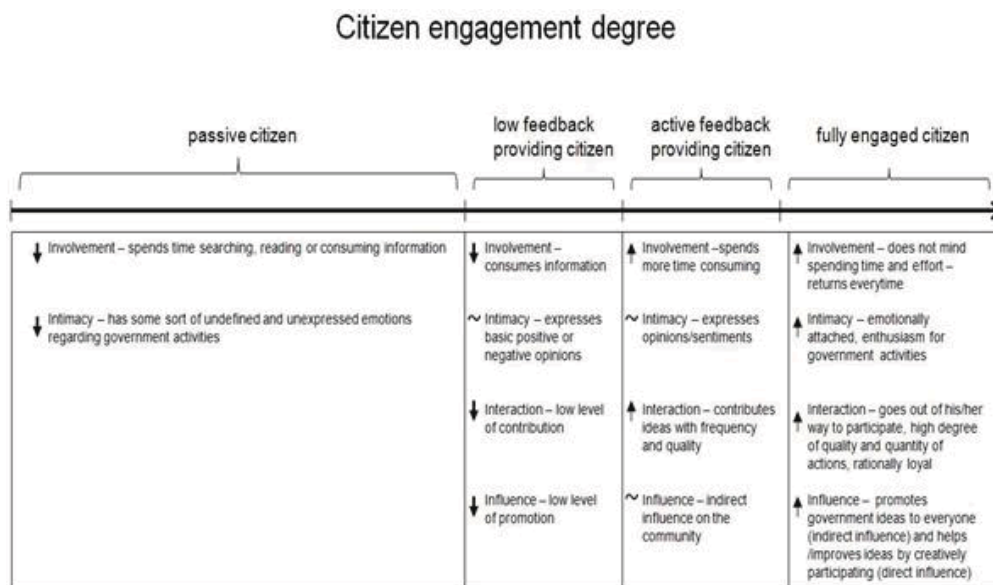
Figure 1: Citizen engagement degree with governmental activities

The first stage of citizen engagement is passivity. The citizen consumes government information and has some undefined feelings and understanding about its initiatives. The possible result of such an engagement level is almost negligible. The second stage implies a low involvement degree by expressing some basic opinions about government activities. The contribution is scarce because we do not have creative and original thoughts but merely yes or no answers (likes on Facebook for example) and the promotion lacks breadth. In the third stage we finally see an active participation, where involvement and interaction levels are high and the citizen expresses opinions (citizen insight) which have the power to indirectly influence government image and provide important information for government actions. In this phase the citizen has for the first time some sort of control and can transform in a prosumer. But the fully engaged citizen is considered the most valuable prosumer transformation due to the fact that this participant spends time and effort in government initiatives, is loyal and emotionally attached to government and political ideas and promotes these beliefs through word-of-moth and original free labour. Even Tapscott (1995) envisages that by facilitating co-creation of public services eParticipation enables citizens' transformation from consumers to prosumers. And this change of roles provides innovation. As Izvercian, Seran and Buciuman (2013) emphasize, a satisfied customer (citizen) who appreciates the brand (government actions, ideas, initiatives), motivated by an open information system (tools) and corporate values (governmental values towards transparency and empowerment of citizens) has all the premises to transform into a fully engaged prosumer. And the creatively engaged citizen named the prosumer has the ability to "link the three intellectual capital components together in a beautiful symbiosis for co-creating innovation and positive word-of-mouth".

The citizen transformation process encounters barriers both from external governmental sphere and internal civic knowledge and motivation degrees. In the next chapter we review several stage maturity models for open government upon which we will build a complex model for value co-creation.

3. Open government models – literature analysis

In literature we have witnessed the development of several e-government models with evolution stages towards open government. For a clear understanding of the viewpoints debated along the years, Table 1 offers a short description of the main open government literature opinions.

Table 1: Literature open government models description

Authors	Type of model	Stages of the model
Baum and Di Maio (2000)	e-Government model predictions regarding the evolution of citizen-government relationships	Presence – integration – transaction - transformation
Layne and Lee (2001)	e-Government growth model – focused on functionalities and technical governmental capabilities and integration level	Catalogue – transaction – vertical integration – horizontal integration
Wescott (2001)	e-Government model – regarding government integration and citizen participation	e-mail internal network – inter organizational and public access to information – two way communication – exchange of value – digital democracy – joined-up government
Linders (2012)	typology of citizen ICT-facilitated coproduction	Citizen sourcing – government as platform – do it yourself government
Lee and Kwak (2012)	Open Government Maturity model – considers e-Government maturity and the correlation with public engagement and value	Initial conditions – data transparency – open participation – open collaboration – ubiquitous engagement
Lörincz et al. (2012)	eGovernment to Open government – focused on eServices and Life events	Presence – integration – transaction
Izvercianu, Seran and Branea (2013)	Open Government Strategies – established upon government-citizen relationship and citizen culture	Informing – consulting – partnership – citizen power

Baum and Di Maio (2000) have published a progressive model which predicts a systematic change of government online presence and interactivity with citizens till a transformation stage where e-government will develop a citizen-centric approach for citizen trust. This model outlines the importance of progressive governmental

change towards citizens needs but does not detail the citizen participation degree or the real value each stage provides to governmental initiatives.

Layne and Lee (2001) present a model more oriented toward internal sharing and organizing data. This problem of government capability integration is a basic necessity for government before opening boarders to the public. Wescott (2001) is also focused on the need for service and data integration and does not develop the model for deeper levels of citizen's participation.

Linders (2012) introduces the citizen coproduction concept facilitated by information and communication technology (ICT). Thus he develops a typology of citizen coproduction facilitated by ICT taking into consideration the stages of service delivery. The originality in the conceptual approach is mainly the need for adequate ICT tools for the distribution of power between citizens and government agencies. We agree that open government models must include helpful tools for each progressive stage and must take into consideration citizen participation based on the provided power or control.

Lee and Kwak (2012) propose their maturity model for guiding government agencies to open government enabled by social media and relevant technologies. Therefore, they present a logical sequence for advancing government initiatives from initial conditions to open participation and collaboration. The final stage they refer to as ubiquitous engagement is not entirely the last one, because the integration within and across government agencies and the optimization of computing platforms are necessary for the fourth stage of citizen fruitful collaboration.

Lörincz et al. (2012) present in the eGovernment Benchmark Framework 2012-2015 report for the European Commission, the official perception of an Open Government. Compared to the academia created models, Lörincz et al. (2012)'s framework lacks the collaborative and creative aspects of eGovernment focusing on the efficiency and effectiveness of eServices for Life Events for mirror physical ones. This does not allow innovation neither on an institutional level nor as co-created value from prosumers.

Izvercianu, Seran and Branea (2013) argue for the first time the importance of citizen transformation into a new prosumer role for value creation and collaboration. Taking into account the basic two factors that define prosumers (engagement and creativity), and the characteristics of an open minded organization, they develop four prosumer-oriented strategies. The degree of control in each step of the policy development process and the effect it can have on citizens as prosumers are evaluated and correlated with the proposed model.

Therefore, after analyzing the literature findings, we begin to build our own model in the next chapter.

4. The proposed open development plan

From the previous literature analysis we can conclude that an open government model must be built upon several progressive stages before reaching a maturity status. In these stages government activities must be oriented towards internal integration of data and facilitation of citizen participation through adequate social media tools for a final scope of value co-creation for governmental image and services.

Luna-Reyes et al. (2005) draws attention towards agencies activities because they need to attend to issues related to technology and culture, where technology is a key enabler and the culture is a critical barrier. Therefore, in our model we must discuss the possible internal and external barriers for citizen participation and especially transformation into prosumers. Coglianese (2006) argues that the more significant internal barriers to citizen participation are cognitive and motivational. OECD (2003) emphasizes that the external chief barriers to citizen participation are not technological ones, but mostly organizational and constitutional.

In Figure 2 the complex model of open government development plan to foster prosumption is outlined. We have built it on five stages of government effort and openness depending on the citizen engagement degree and the resulted co-creation of value: starting conditions, data transparency, open participation, open collaboration and prosumption, each detailed in the following. The five stages express three approaches, the first two a government approach because the entire power and control is managed by government agencies, the other two stages shift towards a citizen approach where the citizen is in the centre of decisions, his valuable insight is taken into consideration, but ultimately the government has the last decision power. The last stage of our model marks

a valuable and seldom reached approach, towards the prosumer. Here, the citizen is creatively engaged, collaborates with the community and becomes empowered in some aspects and projects to decide/ make the rules and innovate public services.

- Starting conditions

In this stage government activities are oriented towards traditional transactions and the online presence is minimal as expressed by Layne and Lee (2001), represented by an official website with few information and one-way communication methods. The public is passive because there is little transparency and data is not frequently updated (Lee and Kwak,2012), resulting in no real added value. From these initial conditions, government agencies can climb the ladder of openness towards its public by increasing transparency. But unfortunately this progressive change heads back due to diverse barriers like the reluctance to open data to the public and from the part of the citizen, the basic understanding of civic activities.

- Data Transparency

Once the first stage has been surpassed, we find ourselves in the second government-centric phase, where the government publishes data online and shares it with the public (Meijer and Thaens, 2009)

Thanks to smart Dashboards, blogs and results tracking technologies. Data transparency increases public awareness and the citizen becomes more informed and interested in governmental work.
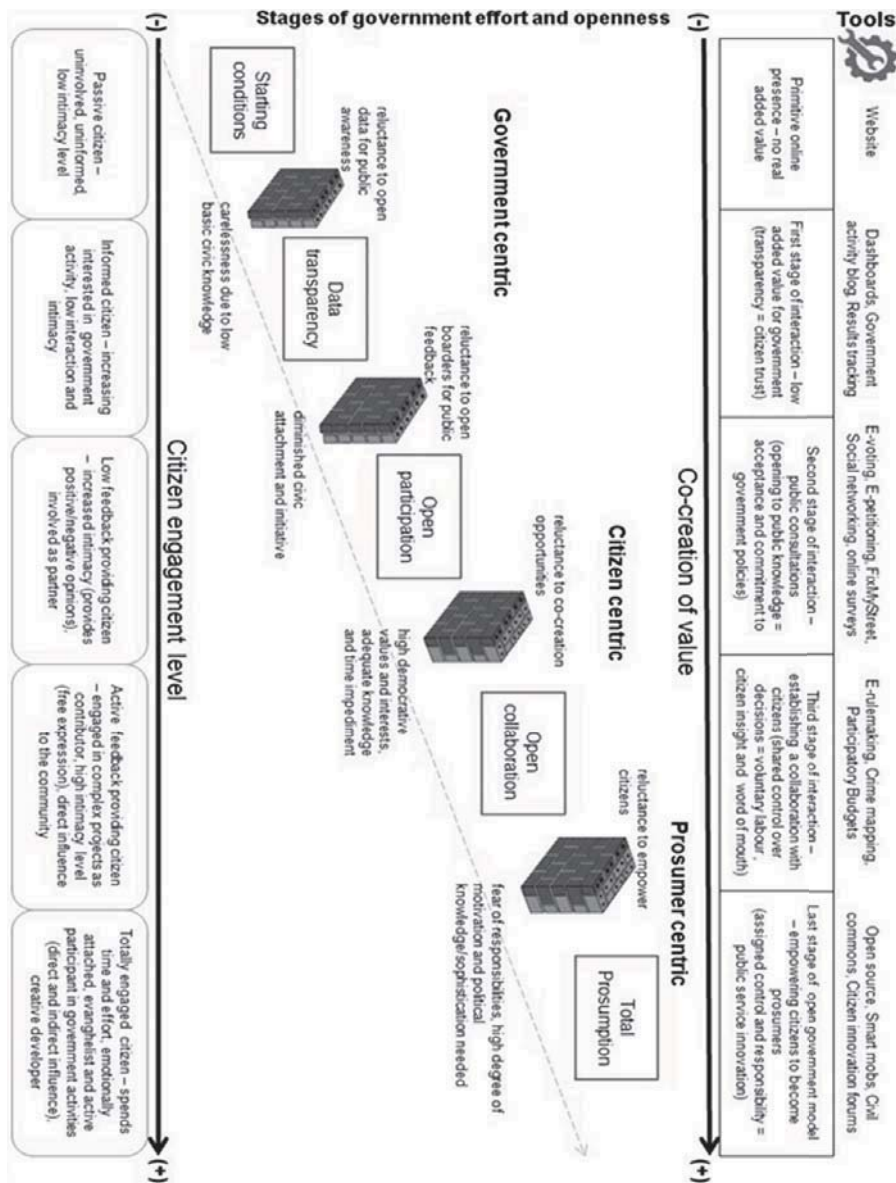
Figure 2: The open government development plan to foster prosumption for value co-creation

The value transparency adds to government image is represented by citizen increased trust. The initiative can grow towards a participation degree, but the change from a government centric to a citizen centric approach is tough. There are numerous barriers from government culture like the reluctance to the interest in public feedback and the citizens' low initiatives and engagement motivations.

- Open participation

We understand open participation as the first citizen centric phase where government agencies use the input of the public in policy decisions. With the help of e-voting and other social media tools, the citizen feels involved like a partner and these public consultations acquire citizens' increased commitment to governmental work and policies. But while giving a like or a vote for a cause is not time consuming, the next envisaged stage of open government is hindered by knowledge and time constraints. Citizens need to overcome the problem of collective action where it is inoculated that one comment does not make much difference and does not trigger changes (Coglianese, 2006). This motivational barrier together with time effort to write reviews or participate in complex tasks and projects obstructs many citizens to become active and transform step by step into prosumers.

- Open collaboration

This last citizen centric approach marks the point where agencies share some sort of control with citizens, gaining citizen free labour, their valuable insight and word-of-mouth for a good image in the community. Citizens express freely and become more intimate and attached to government actions, promoting them in their social network. The tools that have been used in this sort of open government stage are: crime mapping (Linders, 2012), e-rulemaking (Coglianese, 2006), participatory budgets (Rios and Rios, 2008), and many others. The open collaboration mechanism emphasized by Lee and Kwak (2012) uses public contests, shared repositories, and applications for public response to national or local emergencies. Many models stop at this point or argue the need for open government strategies to integrated collaboration within and across other governmental agencies and the public sector. But this paper is focused on citizen value co-creation based on their progressive transformation into active and creatively engaged empowered contributors.Thus, the barriers towards a prosumer centric approach are based on different type of fears. The governmental sphere is reluctant to assign control and responsibility solely to prosumers in specific projects and the citizens need a high motivation drive and political knowledge to innovate public services. If overcome, the open government development plan reaches the final stage of government-prosumer innovation driven relationship.

- Prosumption

The final stage of our model envisages an empowering citizens' process where citizens are totally engaged, emotionally attached, active in promoting governmental policies and creative contributors for innovative outcomes. The tools they can use for this stage are essentially open source, innovation forums and creative social media applications. Prosumers live in communities of interest; therefore the tools used are mainly collaborative and interactive for taking part, monitoring and reformulating processes for different governmental projects. In these specific activities, government agencies delegate the power and control to prosumers as a way of ensuring a decisive openness towards the public. And the outcome of such prosumption initiatives assures sustainable development and an integrated government-citizen relationship.

5. Conclusions

With the open government initiatives debated all over the world, the academic world needs to develop and sustain these approaches by presenting detailed steps towards this final goal of citizen involvement in government activities. The present paper suggests a new citizen participation degree based on several marketing metrics like: involvement, intimacy, interactivity and influence. After a thorough literature analysis, the four developed citizen engagement typologies have been linked with the government position towards opening boarders and the value provided after each governmental maturity stage in an original model to foster prosumption.

The authors have considered appropriate to introduce the concept of presumption in eGovernment due to the fact prosumers designate the ultimate citizen empowerment degree, creatively engaged individuals that can be co-opted in government-public innovation. By working together and opening boarders progressively, taking into consideration the potential barriers and the facilitating tools for this process, government agencies are well prepared to foster prosumption. This present conceptual research can become a starting point for further research regarding adequate strategies and facilitating tools for each open government development plan model.

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Benefits and Challenges in Information Sharing Between the Public and Private Sectors

Dhata Praditya and Marijn Janssen
Faculty of Technology, Policy and Management, Delft University of Technology, The Netherlands
D.Praditya@tudelft.nl
m.f.w.h.a.janssen@tudelft.nl

Abstract: Advancements in information and communication technology (ICT) helps to enable information sharing between organizations. A large number of researches have been conducted to identify benefits and also barriers in inter-organizational information sharing as key elements in adopting this process. However, there are only a few studies of information sharing focused on public and private sectors relation. Based on literature review, this paper provides an overview of the benefits and challenges of sharing information for both government and business' perspective of current practices, defines comparative and similarities, and discusses proposed solutions to lower barriers and increase benefits perceived by governments and companies. We find that information quality and comprehensive information are main benefits in public and private sectors information sharing, while technical barriers must be cleared up before other barriers.

Keywords: information sharing, inter-organizational, challenges, G2B, benefits, e-government

1. Introduction

Public and private sectors information sharing is regarded as a bridge to improve performance by simplify administration procedures for government agencies and companies (Klievink et al., 2012). The importance of inter-organizational information sharing (IIS) in public sector was explored by several researchers (Cresswell, 2005, Dawes, 1996, Gil-Garcia et al., 2005, Pardo et al., 2006). A study from Dawes (1996) grouping benefits and barriers of IIS into three categories which are technical, organizational and political. In general, IIS offers the opportunity to improve information infrastructure, data management integration, information quality and business process enhancement, and strengthening the relationship among participating organizations (Dawes, 1996, Zhang et al., 2005).

Despite many expected benefits, there are significant barriers in adopting the initiatives. Heterogeneous IT systems, system security, lack of resource, user privacy, bureaucracy, and ambiguity of power and authority (Gil-García et al., 2007, Zhang et al., 2005, Dawes, 1996) are difficulties perceived by users before and during the implementation of information sharing.

Defining benefits and challenges are important because the expectation of benefits gives motivation for users to participate in information sharing process, while the expectation of barriers may undermine user's commitment to sharing process and their willingness to take risks (Zhang et al., 2005). It is critical to have an understanding of the interests and concerns of those interested parties before and during the development of any IT-based initiatives to achieve desired success and adoption of the information sharing process (Zhang et al., 2005).

There are many studies discussing information sharing in public sector. Most of them involve collaboration within public agencies and between government and citizen, and only a few studies explore G2B information sharing. These few studies mainly explain the need of G2B information sharing to reduce the administrative burden of both companies and government.

The goal of this article is to identify benefits and barriers in implementing sharing process by reviewing existing research papers that focus on G2B information sharing. In the next section, we describe the methodology used to accumulate the data. Thereafter, a review of the relation between public and private sectors, including their perspective about sharing and integration will be presented. Finally, we conclude this article by discussing typical G2B information sharing challenges and benefits.

2. Research approach

This article used three steps proposed by Webster and Watson (2002) in writing a literature review paper to collect all data related to benefits and challenges of information sharing between government and business.

First step, we searched papers from leading journals and conferences. At the beginning, some keywords such as "information sharing", "inter-organizational information sharing", "business-to-government information sharing", "benefits and barriers of information sharing" and "G2B collaboration" were used to achieve the relevant literatures in this research. Then we found some of the key articles also used to develop research about E-Government. So, we also searched using keywords "E-government" and "E-Government to business" based on the E-Government Reference Library (EGRL) from University of Washington.

Second step, reviewing the citations for the articles identified in the previous step to find appropriate prior studies. Last, we identified articles citing the key articles in the previous steps by using Web of Science to search the most recent updates in the knowledge area.
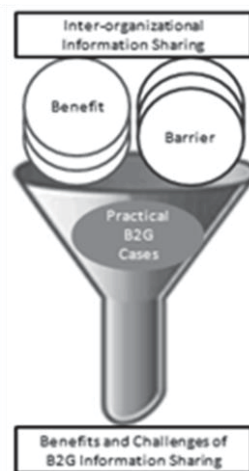
Figure 1: Research approach

As shows in figure 1, to achieve the research goal, we searched benefits and challenges of IIS from literatures, then using earlier studies which explored case study of the G2B relationship as a filter. Therefore, we summarized some relevant benefits and challenges for G2B information sharing.

We found more than 700.000 articles discussed about information sharing or information exchange, plus more than 5000 articles in the EGRL. From that number, only 139 articles focus on G2B information sharing. In this article, we select 61 papers as the main sources.

Key articles for this research are collected from various journals in interdisciplinary fields and conference proceeding papers: Government Information Quarterly (9 articles), Proceedings of International Conference on System Sciences (4), Information & Management Journal (2), International Journal of Electronic Government Research (2), Management Information System Quarterly (2), Public Administration Review (2), European Journal of Information Systems (2), Journal of Enterprise Information Management (2) and 36 articles from others. These papers mostly developing research conducted by Dawes (1996) and Landsbergen Jr and Wolken Jr (2001) with additional articles discussing implementation of information sharing in private sectors.

3. Literature overview

3.1 Public-private sectors information sharing

Information sharing is defined as *exchanging or giving other involved users access to explicit data in any forms through ICT system*. In terms of public and private sectors, the data could be tax report, statistical data, development report, invoice statement, or anything else. In understanding public and private sectors, Van Der Meer (2014) introduced four models of relationships, according to its leadership, length of relationship, type of relationship and how information exchange in the system: 1) Corporate Management, 2) Business Development, 3) Community Development and 4) Inter-organizational Network. Van Der Meer explains that exchanging

information in community development and inter-organizational network are broader because these models formed with less formal approach.

Building integration system between government and companies is part of the first model. It is characterized by joint leadership between users, formal approach relationship and throughout specific project. In all models, government usually becoming the initiator (Van Der Meer, 2014), because they have more power than businesses. Although the first model requires joint leadership, most likely government is the driver of the whole project. This power inequality worsened if the project uses public funding.

Government and business might have different objectives, structure and hierarchy. Businesses usually see excessive regulation, policy uncertainty and rigid communication of government as the main causes of economic failure. The government also tends to analyze problems from macro approach and political view, while businesses usually act with micro approach and economical view (Arendsen et al., 2014). For example, in a high risk market, government creates more detail regulations for supply chain system because it will reduce risks for society. While from businesses perspective, more detail regulations most likely result in higher compliance costs (Bharosa et al., 2013).

3.2 Benefits

Table 1 summarized the benefits of information sharing between government and businesses. Although many of the benefits are similar, there are specific benefits for government or for businesses. Based on literatures, the government considered getting more benefits from information sharing than businesses. This imbalance benefits might add complexity and could result in unwillingness of businesses to join the project.

Table 1: Benefits of information sharing

Benefits	Source	Perspective	
		Government	Business
Wider Professional Network	(Dawes, 1996, Landsbergen Jr and Wolken Jr, 2001, Calo et al., 2012)	√	√
Simplify administrative procedure	(Winne et al., 2011, Raus et al., 2010, Calo et al., 2012, Janssen and Tan, 2014)		√
Accelerate the processing of information	(Prajogo and Olhager, 2012, Klievink et al., 2012)	√	
Better Information Quality	(Zhang et al., 2005, Gil-García et al., 2007, Janssen and Tan, 2014, Crowther, 2014, Popovič et al., 2014)	√	√
More Comprehensive Information	(Zhang et al., 2005, Calo et al., 2012, Chengalur-Smith et al., 2012)	√	√
Shared Infrastructure	(Dawes, 1996, Landsbergen Jr and Wolken Jr, 2001, Gil-García et al., 2007, Calo et al., 2012)	√	√
High quality service	(Gil-García et al., 2007, Calo et al., 2012, Zheng et al., 2009, Landsbergen Jr and Wolken Jr, 2001, Bharosa et al., 2013)	√	
Improve accountability	(Winne et al., 2011, Dawes, 1996, Zhang et al., 2005, Janssen and Tan, 2014)	√	√
Reduce duplicate data	(Dawes, 1996, Gil-García et al., 2007)	√	√
Improve decision making	(McCaffrey et al., 1995, Calo et al., 2012, Dawes, 1996, Janssen and Tan, 2014)	√	
Cost efficiency	(Badri and Alshare, 2008, Dawes, 1996, Calo et al., 2012, Chengalur-Smith et al., 2012)	√	√
Improve transparency	(Calo et al., 2012, Gil-Garcia et al., 2009)	√	
Increase productivity	(Calo et al., 2012, Van Der Meer, 2014, Lotfi et al., 2013, Mourtzis, 2011)	√	√
Improve compliance	(Bharosa et al., 2013, Aviram and Tor, 2003, Chen, 2012)		√

3.3 Barriers

Table 2 summarized some barriers of information sharing between government and business. A study from Veenstra et al. (2011) argued that it is better to address all possibilities of barriers because some of barriers

could be interrelated to each other, and it is also important to make it broad so that the approach in dealing with barriers will be more comprehensive. To make distinction of specific barriers for government and businesses is difficult because in a project involving interaction of many users, problems in one side could be challenges for other sides.

Table 2: Barriers of information sharing

Categories	Barriers	Source
Organization	Resource problems	(Ismail and Yusof, 2010, Nooshinfard and Nemati-Anaraki, 2014, Yang and Maxwell, 2011, Moon, 2002, Ebrahim and Irani, 2005)
	Individual and Organization resistance to change	(Ismail and Yusof, 2010, Nooshinfard and Nemati-Anaraki, 2014, Yang and Maxwell, 2011, Ahrend et al., 2014, Moon, 2002)
	Organizational Hierarchy/Structure	(Zheng et al., 2009, Layne and Lee, 2001, Klievink and Janssen, 2008, Ismail and Yusof, 2010, Nooshinfard and Nemati-Anaraki, 2014, Yang and Maxwell, 2011, Ahrend et al., 2014)
	Lack of Top level leadership	(Fan et al., 2014, Yang and Maxwell, 2011, Zheng et al., 2009, Layne and Lee, 2001, Klievink and Janssen, 2008, Gil-Garcia et al., 2007)
Inter-organization	Goal problems	(Ronaghan, 2002, Savoldelli et al., 2014, Lam, 2005, Gil-García et al., 2007, Gil-Garcia et al., 2009)
	Lack of Funding	(Sayogo and Gil-Garcia, 2014, Fan et al., 2014, Yang and Maxwell, 2011, Moon, 2002, Zheng et al., 2009, Layne and Lee, 2001, Klievink and Janssen, 2008)
	Project schedule problems	(Zhang et al., 2005, Gil-García et al., 2007, Karagoz et al., 2014)
	Communication problem	(Crowther, 2014, Desourdis and Contestabile, 2011, Gilja, 2013)
	Lack of Trust, Respect and Confidentiality among organizations	(Wenjing, 2011, Yang and Maxwell, 2011, Layne and Lee, 2001, Savoldelli et al., 2014, Zhang et al., 2005, Donahue and Zeckhauser, 2006)
	Lack of measurement and evaluation	(Moon, 2002, Savoldelli et al., 2014, Heeks, 2006)
	No sharing guidelines	(Samaddar et al., 2006, Ronaghan, 2002)
Technical	Lack of telecommunication network	(Ferro et al., 2007, Savoldelli et al., 2014, Ronaghan, 2002, Zhang, 2006)
	System security	(Sayogo and Gil-Garcia, 2014, Yang and Maxwell, 2011, Ebrahim and Irani, 2005, Savoldelli et al., 2014, Medjahed et al., 2003)
	Lack of enterprise IT-architecture	(Ebrahim and Irani, 2005, Veenstra et al., 2011, Janssen and van Veenstra, 2005, Li and Lin, 2006, Lam, 2005)
	IT Capability	(Yang and Maxwell, 2011, Rhoda, 2009, Yang and Wu, 2014)
	Incompatible hardware and software	(Sayogo and Gil-Garcia, 2014, Yang and Maxwell, 2011, Gil-García et al., 2007, Lam, 2005)
	Lack common data definitions and standards	(Sayogo and Gil-Garcia, 2014, Dawes, 1996, Zhang et al., 2005, Yang and Maxwell, 2011)
	Information asymmetric	(Liu and Tan, 2008, Aviram and Tor, 2003, Yang and Wu, 2014, Engel et al., 2014)
Political	Lack of political support and commitment	(Ronaghan, 2002, Savoldelli et al., 2014, Sayogo and Gil-Garcia, 2014, Zhang et al., 2005, Gil-García et al., 2007, Yang and Maxwell, 2011)
	Restrictive laws and regulations	(Zhang et al., 2005, Gil-Garcia and Pardo, 2005, Ronaghan, 2002, Savoldelli et al., 2014, Sayogo and Gil-Garcia, 2014, Gil-García et al., 2007)

4. Discussion

In a relationship with business, government has two main functions, to ensure private companies comply with the established laws and regulations and to maintain equality in competitive market. For compliance monitoring purpose, government need to collect and analyze information such as tax report, statistics or employment report. With shared and standardized IT system, businesses get accessibility to deliver correct information in simpler way and only need to send information one time (Bharosa et al., 2013). Users also have ability to re-use, modify

and add information inserted in system directly, these will increase information quality while simultaneously reduce duplicate data. In the end, verifying compliance or audit process will be based on system. For regulating the market, government need to compromise with many parties especially companies and in many cases this will cause problems, for example discrimination experienced by SMEs in China (Song and Guo, 2014). With information sharing, government get all information needed in system without any prejudice especially which one has stronger capital or closer to the authority. The number of companies that join the initiative will decisive in generating comprehensive information and could be beneficial in decision making. Further, transparency and accountability in creating regulations also improved because all information obtained from shared system.

In businesses perspective, they need to retain their competitiveness in market, income and revenue is important to them. The use of ICT system rather than paper-based procedure makes administrative process more efficient, it could even better if some of the processing steps are eliminated. Developing an on-line service also reduces the processing and operating costs of many activities compared with the manual way (World Bank, 2011).

From all benefits explained in this article, shared infrastructure and enhance professional network are the minimum benefits that could be expected by users from the information sharing. If shared infrastructure is developed with a proper IT enterprise architecture plan and recognized standards, data duplication will be decreased, thus more comprehensive information and better information quality will be realized. Once achieved, these benefits will bring many more derivative benefits such as transparency for government agencies, cost efficiency, compliance improvement for companies, accountability improvement, better decision making process, better productivity, and more effective, efficient, and responsive services.

Some of the benefits may relate to each other, for example, with enough information accepted by the government, it will help them to make a better regulations, but sometimes it could also make government agencies face a more complex situation, and took longer time to make a decision. Maintaining the information quality and its comprehensiveness will reduce the possibility of this problem. Another example, it is understood that sharing of information could reduce administrative burden, but it also depends on how close relation of users and how well shared infrastructure adopted by users. While simpler administrative process could make companies easier to comply with the regulation.

Furthermore, each initiative could offer specific benefits. For example, supply chain network information sharing decreases inventory delivery cost, facilitates restock inventory faster, provides better production schedule for suppliers, and lower delay time (Samaddar et al., 2006). In other case, information sharing offer preventive support in dealing with catastrophes (Crowther, 2014). Technology is often viewed as a solution (Allen et al., 2013) while the problem that often arise is in collaboration process (Crowther, 2014). A study from Yang and Maxwell (2011) conclude that overcoming technical barriers only solve basic problem, while more complicated issues occur in organization and policy.

According to a study from Zhang et al. (2005) resistance to change and lack of funding are top two most negative barriers in implementing e-government knowledge sharing for all types of organization. Further, a study from Gil-García et al. (2007) showed goal problems, project schedule problems and lack of funding as major impediments.

Understanding technology barriers is the fundamental step to achieve decent information sharing system. It is impossible to get enough participation in the initiative when broadband penetration is low. If telecommunication network is ready, data definition and standard, and incompatibility of hardware and software among users need to be negotiated. XBRL (eXtensible Business Reporting Language) is selected as standard for the data exchange in many cases. It was originally developed for financial reporting but currently has been used for other reporting types. The broader use of XBRL produced by its ability to enable interoperability despite the differences in local system (Winne et al., 2011). IT capability is influenced by skills of organizational members in utilizing and integrating IT applications. Information sharing requires similar level of IT capability from users (Badri and Alshare, 2008). A study from Bradley et al. (2011) explained enterprise architecture (EA) is IT capability used by organizations to align their IT system with the business processes, this will enable organizations to achieve their business objectives through IT system. However, lack of EA could be impacted to any functional overlap, duplication and redundancy of IT applications adopted in organizations which also means increased of organizations expense in investing new IT system. System security is important because it is related to level of trust and confidentiality among users. For companies, information is a

competitive advantage in the market. They need to be reassured that their personal and restricted information with joining information sharing will not be leaked to other parties.

Interrelated barriers of information sharing can be seen clearly in organizational, inter-organizational and political barriers. Lack of trust and respect among users can have an impact on communication among users and difficulty in reaching agreement for collaboration goals. Structure and hierarchy of organizations especially in government agencies can also cause lower communication level. Study from Desourdis and Contestabile (2011) and Crowther (2014) in evaluating common information sharing failures for major catastrophes explained communication problem such as poor messaging, inaccurate relay of data, failure to disseminate and incomplete reporting between collaborating organizations results in misinterpretation of information and responsible for failure of IIS project. No guidelines, resistance to change and disagreement on goals can lead to project schedule problems. Any delays in project schedule will impact the funding. However, the funding problem can be solved if there are strong political supports and commitments from legislators and top level leaders.

Interrelated benefits and barriers also occurs in developing G2B information sharing, for example cost efficiency is one of considered benefits of information sharing for businesses, it is also understandable that the government wants to achieve higher quality service with limited employees. However, when adopting information sharing, organizations will need appointed employees that have a special commissioner to receive and send information. These people have to understand which information need to share, how the information will deliver to other parties and have enough authority to make a decision if some important information received particularly in emergency circumstances. This specific job not only will increase cost organizations for training, in IT and communication skills, but also need to be paid appropriately because they have to deal with some important information.

5. Conclusion

Information sharing is needed to promote inter-organizational collaboration. This article's main objective is to understand the basic factors that influencing willingness of the public and private organizations joining the information sharing project. We assume that if involved users realize clear benefits and barriers, it will increase their eagerness to adopt the system.

From the relationship between government and businesses, power inequality, bureaucracy and different approach in analyzing problem could potentially cause a conflict.

There are many benefits of G2B information sharing from the literatures, some of them could be interrelated, and sometimes it is other benefits' derivative. We argue that generating more comprehensive information and better information quality are the most important benefits. In addition, the government considered getting more benefits from information sharing than businesses. This might add complexity and could result businesses' reluctance to join the information sharing project

G2B information sharing has many challenges. We tend to agree with most scholars that consider organizational and political barriers as bigger problems than technology barriers. As the result, technology barriers must be compromised firstly to achieve successful implementation. For next research, we suggest to explore other factors influencing G2B information sharing. As G2B collaboration are increasing, having a clear and comprehensive understanding of factors influencing G2B information sharing can produced a better confidence in the outcome.

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The use of Social Network in Enhancing e-Rulemaking

Lobna Sameer and Hany Abdelghaffar
German University in Cairo, Cairo, Egypt
Lobna.sameer@guc.edu.eg
Hany.ismail@guc.edu.eg

Abstract: E-rulemaking is concerned with the use of ICTs to allow citizens to read the laws the government is working on, and submit their feedback so this feedback can be incorporated in the finalized laws. Forums have been the main technological tool used in e-rulemaking however they have shown many limitations, and are unable to fulfill all the requirements of e-rulemaking. It is thought that the use of social networks in e-rulemaking might remedy these limitations as SNSs showed a political impact in other political activism venues. However, little research has been conducted to investigate the use of SNSs in e-rulemaking. This research answers the following research question "How can social networks be used in enhancing e-rulemaking?" To answer this question, a proposed conceptual model and a research model were developed and tested through qualitative and quantitative methods. Five out of the variables studied (information collection, user interface, privacy, security, and use of emoticons in communications) were found to have a significant influence over citizen inclusion in e-rulemaking. Accordingly the research contributed the determination of the variables that influence the use of SNSs in e-rulemaking. Moreover, the research contributes a conceptual and a research model illustrating the effect of these variables on e-rulemaking as well as an understanding of how social networking sites could be used to enhance e-rulemaking practices and citizen inclusion.

Keywords: social networks, social media, e-rulemaking, e-participation, inclusion

1. Introduction

Electronic rulemaking allows citizens to use ICTs to read the regulations proposed by governmental agencies, and provide their feedback on them. It increases the participation of those that have not been engaged in the rulemaking process (Emery and Emery, 2005; Beierle, 2003). Representative deliberations on forums are considered the only method by which governmental agencies seek out a public opinion on the rules they are developing (Coglianese, 2011; Schlosberg et al, 2009; Benjamin, 2006; Weeks, 2000). However, such forums are complicated and do not fulfill the requirements of e-rulemaking (Schlosberg et al, 2008; Benjamin, 2006). Governmental agencies are contemplating the use of new technologies to improve the quality of such deliberations (Coglianese, 2011; Farina, 2010; Schlosberg et al, 2008; Benjamin, 2006; Coglianese, 2004). Unfortunately, little research has been done to examine how an SNS can be used in e-rulemaking. This paper is presenting a model of how SNSs can enhance e-rulemaking. It aims at answering the following research question: "How can social networks enhance e-rulemaking?" The paper starts by presenting the theoretical background for understanding e-rulemaking followed by the proposed e-rulemaking model, research methodology and discussing the findings.

2. Theoretical background

2.1 The e-rulemaking process

The rules' development process differs between agencies inside the same country, and across countries (Schlosberg et al, 2008). The rulemaking process in many countries is still solely executed by officials and does not directly involve citizens. Allowing citizens to comment on the regulations that are to govern them would help ensure the well being of democracy in many countries. Hence, electronic rulemaking has the potential to improve the rulemaking process, increase citizen engagement, and improve the quality of issued rules (De Figueiredo, 2006; Shulman, 2005). The e-rulemaking process followed in the United States through forums illustrated in figure (1). Is an example of such a process and is going to be adopted in this research.
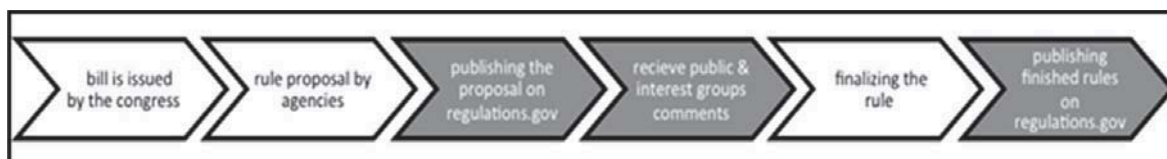
Figure 1: E-Rulemaking process in the USA

2.2 Democratic deliberation theory and e-rulemaking

E-rulemaking requires agencies to publish the rules they are developing, and to collect, and respond to, the feedback they receive when finally the rule (Schlosberg et al, 2008; De Figueiredo, 2006). Agencies can fulfill this obligation through democratic deliberations (Beierle, 2003; Weeks, 2000). Deliberative democracy theory believes that; informed voluntary citizens' discussions of the issues that concern them help the government in decision making (Schlosberg et al, 2008; Ranerup, 2000). Thus, a democratic practice like e-rulemaking should rely on the study of citizens' online and/or offline deliberations (Min, 2007; De Figueiredo, 2006). The deliberation model by Perote-Pena and Piggins (2012) in figure (2) is a generic model that can be modified to fit e-rulemaking deliberations. It has five stages after which a social choice is reached. In adopting this model in this research; the voting stage will be removed, as the main aim of e-rulemaking is to discover new issues that the government did not consider while rulemaking and not the conduct of a vote to pass/reject a rule, the main deliberation variables that are thought to affect e-rulemaking are discussed next.

Figure 2: Deliberation model by Perote-Pena & Piggins (2012)

Information management: divided into information provision and collection. Information provision requires that information should be provided to citizens, as an informed citizen is the base of deliberations (Bertot, 2012; Farina, 2010; Schlosberg et al, 2008). SNSs aid in creating informed citizens (Schlosberg et al, 2008; Min, 2007) as they allow access to information without gatekeepers (Bertot, 2012; Oehri and Teufel, 2012; Iskander, 2011). On the other hand, SNSs allow data mining which saves the agencies money and improves the quality of data analysis (Kuzma, 2011; Coglianese, 2003). Agencies should emphasize that the quality of comments received matter more than their quantity (De Figueiredo, 2006; Farina, 2010), as rule makers are mainly interested in receiving new information that would help them improve the proposals they are working on (Shulman, 2009; Emery and Emery, 2005). Based on this we assume the following two hypotheses:

H1: Information provision through SNSs significantly Influences citizen inclusion in of e-rulemaking

H2: Information collection through SNSs significantly Influences citizen inclusion in e-rulemaking

2.3 Social networking sites (SNSs)

Social Networking Sites (SNSs) are web services that allow users to create profiles, interact and share information with others (Bertot, 2012; Oehri and Teufel, 2012; Burke et al, 2011; Kuzma, 2011; li et al, 2011; Wilson et al, 2009). SNSs created a communication channel between citizens and activists that was not present before. (Choudhargy et al, 2012; Sundaram et al, 2012) and has become the study interest of many researchers in information systems, and political sciences (Abdelghafar and Sameer, 2013; Lim, 2008). SNSs were utilized in the 2008 American presidential elections (Bertot, 2012) and in the Egyptian and Tunisian revolutions in 2011 and 2010 (Abdelghafar and Sameer, 2013; Choudhargy et al, 2012; Iskander 2011). According to Papacharissi (2009), what makes some SNSs more successful than others is the unique combination of their features. There features and combinations would affect the use of SNSs in rulemaking and are thus studied next.

A. The user interface: A graphical link between a system and the user (Nasir, 2010). If the interface of an SNS is hard to understand, the users might choose not to use the SNS at all (Gross and Acquisti, 2005); which defeats the purpose of these networks. The government should consider the capabilities of the citizens and the interface of the SNS to be selected for rulemaking amd to find a balance (Crespo, 2013; Nasir, 2010). A deliberation tool should have an interface that is easy to use to encourage participation (Yetim 2009). Based on this we hypothesize:

H3: The user interface of SNSs significantly Influences citizen inclusion in e-rulemaking

B. Communication methods: SNSs support almost all kinds of communications although text communications dominate (Chandramouli, 2011); however, text communications seem lacking in emotional expression (Schlosberg et al, 2008). Multimedia and emoticons give the users more expression tools (Bertot, 2012). However collection and analysis of multimedia requires resources from the government which might not be available (Shulman 2009). Some researchers believe that the lack of emotions makes deliberation objective, and encourages inclusion of minorities (Min, 2007). Others believe that multimedia and emoticons make discussions

as natural as possible (Yetim 2009). The government thus has the choice of allowing or prohibiting multimedia depending on its available resources and the abilities of the involved stakeholders. Based on this we assume the following;

H4: Multimedia communications on the SNS significantly Influences citizen inclusion in e-rulemaking

H5: Emoticons Communication on the SNS significantly Influences citizen inclusion in e-rulemaking

C. Privacy: Methods of access to private information by members and non-members of the network are defined in the early stages of SNS technical design (Boyd and Heer, 2006). A study conducted revealed that most of the SNSs have privacy policies protecting their users (Kuzma, 2011). Regardless, members might use third party applications that could access their information with or without their permission (Oehri and Teufel, 2012). Researchers however believe that privacy violations are a price of living in the digital age and cannot be totally avoided (Laudon et al, 2013; Oehri and Teufel, 2012; Kuzma, 2011). Based on this we assume the following;

H6: The privacy options of the SNS significantly Influences citizen inclusion in e-rulemaking

2.4 Environmental influences on e-rulemaking

These are deliberation and technological variables that are outside the direct manipulation of the government and thus were classified together in a separate category. These variables are

A. Security: One of the issues of e-rulemaking is the security of confidential information (Coglianese, 2003). Other issues include denial of service attacks, phishing, viruses, spyware, and Trojans. These attacks can be avoided through different technological methods; however they remain a threat (Chandramouli, 2011). Reaching a 100% secure SNS is impossible and is not cost effective thus governmental agencies should accept a certain degree of security threats in the SNS they wish to use (Oehri and Teufel, 2012). Based on this we assume the following;

H7: The Security level of the SNS significantly Influences citizen inclusion in e-rulemaking

B. Interest Groups: They utilize technologies to mobilize individuals and generate comments on rule proposals (De Figueiredo, 2006; Shulman, 2009) thus ineffectively increasing the analysis cost. The government has to emphasize that what matters is the value the comments add to rulemaking and not their quantity (Shulman, 2009). The government could also encourage interest groups to submit a single comment with signatures attached to it (Emery and Emery, 2005). On the other side, some researchers believe that these campaigns could be a fire alarm to the consequences a new rule might bring (Shulman, 2009). Based on this we assume the following;

H8: interest groups on the SNS can significantly Influences citizen inclusion in e-rulemaking

3. Proposed model

The proposed model was developed by matching the adopted deliberation model to the e-rulemaking process. The variables thought to affect e-rulemaking in table (1) were added to the model. The outcome of e-rulemaking is measured through the increase in the willingness of those that have not been previously engaged in e-rulemaking to engage in e-rulemaking in the future.

Table 1: Variables included in the proposed conceptual model

	Variables	Measuring factor	Definition	Source
1. Deliberation variables	1.1 Information Management	Information provision	Perceived readiness of the government to publish and e-rulemaking information	Bertot, 2012; Chandramouli, 2011; Schlosberg et al, 2008
		Information collection	Perceived readiness of the government to collect citizen comments for analysis	Kuzma, 2011; Farina, 2010; Barnes, 2006; Shulman, 2005;
2. Technological variables	2.1 user interface	User Interface	The user evaluation of the layout of the tool that is to be used in e-rulemaking	Laudon et al, 2013; Asur and Huberman, 2010; Nasir, 2010
		Multimedia	The use of multimedia in deliberations	Bertot, 2012; Chandramouli, 2011; Coglianese, 2003.

	Variables	Measuring factor	Definition	Source
	2.2 Communication method	Emoticons	The use of pectoral representation of emotions in deliberations	Schlosberg et al, 2008; boyd and Heer, 2006;
	2.3 Privacy	Data protection	Perceived protection of confidential data	Laudon et al, 2013; Oehri and Teufel, 2012; Kuzma, 2011; Papachaissi, 2009.
3. Environmental variables	3.1 Security	Vulnerability to attacks	Perceived ability of the tool to withstand outside attacks	Oehri and Teufel, 2012; Chandramouli, 2011; Papachaissi, 2009;
	3.2 Influence groups	Influence of interest groups	Perceived ability of interest groups to mobilize citizens	sur et al, 2010; Shulman, 2009; Schlosberg et al, 2008; De Figueiredo, 2006;

To validate the proposed model, two interviews were conducted; the first with an expert in information system, the second with a legislation expert. The proposed model was presented to them, and they were encouraged to give their feedback. The improved conceptual model is in figure (3).
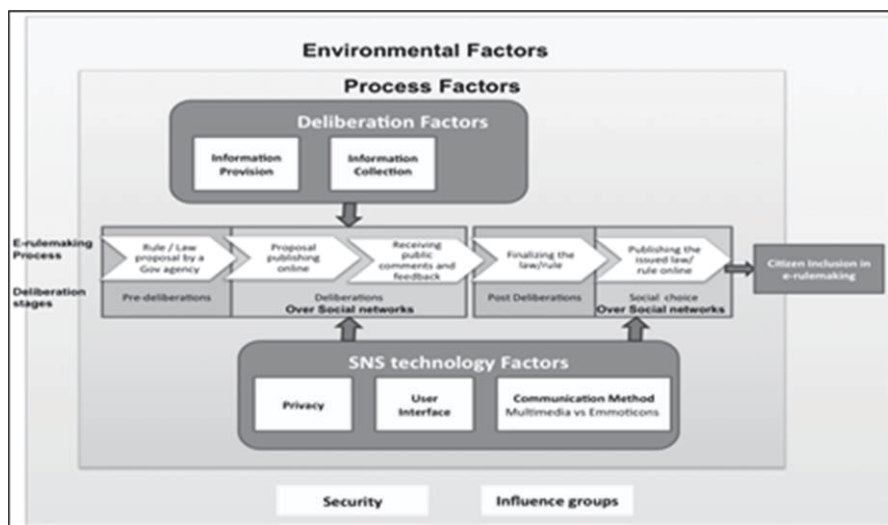
Figure 3: Improved proposed conceptual model

4. Research methodology

Egypt was selected to answer the research question of "how can social networks enhance e-rulemaking?" because SNSs have become an activism channel for the Egyptian youth. This has been clear in revolution of 2011 (Iskander, 2011). Accordingly, it could be assumed that the use of SNSs in e-rulemaking would increase the inclusion of some sectors of the Egyptian society in rulemaking. An exploratory research deign was employed as little is known about the phenomena understudy (Saunders et al, 2012; Sekaran and Bougie, 2010). Combinations of quantitative and qualitative data collection methods have been used in this research. The use of a combination of different data collection methods help overcome some of the limitations singular data collection methods (Sekaran and Bougie, 2010). The research process is presented in figure (4):
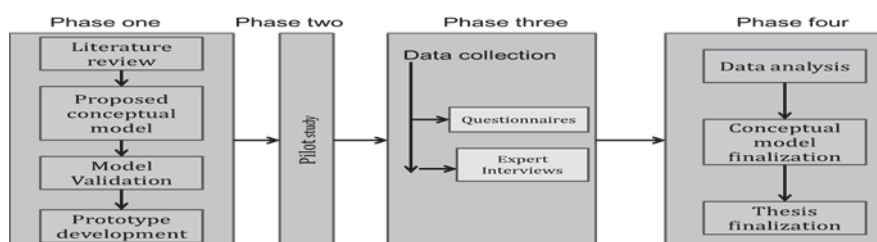
Figure 4: Research process

Prototype development and pilot study

a prototype was developed on Facebook as it has the highest reach in the Egyptian society (Abdelghafar and Sameer, 2013; Arab media outlook, 2012), It has a simple interface, supports communications in multimedia and emoticons, has a privacy policy, a known level of security (Papacharissi, 2009; Boyd and Ellison, 2008; Gross and Acquisti, 2005) and most of the influence groups in Egypt have a presence on it (Iskander, 2011). A pilot study was conducted to evaluate the developed questionnaire and interviewer's guide. Fifteen scholars in the fields of information systems and management used the prototype, filled in the questionnaire and their feedback was used in the improvement of the prototype and questionnaire. Some scholars went through a pilot interview and their feedback was used in improving the interviewer's guide. Statistical tests were run to ensure the validity of the questionnaire. The Cronbach Alpha of the different sections of the questionnaire ranged from 0.68 to 0.80. A valid questionnaire should not have a Cronbach Alpha of less than 0.7 (IBM, 2011). The results indicate a moderate to good validity level.

Questionnaires design

Questionnaires were used as they are precise, quick, and reach a wider spectrum of participants (Blumberg et al, 2008; Ghauri, and Gronhaug, 2005). The questionnaires were developed by the researcher based on the literature review and the improved conceptual model. The population of the questionnaire included Egyptian politically active social networks users above the age of eighteen. Two hundred and eighty six participants successfully completed the study reached through Facebook through purposeful sampling. The questionnaire has five sections including sections for the measured variables, and demographic data. Descriptive analysis summarized the results of the demographic data and the results are in table (2).

Table 2: Demographic data summary

Variable		Number	Percentage
Gender	Male	107	37%
	Female	179	62%
Age	Less than 18	0	0%
	19 to 29	168	58%
	30 to 40	77	26%
	41 to 51	20	7%
	Above 51	20	7%
Frequency of social networks usage	Daily	289	94%
	Weekly	16	5.6%
	Monthly	1	0.4%
Social Networks used	Facebook	297	57%
	Twitter	166	31%
	Google+	52	13%
	MySpace	3	1%

Expert Interviews design

Semi-structured interviews allow for in-depth understanding of the issues at hand (Saunders et al, 2012; Sekaran and Bougie, 2010). Purposeful sampling was employed as it allows the researcher to choose the sample based on their professional judgment (Saunders et al, 2012). It is appropriate for this research as the researcher wishes to interview the middle level managers who are involved in e-rulemaking, as those are the managers with the most relevant experience to the phenomenon understudy. Two middle level governmental managers at the Egyptian Ministry of State and Administrative Development (MSAD) were interviewed to validate the developed mode.

5. Analysis and results

5.1 Interviews results

The interviewed sample believed it essential to provide citizens with information about the rules the government wants to issue and to collect their feedback on it. As for the technological variables; the interviewees believed that the user interface of an e-rulemaking tool should be easy to understand. Allowing multimedia could be a good feature; however, there are concerns on the analysis of such content. Multimedia analysis would add more costs to the government. The same applies to the use of emoticons in communications. In addition to that, it is important to maintain privacy for both the government and citizens. As for the environmental variables; the

Interviewed sample communicated that certain influence groups can have greater mobilization abilities online than others. Some users might create multiple accounts to submit variations of the same comments. The interviewees believe that security is an external issue that would remain a thread to all online mediums of communications. Violations cannot be completely eliminated and must be tolerated.

5.2 Questionnaire data analysis

A. Reliability test The most commonly used reliability measure is Cronbach's Alpha (IBM, 2011; Coaks et al, 2008). A Cronbach's Alpha higher than 0.7 is considered excellent (Coaks et al, 2008). The results obtained from the test are summarized in table (3) indicating excellent reliability.

Table 3: Reliability test results

Variable	Cronbach's Alpha
Information provision	0.741
Information collection	0.721
User Interface	0.727
Multimedia	0.750
Emoticons	0.771
Privacy	0.770
Security	0.780
Influence groups	0.827

B. Correlation *Bakeman* and Robinson (2005) define correlation as a test to determine the possibility of the existence of a cause and effect relationship between the independent and the dependent variable.. To interpret the correlation results we need to look at the value of Pearson's coefficient and its significance (Coaks et al, 2008). For the results to be significance, the value (p) should be less than 0.05 (Bakeman and Robinson; 2005).Table (4) presents the correlation matrix.

Table 4: Correlation matrix

	Provision	Collection	Interface	Multimedia	Emoticons	Privacy	Security	Influence Groups	Inclusion
Provision	1								
Collection	0.448	1							
Interface	0.606	0.523	1						
Multimedia	0.325	0.268	0.328	1					
Emoticons	0.508	0.416	0.539	0.388	1				
Privacy	0.419	0.332	0.526	0.343	0.538	1			
Security	0.542	0.331	0.580	0.314	0.511	0.781	1		
Influence groups	0.469	0.468	0.506	0.251	0.489	0.456	0.439	1	
Inclusion	0.531	0.535	0.529	0.241	0.577	0.517	0.502	0.544	1

Stepwise Regression

Stepwise regression was conducted to develop a regression model that only includes the independent variables that statistically influence citizen inclusion in e- rulemaking (Bakeman and Robinson; 2005). Almost 42% (R square=0.418, P=0.000) of the changes in citizens' inclusion in e-rulemaking are explained by the variables; interface, privacy, information collection, emoticons, and security. The model has a significance value of 0.000 indicating that it is statistically significant. The results are presented in table (6). It is important to note that research in the field of the use of social networks in political activism reaches similar R square results as reported by Oehri and Teufel, (2012); Burke et al, (2011); Nasir, (2010); Schlosberg et al, (2007) Ranerup, (2000).

Table 5: Summary of hypotheses accepted or rejected

Hypothesis	Significance	R squared	Accepted/Rejected
H1	p=0.625	0.196	Rejected
H2	p=0.000	0.190	Accepted
H3	p=0.000	0.280	Accepted
H4	p=0.615	0.058	Rejected
H5	p=0.000	0.227	Accepted
H6	p=0.000	0.268	Accepted
H7	p=0.490	0.252	Rejected
H8	p=0.157	0.197	Accepted
H9	p=0.00	0.418	Accepted

6. Discussion

E-rulemaking deliberation variables affecting e-Rulemaking

Information collection significantly affects citizen inclusion in e-rulemaking (t=0.190, p<0.05). It is one of the variables measuring information management (Kuzma, 2011; farima, 2010; Shulman, 2005; Coglienese, 2003), while Information provision has an insignificant effect (t=0.186, p>0.025). The government representatives communicated that although they are not obliged to change the drafted rules, the government should be keen on feedback collection and incorporation in the laws they draft (Beierle, 2003; Coglianese, 2006; Emery and Emery, 2005). The government representatives reported that they can provide citizens with as much information as they want but the rulemaking participation level would not increase if the feedback received from the citizens was not included in actual law making. On the other hand, 76% of the participants indicated that the quality of their feedback would improve if they were assured that attention would be paid to it, which further emphasizes the importance of feedback collection and analysis.

But if there are no rules that require the government to incorporate the received feedback in the drafting of rules as there are laws that require them to publish information online, then the government should make it clear that they are not obliged to change the drafted rules according to the received feedback (Schlosberg et al, 2008; Shulman, 2005) so as not to raise citizens' expectations

SNSs' technological variables affecting e-Rulemaking

The user interface has the strongest correlation with citizens inclusion (t=0.280, p < 0.05). An e-rulemaking tool should have an easy to use interface (Nasir, 2010; Yetim, 2009). Fortunately the user interfaces of SNSs are usually uncomplicated as SNSs are generally characterized with ease of use (Asur and Huberman, 2010). The participants who filled the questionnaires confirmed these beliefs as most of them evaluated the interface of the prototype as easy to use (78%). More than 90% of them indicated that they are willing to use the prototype in e-rulemaking with its current design.

The government representatives are not enthusiastic about increasing the costs of data collection and analysis if these costs do not reflect on increased levels of citizens' inclusion. These costs could be justified as it appears that online text communications seem to be lacking in emotional and non-verbal expressions (Schlosberg et al, 2008; Min, 2007). 80% of the participants expressed that they use emoticons in their communications, and 89% of the participants perceived Emoticons as helpful in expressing their opinions, However, a relatively smaller number (77%) reported that they found multimedia helpful in communication. in the context of e-rulemaking; Communications though Emoticons has a significant effect on citizen inclusion (t=0.227, p<0.05), while communications through multimedia has an insignificant correlation (t=0.058, p>0.015). It appears that the use of Emoticons would have a positive influence on citizens' inclusion in e-rulemaking. The government should investment in developing mechanisms for the collection and analysis of such content.

The third technological variable; Privacy, has a statistically significant effect on citizen inclusion in e-rulemaking (t = 0.268, p < 0.05). The interviewed representatives as well as many researchers believe that for an SNS to be used in e-rulemaking, it should have strong privacy options and should give the users control over their privacy

settings (Wilson et al, 2009; Barnes, 2006; boyd and Heer, 2006; Gross and Acquisti, 2005). On the other hand, the representatives also believed it important to make citizens reveal some personal information about themselves, so as to ensure the quality of the discussions and the feedback the government receives. The privacy options of most social networks require a set of basic information to be publicly revealed to everyone, this includes; the user's name, age, gender, marital status, and the regional area the user belongs to (Wilson et al, 2009). These information would satisfy the government's need for revealing some basic information about the citizens without violating the citizens" sense of privacy.

Environmental variables affecting e-rulemaking

Security has a statistically significant effect on citizen inclusion (t=0.252, p>0.05). Threats will always exist in the digital age (Kuzma, 2011; Oehri and Teufel, 2012) and it also has an effect on the outcomes we hope to achieve from the use of SNSs in e-rulemaking. In addition, the government has little influence over the security of the SNS it chooses to use, as it is physically outside of its reach which makes it harder to ensure the security of the SNS. Thus it is essential for a government engaging in e-rulemaking on SNSs to select an SNS with high levels of security to ensure the protection of the rulemaking process. Reaching a 100% secure social network is impossible and is not cost effective thus governmental agencies should choose an attainable security level and accept a certain degree of insecurity (Oehri and Teufel, 2012).

Influence groups have a statistically insignificant effect on citizen inclusion in e-rulemaking (t=0.021, p>0.05). Both the interviewed representatives and researchers believe that some influence groups have a good online presence with better online mobilization than others, posing the threat that a government engaging in e-rulemaking would receive a large volume of comments that only reflect the interests of a single group unrepresentative of the Egyptian society (Shulman, 2009; Schlosberg et al, 2008; Emery and Emery, 2005; Coglianese, 2004), however, the representatives emphasized that the number of comments they receive does not matter, what matters is the value the comments would or would not add to the rulemaking process (Emery and Emery, 2005)

The presence of interest groups on the SNS to be used in e-rulemaking would not increase citizen inclusion in rulemaking, as on an individual level this would not add much to the inclusion of individuals specially those not belonging to a certain influence group. This explains why the variable has an insignificant effect on citizen inclusion, and only a little over half of the respondents (55%) believed that influence groups have an effect on their political opinion

How to use social networks in e-rulemaking?

We believed that the proper use of SNS would increase citizens" inclusion in e-rulemaking. The American rulemaking process could be adopted to facilitate e-rulemaking through SNSs. Five of variables included in the study (information collection, user interface, communications in emoticons, privacy and security) have a significant effect on citizens' inclusion in e-rulemaking at different stages of the e-rulemaking process. A government wishing to use SNSs in e-rulemaking should examine the contributed conceptual model contributed when examining the features of an SNS for e-rulemaking.

When a rule proposal is published online, the interface of the SNS, its privacy and available communications methods would affect the extent to which the citizens would provide their feedback to the government through it or not. The extent to which the government is keen on collecting the feedback of the citizens and incorporate it into rulemaking, would also affect their participation at this stage. The interface of the SNS and its privacy would affect citizen inclusion in the last stage of e-rulemaking. In this stage the government publishes the finalized rules online for the citizens to read them. Security would affect the use of the SNS in all the rulemaking process as it is an environmental threat always present whenever online communication are conducted
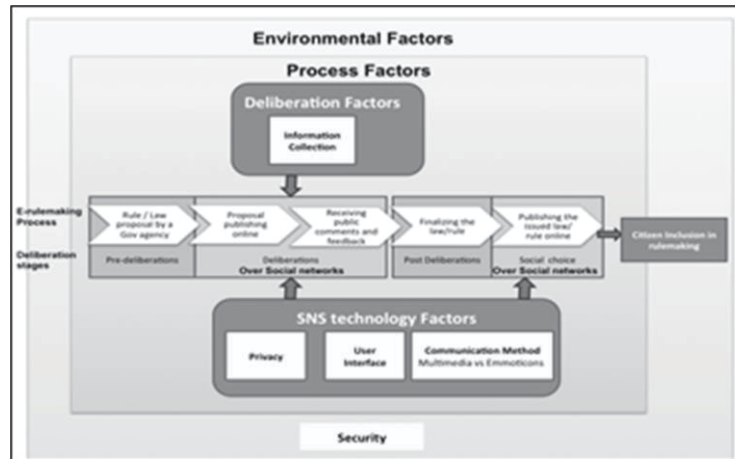
Figure 5: Contributed conceptual model

7. Conclusion

This research examined the use of social networking sites in e-rulemaking. It examined variable extracted from the literature that are thought to affect e-rulemaking on SNSs and out of these variables it determined five of them that have a statistically significant effect on e-rulemaking on SNSs. This research contributes a conceptual and a research model that can be used by governments to conduct e-rulemaking over social networks. The research also illustrates how to use SNSs in e-rulemaking. The conceptual model can be expended in the future to include other variables affecting e-rulemaking other than those studied. The model could be adapted to the e-rulemaking process of different countries with minor modifications to fit the cultures of these countries. Based on the contributed conceptual model, questionnaires and interview results; a checklist has been developed that can be used to evaluate wither a government can use a certain networks in e-rulemaking or not which could make the transition to the use of SNSs smoother.

8. Limitations and future directions

The participants of the study are considered a small sample. The study chose to focus on SNSs' users only. The opinion of parliament representatives' was not assessed in the study as it was dissolved in Egypt during the time at which this research was conducted. Future researchers are recommended to include these groups in their studies or to adopt a more statistically centered research methodology such as Structured Equation Modeling (SEM).

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Building a Benchmarking Model to Assess Political Accountability in Parliaments

Elena Sánchez-Nielsen[1] and Francisco Chávez-Gutiérrez[1, 2]
[1]Dpto. Informática y de Sistemas, Universidad de La Laguna, Spain
[2]Parlamento de Canarias, Spain
enielsen@ull.edu.es,
fchavez@parcan.es

Abstract: Effective parliaments are essential for strong and stable governments. The different types of initiatives processed in parliaments play a crucial role to address issues of health, social welfare, education and economy, and hold governments to account. In this context, benchmark indicators are essential elements in ensuring political accountability and transparency. Although in recent years different benchmarking proposals have been developed for purposes of self-assessment and to identify the minimum criteria for being a democratic parliament, little is known about how to measure productivity of politicians. This paper presents a benchmarking proposal, focused on a productivity and attendance model, as a tool to assess political accountability. This approach addresses the following key issues: what to measure, how to measure, the minimum criteria to be measured to obtain a set of indicators and what technical issues should be addressed to support this approach. It has been researched in the context of the Parliament of Canary Islands in Spain for all representative members of parliament and parliamentary groups in the last legislature. The initial findings suggest that an approach to assess political accountability focused on productivity should be linked with comparing parliamentary initiatives of the same type of complexity and not only based on computing quantitative outputs on presented initiatives. It ensures that a more robust productivity measurement is obtained and productivity indicators are calculated in a weighted way according to the complexity measure that entails each initiative type.

Keywords: political accountability, policing politicians, legislative transparency, benchmarking, benchmark indicators

1. Introduction

The transparency of political activity in parliaments related to the different initiatives processed is crucial for letting citizens know the decision making relevant on issues of health, social welfare, education and economy, hold government to account and approve government budget. Building benchmarking models to assess the productivity of initiatives presented and attendances related to plenary sessions and committees are therefore an important element in ensuring political accountability and transparency in parliaments (Dalferth 2013). Furthermore, the increased focus to parliaments as political institutions will bring increased pressure on individual legislatures to demonstrate to citizens that they can perform their key roles (such as initiatives processed and attendances related to plenary sessions and committees) and deliver results. Therefore in recent years an increased attention to benchmarking and assessment frameworks for legislatures has arisen. Although different benchmarking proposals have been proposed for purposes of self-assessment and to identify the minimum criteria for being a democratic parliament, little is known about how to measure productivity of political representatives. The benefits of using benchmarks and standards have been highlighted at the March 2010 Paris Conference on Benchmarking and Self-Assessment for Democratic Parliaments. The advantages were classified according to four different viewpoints (OPPD 2012): parliaments and parliamentarians, international organizations, civil society and academics. The use of benchmarks from the parliamentary viewpoint was perceived as a key mechanism to enhance legislative transparency and accountability while from the international organizations viewpoint was seen as an instrument to design the parliamentary strengthening programming and determining where to focus support. From the civil society viewpoint was appreciated as an important means to ensure greater public confidence in and knowledge of the legislature. Academics appreciated it as a critical element of democratic institutionalization. The potential benefits of using benchmarks to review performance of political activity have also been stressed by experimental projects (Humphreys 2007). On one hand, they enable the institution to be more aware of how it can improve its performance, and then to identify priorities and means for strengthening parliament. On the other hand, they enable citizens to be informed about the effort and outputs of their members of parliament (MPs); and as consequence, to have better information to select higher quality politicians in elections.

The aim of this paper is to present a benchmarking proposal, focused on a productivity and attendance model, as a tool to assess political accountability in parliaments. With this purpose, our approach is to consider what to measure, how to measure, the minimum criteria to be measured to obtain a set of indicators and what technical

issues should be addressed to support this approach in order to stress what the MPs and parliamentary groups are *capable* of achieving. This approach has been researched in the context of the Parliament of Canary Islands in Spain.

The remainder of this paper is organized as follows. Section 2 reviews the background related to our aim. Section 3 describes the parliamentary benchmarking model to assess political accountability. Section 4 addresses the technical issues for the approach proposed. Section 5 describes our initial findings with the case study of the Parliament of Canary Islands. Finally, Section 6 gives the concluding remarks.

2. Background

2.1 Overview of parliamentary benchmarks

To date, it is not clear the understanding of what are benchmarks in parliaments. For example: are they minimum standards, ideals or goals? In this context, the parliamentary benchmarks, standards and good practices until now have been developed for purposes of self-assessment while others seek to identify the minimum criteria for being a democratic parliament. Both methods are focused on the stage of assessing where a legislature is at the moment, identifying three categories of parliaments: emerging, developing and mature legislatures. There are four approaches that categorize the various benchmarks and assessment frameworks. The first is the approach of the IPU (International Organization of Parliaments) which has created a toolkit organized as a questionnaire to identify good practices and is intended to foster discussion at various levels. A second approach taken by the CPA (Commonwealth Parliamentary association) is different in that their benchmarks are expressed as minimum standards rather than as questions. A third approach is the EC (European Commission) approach focused on how the Commission may engage and support parliaments worldwide. It provides a number of questions and a sample assessment matrix to determine whether minimum conditions for a successful parliamentary development programme are in place. Finally, the fourth approach, the NDI (National Democratic Institute) approach has produced a Standards-Based Questionnaire to compare an individual legislature to norms and basic functions of other parliaments, and identify best practices and lessons learned.

However, neither of the above approaches has been designed to rank legislatures against others, nor neither of the designed approaches has been aimed to assess specifically the productivity of all MPs and parliamentary groups in a given legislature.

2.2 How to define and measure productivity?

Productivity is commonly defined as a ratio between the output volume and the volume of inputs for a specific production situation (Diewert 1992). There are different measures of productivity and the choice between them depends either on the purpose of the productivity measurement and/or data availability. Broadly, productivity measures can be classified as single factor productivity measures (relating a measure of output to a single measure of input) or multifactor productivity measure (relating a measure of output to a set of inputs).

The use of benchmarking models to assess productivity in parliamentary institutions is still in its infancy. Studies have begun to appear to study the productivity of the government sector. In recent years, the conceptual problems to measure productivity of a government production have been addressed by different research studies (Diewert 2011; Gu & Wong 2014; Schreyer 2009; Yu 2011).Three general methods have been highlighted by Diewert (Diewert 2011) to measure the price and quantity of nonmarket government outputs.

In the context of parliamentary institutions, it is complex to determine exactly what is the parliamentary production unit. To date, the information related to performance and productivity of MPs have been focused on the activity of parliamentarians in terms of attendances, appearances, quantitative outputs based on topics, and total of words each MP speaks in plenary sessions and committees and the number of initiatives presented. Until now, these data have been provided by some projects/initiatives developed by independent organizations and researchers (Papaloi 2013). At the same time, parliamentary websites are becoming a means for promoting members' and committees' accountability to the public presenting their work in different ways, for example by linking on one page their functions, responsibilities, activities, and speeches (The Global Centre for ICT 2012). However, specific data about productivity for each MP and parliamentary group have not been provided by any parliamentary institution around the world.

3. Parliamentary benchmarking model

Our aim of building a parliamentary benchmarking model to assess political accountability is to deliver an assessment tool on productivity for all MPs and parliamentary groups in a given legislature. It provides a useful instrument to evaluate the areas of strength and weaknesses for each MP and parliamentary group and then compare it to a legislature as whole. As a result, the public will be able to see whether their MPs and parliamentary groups behave according to their promises. On the other hand, the parliamentary institution will be able to identify shortcomings and take appropriate actions to design parliamentary strengthening programming.

The process of making operational this benchmarking model requires the development of an integrated framework that entails the following key issues:

3.1 Determine what to measure

Given the fact that it is difficult to determine exactly what it is that a parliamentary unit production produces, it is essential to define what should be included as outputs of the parliamentary production and how to measure them. This implies decomposing the responsibilities and functions of MPs into outputs and then into measurable components.

In order to define the outputs for the parliamentary production, we broken down outputs into two components: parliamentary activities and parliamentary processes. The parliamentary activities are plenary sessions and committees. The parliamentary processes correspond to the processing of the different types of parliamentary initiatives. As a result, we define two types of outputs: parliamentary activities and parliamentary initiatives presented.

Given the fact that that not all parliamentary institution made public the labor costs for MPs, we will measure the outputs produced by MPs and parliamentary groups in the parliamentary institution but not the corresponding prices of inputs to obtain these outputs.

For parliamentary activity outputs we define an attendance based measure and for parliamentary initiatives presented we define a measure based on a productivity function. The attendance measure is obtained for each MP as the total number of presences at plenary sessions and committees in a given legislature in which a MP is an active MP and he/she has signed an official attendances register. This type of measure is presented as a percentile in order to facilitate comparisons among MPs.

For parliamentary initiatives presented outputs we seek a measure of the extent to which MPs and parliamentary groups are acting in the different initiatives. Since the different types of initiatives have different types of complexity, the total number of initiatives presented by a MP or/and a parliamentary group does not accurately measure its productivity. To properly measure the productivity for all MPs and parliamentary groups, a weighted function which takes into account the complexity measure associated to each initiative type should be developed. This implies the measurement of the complexity associated to each initiative type. Since the most complex initiatives take more days of processing (e.g., law proposals) and the least complex initiatives take less days of processing (e.g., oral questions in plenary sessions), the average number of days that entails processing a initiative type during a given legislature allows us computing in a weighted way the complexity measures for all the different types of initiatives. Thus we denote that in a given legislature l, there are I different initiative types. With each initiative type i in this given legislature l there is an associated weight (β_i^l) that relates each initiative type i with its complexity measure. As a result, the initiatives productivity function (P_i^l) for each MP and parliamentary group during a given legislature l is calculated as a weighted sum of all the I initiatives presented during this legislature l as follows:

$$P_i^l = \sum_i \alpha_i^l \cdot \beta_i^l; \quad i = 1, \dots, I \quad (1)$$

Where: α_i^l is the number of initiatives of type i presented by the MP or parliamentary group during the legislature l respect to all the initiatives corresponding to the initiative type i during this legislature l; and β_i^l is the weight that represents the complexity measure associated to each initiative type i, which is calculated as the average number of days that entails processing initiative of type i during the legislature l.

3.2 Develop indicators

The following features were considered when we develop indicators for MPs and parliamentary groups:

- **Indicators should measure something significant**: only those aspects that have a significant impact on the parliament's performance and efficiency should be measured.

- **Indicators should be meaningful:** indicators must be relevant to the legislatures' objectives.

- **Reliability of data:** data should be reliable and consistent. The indicators should provide accurate information about the productivity of MPs and parliamentary groups.

- **Viability:** indicators should be easily to be understood by citizens, parliamentarians, civil organizations and academics.

As a result, the political accountability of the MP is estimated by developing two types of indicators: attendance indicator and productivity indicator. The attendance indicator is estimated as the degree of attendance at plenary sessions and committees. The productivity indicator is measured using the initiatives productivity function defined by (1). Both indicators are presented as a percentile in order to facilitate comparisons among MPs. The political accountability of a parliamentary group is estimated with the productivity indicator.

3.3 Design and implement

After the indicators have been defined, the next step in the development of the benchmarking model is to provide a pre-assessment checklist to ensure that participants in the assessment model understand why they are carrying out so that they may be clear about their objectives. With this aim, we suggest the following key questions to the parliamentary institution:

- Establish accountabilities and responsibilities for the provision and use of indicators.

- Link the indicators and determine how the productivity of MPs and parliamentary groups as whole affects the parliamentary institution's overall performance.

- Decide how the indicators may be used in identifying three key issues: (1) the areas of strength and weaknesses of MPs and parliamentary groups; (2) the priorities and means for strengthening parliament and, (3) where to focus support.

- What outcome information will be produced for the public and institution?

The next step is to establish an ICT solution using the appropriate technology to collect, analyze, report and disseminate the outcomes of the political accountability in a given legislature (see Section 4).

3.4 Monitor and review

It is important to stress that assessing productivity is not a one-off exercise. The effectiveness of the measurement system should be reviewed periodically by the parliamentary institution and solicit feedback from users (such as political parties, civil society and academics) to further enhance the system, including how to define/modify indicators, present the information in the way that it can be understood by the different audiences and ensure its relevance.

4. Technological infrastructure

The development of a technological solution to provide information on political accountability, in terms of attendance and productivity indicators, in parliamentary institutions entails the following technical issues:

What data are required? How are these data stored? After the measurement indicators have been defined (see Section 3.2), the next step is to define how to obtain these data with the support of the ICT department. Traditionally the raw data in parliamentary systems are stored in a data store (i.e. a repository for persistently storing collections of data, such as a database and/or a cloud-based solution).

How to collect/analyze? Given the fact that the origin of raw data is a database, techniques such as structured query languages (e.g., SQL) can be used to obtain the specific information.

How to present/visualize/disseminate? Once data have been processed, the outcomes on political accountability should be presented to users in an easy and comprehensive way. Since over 90 per cent of

parliaments have reported having a website (The Global Centre for ICT 2012), the parliamentary websites should be one of the primary means by which parliaments make these outcomes known to civil society, to the media and to citizens. In this context, in order to integrate in the most appropriate way information on political accountability, it is essential to highlight how during the past decade the goals of parliamentary websites have become more complex and more challenging. They began with the objective of providing basic information about the history, the functions, the leadership, and the membership of the legislature. Increasingly, parliamentary websites have become a means for introducing members' and committees' accountability to the public presenting their work in different ways, for example by linking on one page their functions, responsibilities, activities, and speeches. Beyond all of these functions, however, one of their fundamental purposes currently is to support a culture of transparency and accountability. This can be developed through the incorporation of the productivity information concerning MPs and parliamentary groups using the characteristics and capabilities of information visualization techniques (IV). IV provides multiple methods to make sense of complex data by graphic representations in the field of politics (Windhager 2014). Furthermore, current research regarding visualization of public information (Papaloi 2013) highlights the importance of the effort to communicate information by visual means is of utmost importance given that (1) available documents contain too much information, (2) our time is limited and, sometimes (3) information may be unclear or ambiguous. In this respect, the most appropriate visualization techniques to show the outcomes on political accountability are graphs to visualize statistical data. As a comprehensive toolkit, they help to visually analyze most diverse sorts of quantitative data related to parliamentary activities and initiatives developed. Scatter plot, bar chart, area chart, bubble chart, timeline and histogram, radar chart and network graphs are suitable visualization methods to show and summarize the meaning of the main outcomes on political accountability.

5. Case study: The Canary Islands Parliament

The Canary Islands Parliament, the regional parliament for the Spanish autonomous community of the Canary Islands (http://www.parcan.es), is the legislative arm of the autonomous region of Canary Islands and derives its mandate and functions from the 1982 Statute of Autonomy of the Canary Islands. Elected for a four year period is composed of 60 MPs and four parliamentary groups. Its functions in broad terms include passing new laws, processing non law propositions, scrutinizing government policy and administration, approving government budget, introducing oral questions, bills and amendments, and debating matters of topical interest.

The aim of the case study is to apply and explore the benchmarking model described in this paper to find out what are the initial outcomes we can obtain for all MPs and parliamentary groups in the Parliament of Canary Islands.

5.1 Methodology

The premise of the methodology developed is to apply a systematic evaluation with all the initiatives presented and attendances at plenary sessions and committees during the last legislature (from 2011 to 2015) at the Parliament of Canary Islands for all MPs and parliamentary groups.

The methodology proposed was set up following a tree-steps process: (1) collect and classify data in terms of the different types of initiatives and attendances; (2) compute the productivity and attendance indicators; and (3) analyze the results to find out what are the outcomes for MPs and parliamentary groups.

The Parliament of Canary Islands has collaborated with us in the development of this benchmarking model with the support for data collection, computing indicators and analyzing the outcomes obtained.

5.1.1 Data collection

The data required for estimating productivity and attendance indicators for all MPs and parliamentary groups started with collecting information on the parliamentary activities and parliamentary initiatives corresponding to the eighth legislature of the Parliament of Canary Islands. The parliamentary data were obtained from the different parliamentary databases.

The data on attendances for each MP are calculated as the total number of presences at plenary sessions and committees attended by each MP during the period they were in active.

In relation to parliamentary initiatives, they are classified into 44 different types, which nine different types of them can be presented by any one MP, 16 other types of them can be presented by any one parliamentary group, and the remaining group of initiatives can be presented by the government, city council and other institutions. Table 1 and 2 shows respectively the different types of initiatives with the corresponding code for MPs and parliamentary groups that will be used herein hereafter.

Table 1: Parliamentary initiatives for MPs

CODE	TYPES OF PARLIAMENTARY INITIATIVES FOR MPs
PE	Formulating a written answer question
SD	Request for data, reports and documents
PO/P	Oral questions in plenary sessions
C	Appearances
PO/C	Oral questions in committees
PNL	Non law proposals
I	Interpellations
ED	Written by members of parliament
PCC	Presences and appearances in committees

Table 2: Parliamentary initiatives for parliamentary groups

CODE	TYPES OF PARLIAMENTARY INITIATIVES FOR PARLIAMENTARY GROUPS
PE	Formulating a written answer question
SD	Request for data, reports and documents
PO/P	Oral questions in plenary sessions
C	Appearances
PO/C	Oral questions in committees
PNL	Non law proposals
I	Interpellations
M	Motions
PCC	Presences and appearances in committees
PPL	Law proposals
EGP	Written by parliamentary groups
ED	Written by members of parliament
AGIV	Inquiry Committee
AGOC	Other Committees
DI	Official statements
SIAC	Requests for reports and opinions to hearing of accounts

5.1.2 Measures and findings

Once data on parliamentary activities and parliamentary initiatives have been collected, the next step consists of computing the attendance indicator for all MPs and the productivity indicator for all MPs and parliamentary groups. In order to show the different results all MPs and parliamentary groups will be identified and represented by a numerical code and the different types of initiatives presented by MPs and parliamentary groups will be identified by an alphabetic code (see Table 1 and 2).

5.1.3 Measures and findings for MPs

During the eighth legislature a total of 14.546 initiatives were processed. These initiatives were classified by nine different types of initiatives (see Table 1). Figure 1 shows the total of initiatives presented by all MPs, classified

by the nine different types of initiatives, and the average number of days for processing each initiative type. Figure 1a and 1b shows respectively that the total of initiatives processed are not the same for all different types of initiatives and different types of initiatives require different processing time. Specifically, the initiative type PE (Formulating a written answer question) and SD (Request for data, reports and documents) are the types of initiatives more processed while the initiative type PCC (Presences and appearances in committees) and ED (Written by members of parliament) are the types of initiatives less processed. On the other hand, the initiative type C (Appearances) is the initiative which has required more average processing time while the initiative type ED (Written by members of parliament) is the initiative type which has required less average processing time.
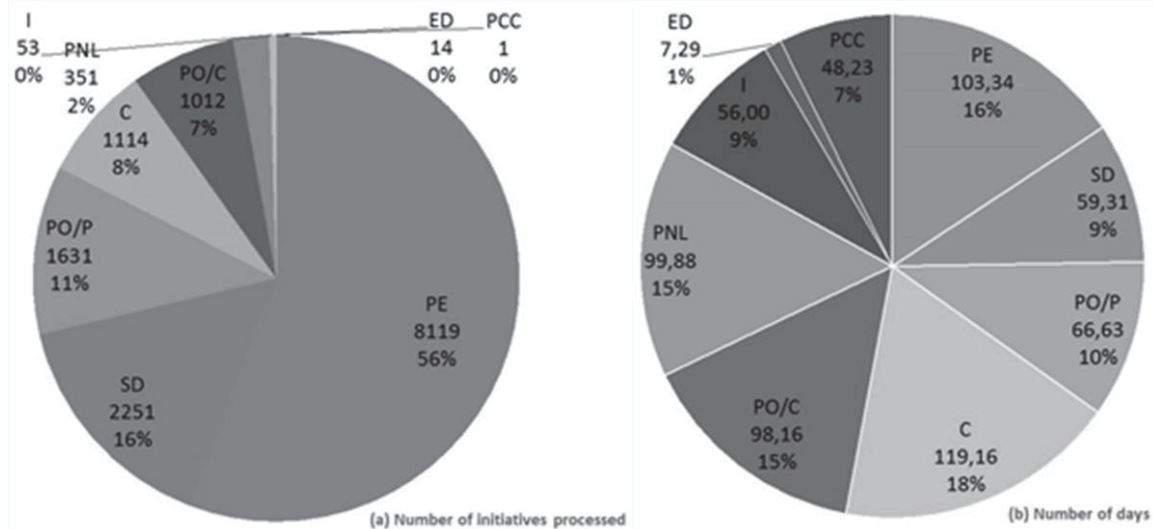
Figure 1: Data on types of initiatives for MPs: a) Total of initiatives processed by all MPs classified by nine types of initiatives; b) Average number of days for processing each initiative type

Figure 2 shows the results for the productivity indicator for all MPs compared to the total of initiatives presented by all MPs (each MP is identified by a numerical code in the axe *x*). This indicator has been computed according to the productivity weighted function defined in (1). Both results for each MP are normalized between a range of values of 0 and 100 in order to compare them. This Figure shows that the most productive MPs do not always correspond to those MPs who have presented more initiatives. It is important to highlight that productive MPs rely on an important assumption: productivity is linked with the complexity measure associated to each initiative type. This implies that a MP with a low number of initiatives presented and a high complexity measure associated is more productive than other MP with a high number of initiatives presented and a low complexity measure associated. Specifically, it can be observed how the MP 8033 is the most productive MP though he/she has not presented the highest number of parliamentary initiatives.

During the eighth legislature a total of 150 plenary sessions and 427 committees were celebrated. Figure 3 shows the results of the computation of the total of attendances at plenary sessions and committees for the computation of the attendance indicator for all MPs compared to the productivity indicator. This figures shows clearly that cannot be established a correspondence between productivity and attendances at plenary sessions and committees. This implies that results of both indicators should be analyzed and presented in an independent way.

5.1.4 Measures and findings for parliamentary groups

During the eighth legislature a total of 14.662 initiatives were processed. These initiatives were classified according to 16 different types of initiatives (see Table 2). Figure 4 shows the total of initiatives presented by all parliamentary groups, classified by 16 different types of initiatives, and the average number of days for processing each initiative type. Figure 4a and 4b shows respectively that the total of initiatives processed are not the same for all different types of initiatives and different types of initiatives require different processing time.

Figure 2: Results of the computation of productivity indicator compared to the total of initiatives presented for all MPs
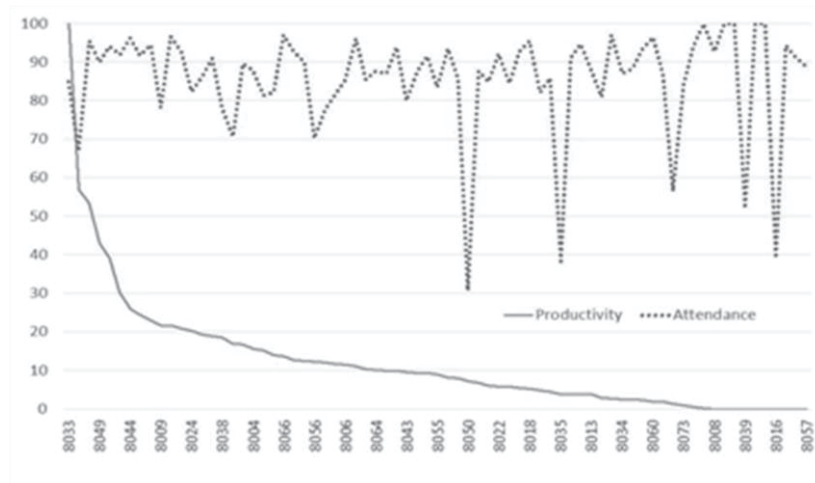
Figure 3: Results of the computation of attendance indicator compared to the productivity indicator for all MPs
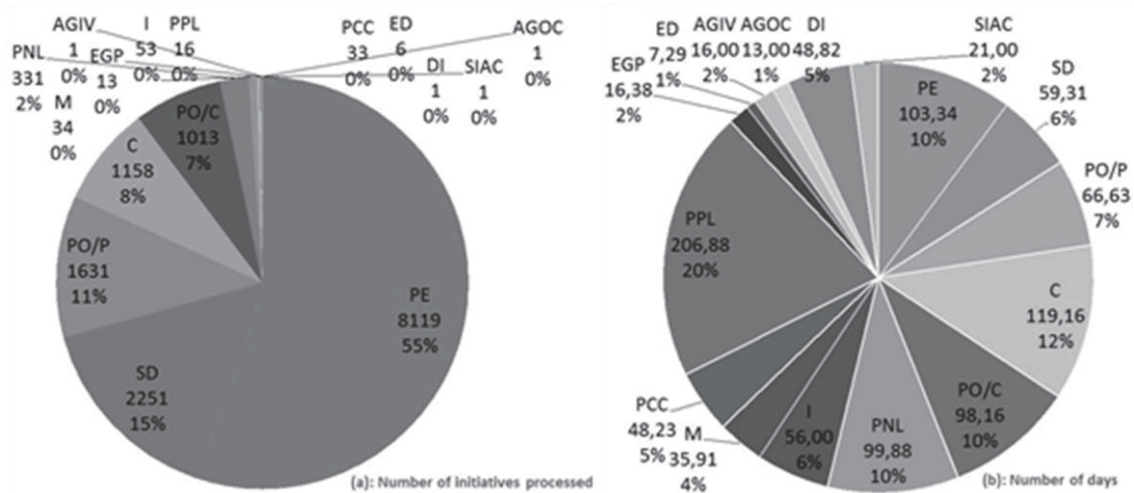
Figure 4: Data on types of initiatives for parliamentary groups: a) total of initiatives presented by all parliamentary groups classified by 16 types of initiatives; b) average number of days for processing each initiative type

Figure 5 illustrates the results for the productivity indicator for all parliamentary groups compared to the total of initiatives presented by each of them (each parliamentary group is identified by a numerical code in the axe *x*). This indicator has been computed according to the productivity function defined in (1). Both results for each parliamentary group are normalized between a range of values of 0 and 100 in order to compare them. This Figure shows similar results to those obtained for MPs. In this case, the most productive parliamentary group was the group which presented more initiatives while the less productive group was the second group with more initiatives presented.
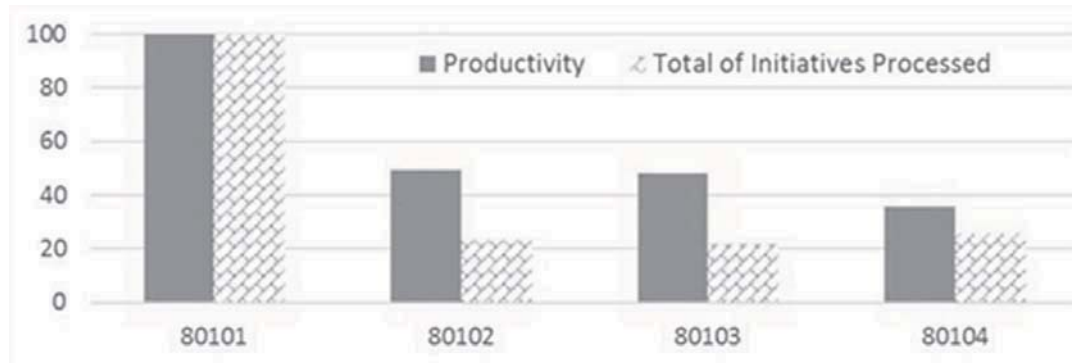
Figure 5: Results of the computation of productivity indicator compared to the total of initiatives presented for all parliamentary groups

6. Conclusions

Greater transparency improves parliament performance and increases political accountability. This may explain the increased attention to benchmarking and assessment frameworks for legislatures in recent years. To date, parliamentary websites have become a means for introducing members' accountability to the public presenting their work by linking on one page their functions, responsibilities, speeches and activities in terms of number of initiatives presented and attendance at plenary sessions and committees. However, specific data on productivity for each MP and parliamentary group have not been provided by any parliamentary institution around the world. This paper presents a benchmarking proposal for parliamentary institutions to assess political accountability and develops an assessment tool focused on a productivity and attendance model. As a result, we develop a productivity weighted function that makes use of a complexity measure associated to each initiative type in order to measure and compare the productivity for all MPs and parliamentary groups. The main findings related to benchmarking, in terms of comparing internally all MPs and parliamentary groups, have been explored in the Canary Islands Parliament and indicate that: (1) the complexity measure associated to all the different types of initiatives can be computed as the average number of days for processing each initiative type during a given legislature. This provides the appropriate weights to develop a productivity weighted function to assess MPs and parliamentary groups; (2) the most productive MPs and parliamentary groups do not always correspond to those MPs and parliamentary groups who have presented more initiatives and, (3) in the case of MPs, there is not a clear correspondence between productivity and attendance at plenary sessions and committees. Therefore, productivity and attendance indicators should be analyzed and presented in an independent way.

The benchmarking model proposed in this paper provides the following benefits: (1) the indicator outcomes facilitate the assessment and comparison of MPs and parliamentary groups, (2) the indicator outcomes help to identify the areas of strength and weaknesses of MPs and parliamentary groups, (3) the approach described can be extended in order to compare different legislatures and/or parliamentary institutions and, (4) if labor costs of MPs are made public, an estimate of costs for the different types of initiatives could be computed.

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Electronic Citizen Participation in Local Government Decision Making; Applications for Public Budgeting

Robert Smith
Savannah State University Savannah, USA
smithro@savannahstate.edu

Abstract: This paper examines the use of electronic means of citizen participation (primarily the use of social media) in selected budget and finance functions of local government in the United States.E-government and electronic participation have received increased attention as tools that 21st Century governments utilize to interface with citizens in the conduct of the public's business. This study employs a survey approach to describe and catalog a purposeful sample of local governments in the United States as a preliminary effort to determine the range and scope and capacity of local government to utilize input gleaned from these forms of citizen participation as tools to guide decisions on resource allocation and spending decisions. A survey was administered to 250 local governments to build a descriptive data set. Jurisdiction size, finance capacity, and other organizational characteristics have been collected and assembled to produce a matrix of the types and usage of electronic forms of participation from each jurisdiction. In addition to the construction of a data set of these local governments, 15 jurisdictions from the State of Georgia have been selected for more in-depthanalysis. Elite interviews were conducted with local government officials in those jurisdictions to develop a qualitative dimension to this study. Though there have been several similar studies conducted across the globe, the fast pace of technology and evolving patterns of adaptation and the struggle of local governments to keep pace presents a need for updating and analyzing current applications and lessons learned.This present paper focuses on one case study in this broader project. Survey results and preliminary analysis will be shared from local governments in the State of Georgia in the United States. Although there are inherent limitations in the presentation of single case study results, it is indicative and representative of trends discovered in the broader survey results. Preliminary findings and observations suggest despite important advances in the use of social media and related technologies to engage citizens, the application for budget and finance functions in local governments in the State of Georgia (and in other US local governments) remains uneven, reflects limited utility and still receives relatively low priority from government officials.

1. Introduction

This paper examines the use of electronic means of citizen participation (primarily the use of social media) in selected budget and finance functions of local government in the United States. E-government and electronic participation have received increased attention as tools that 21st Century governments utilize to interface with citizens in the conduct of the public's business. This study employs a survey approach to describe and catalog a purposeful sample of local governments in the United States as a preliminary effort to determine the range and scope and capacity of local government to utilize input gleaned from these forms of citizen participation as tools to guide decisions on resources allocation and spending decisions.

A survey was administered to 250 local governments to build a descriptive data set. Jurisdiction size, finance capacity, and other organizational characteristics have been collected and assembled to produce a matrix of the types and usage of electronic forms of participation from each jurisdiction. In addition to the construction of a data set of these local governments, 15 jurisdictions have been selected for more in-depthanalysis. Elite interviews were conducted with local government officials in those jurisdictions to develop a qualitative dimension to this study.

Though there have been several similar studies conducted across the globe, the fast pace of technology and evolving patterns of adaptation and the struggle of local governments to keep pace presents a need for updating and analyzing current applications and lessons learned. As social media and more sophisticated tools of participation emerge and are embraced, the stage is set for a potential paradigm shift in how services are delivered and how governments interact with their citizens. The current state of e-government and citizen participation in budget and finance decisions in local governments in the United States can be compared to developments in other nations to help ascertain progress or slippage for these select functions. This present paper focuses on one case study in this broader project. Survey results and preliminary analysis will be shared from local governments in the State of Georgia in the United States.

Although there are inherent limitations in the presentation of single case study results, it is indicative and representative of trends discovered in the broader survey results. The case study approach also affords the opportunity to examine the application of electronic participation in local governments in a range of jurisdictions in the 8th most populous state in the United States. This paper reflects upon the findings in comparison with the extant literature and helps develop a dialogue on the current state of e-government and social media in the budget and finance function of local government that can be compared to jurisdictions in a global context.

2. Theoretical frame

The theoretical grounding for this paper and research can be found in serval threads that are derived from the democratic ethos. The premise of electronic participation is the corollary to citizen participation in democratic forms of governance (Zavestoski, et. al., 2006). Several studies have found that citizen'sencounters with electronic participation in government are consistent with both citizen satisfaction and building trust in government (Welsh, et. al. 2005).

At the local government level, several studies have demonstrated that an information communication technology (ICT) facilitates participatory government. Moreover it was found that disengagement from political participation continues to be significant problem for established and emerging democracies. This study confirms other research that ICT enhances citizen participation in government decisions. Although other research has found an uneven contribution, many works observe that e-government improves the dialogue between citizens and government. This finding suggests that these efforts build transparency, openness and engagement (van der Meer, et. al, 2014). In the limited research involving the concept of participation and the budget and finance function of government, the use of systems like participatory budgeting fosters information exchange between citizens and government officials (Kim and Schachter, 2013). Although citizen participation in democracy is a largely normative and instrumental concern, it is a core value that is the bedrock and foundation for effective democracy (Kathi and Cooper, 2005). These concepts are grounded in the long held views that minimal levels of participation are necessary for a democratic political community to function effectively.

For the purpose of this paper, the theoretical grounding is not to evaluate the premise of democracy and the imperative of citizen participation but it is to convey that participation and electronic participation are threads of representative democracy extended to bureaucracy as well as political participation. ICT can advance these foundational aspirations of democracy despite nuances of what constitutes effective participation (Kakabadse, et. al. 2007). Also, the concept of the public meeting as broadly applied provides citizens with several distinct applications: conveying information to public officials, setting public agendas, deliberative decision-making and communication with other citizens on preferences (Adams, 2004). Hence, meetings and other similar mechanisms for collecting citizen input can be used for expressing political objectives and improving government responsiveness to citizens. The uses of electronic means of participation whether in a political or bureaucratic context therefore enhance accountability, responsiveness and trust and are imperative to advancing democracy.

3. Conceptualizing participation

A relevant departure point for this study is consideration of a long standing argument raised by scholars about the true efficacy of public participation in government decision making (King, et. a., 1998). These authors and others have argued that effective public participation is more than simply finding the right tools and techniques for maximizing input; it is about movement away from reactionary systems and processes towards a more deliberative forums and proactive applications of deliberative systems. This paper argues that electronic tools of participation hold great promise for encouraging a deliberative format to address the objective of effective citizen participation.

In an important study of means of participation in American cities the author found and confirmed several elements of participation in local government settings that frame the foundation for this study (Wang, 2001). The study found that citizens' participation in administrative decision-making was very low, especially in budgeting and personnel arenas. Also participation typically was associated with distinct drivers (such as a public campaign or stakeholder pressures). The existence of participatory mechanisms suggests wider and more robust use of these measures and finally participation was positively correlated with consensus building and overall satisfaction.

But participation has been transformed over the years. New means and modes and approaches have become the norm of communication and influence and input. Hence the conceptualization of participation needs to move away from the concepts of the public hearing, citizen forums, neighborhood meetings, community campaigns, citizen advisory groups, and one on one interactions with government officials. The repertoire now extends to the notion of digital government, open data sharing, Web 2.0 and 3.0, information communications technology, electronic transactions, and under a more inclusive rubric, namely e-participation. Each of these forms of electronic participation takes many different forms and utilizes a variety of platforms.

What this study does is to consider all of these forms of participation as viable and active forms of participation in a local government budget and finance. Therefore if citizens pay taxes online, utilize the budget, views financials, download budget documents, utilize email, engage in virtual forums and use social media in terms of Facebook, Instagram, Twitter and other forms to engage in some way in the budget and finance function, then citizen participation is being maximized.

4. Background literature

Before leaving the concept of citizen participation in government venues, it is important to visit a select literature to set the stage for why participation at the local level and in budget and finance decisions speaks to the value of citizen engagement in the instrumental functioning of government in a democracy. Five selections will address this imperative and form the basis for the exploration of participatory budgeting as a connecting paradigm for understanding the importance of citizen participation.

Moynihan (2007) carefully considers the Washington, DC use of Citizen Summits. He argues that citizen forums and participation are better operationalized through instrumental means and not the more typical normative arguments about the value of participation. Moynihan's analysis suggests process and technique matter most. Administrative costs can be reduced and forms of participation can be developed that afford meaning participation as a tool for implementation of government programs. In an extended empirical treatment Yang and Callahan (2007) nonetheless find that perceptions matter when it comes to citizen participation in local government. Further they find that use of participatory mechanisms is very different from its use in strategic decision-making by the local government. Bureaucratic responsiveness to improve budget and finance are more inherently linked to strategic decision making by local government and hence is anapt arena for maximizing citizen participation.

Stewart (2007) highlights that the mechanisms of participation in budget and finance indeed matter and should be the focal point for meaningful modes of citizen interaction. In Carole Pateman's (2012) Presidential address to the American Political Science association discussed the linkages between citizen participation (and what she called Participatory Democracy) to the utilization of Participatory Budgeting. This connection becomes a key focus of this study in terms of identifying where Participatory Budgeting has been utilized and its prospects for enhancing what citizen participation should look like in a democracy.

5. Participatory budgeting

There is a growing body of literature on participatory budgeting which at its foundation is about participation by citizens in the budget and finance function of government. There is a voluminous literature but this paper will only examine an overview of the literature to set the context for mechanisms of participation in the budget and finance arena. Gordon (2014) offers a nice overview and case study treatment of participation that highlights its active use in approximately 1,000 communities across the world. It was first utilized in Brazil in 1989 and spread slowly in global reach. There are select benefits identified by using this process such as transparency, educated citizenry, greater efficiency, a greater sense of social justice and community cohesiveness.

In a United State perspective there is nothing necessarily new about seeking public input in budget making at the local government level. In New England states and especially Vermont the tradition of the formal Town Hall Meeting was a forum where all government decisions are made including budget allocation decisions. Other forms of input into public budgeting decisions are also widespread in the United States (forums, surveys, etc.).

The first formal adoption was in the City of Porto Alegre in Brazil which consists of an annual deliberative process where residents decide to spend a percentage of the municipal budget through neighborhood, regional and statewide assemblies where residents and appointed budget delegates identify and vote of spending priorities

(Pinnington, et. al, 2009).Citizens decide on the allocation of public funds for public purposes with the technical guidance of municipal staff who are then responsible for implementing the budget that was voted upon. Participatory budgeting has been used in other Brazilian cities, Argentina, Uruguay, Guatemala and Mexico. Other countries using Participatory Budgeting include England, France, Germany, Italy, Spain, Portugal, India, China, Japan, South Korea and select African nations. In the United States there have only been limited applications in Washington DC, Chicago and Lincoln, Nebraskafor example.

Typically the process only applies to a portion of the budget (15-25%) and in subnational government units. The process itself consists of citizen needs assessment, idea generation to meet the need, selection of delegates to present the needs and articulate preferences, specific allocations are developed and finally a vote is held on these priorities. The government unit then implements the budget. There have been few empirical studies on its effectiveness but several case studies that highlight its process and utility. Nonetheless this approach constitutes the best mechanism that is amenable to the use of electronic participation modes for budgeting and finance.

This paper primarily investigates the use of electronic participation in systems that employ participatory budgeting. Some studies have made important observations about participatory budgeting. Ebdon and Franklin (2006) find participation is positive in the arena of resource allocation decisions. Bland and Rubin (1997) observe a direct correlation between participation and goal articulation of citizens. Robbins, et. al. (2008) observes public hearings often do not offer a perfect model of representation, Herian et. al. (2012) found that willingness to accept participatory driven budget decisions did increase. Haller and Faulkner (2012) found that the citizen participation mechanism increased citizens' problem-solving mindset to address public issues. Kim and Schachter (2013) observed that the increase in deliberative communication over budget decisions dramatically increased. Bassoli (2012) found that the presence of participatory mechanisms strengthened ties to administrative decision makers in government. Raudla and Krenjova (2013) and Wu and Wang (2011) both found the greatest obstacle to effective utilization was in the persistence of the dominant political culture. Lastly, Holden, et. al. (2003) discovered that e-government is still very much in the formative stages and that there is only a loose linkage to the normative participatory claims of increasing democratization.

6. The State of Georgia (USA) the south and local budgets

This paper is presented as part of a broader research study which is still in progress across the United States involving 250 local governments in the Southeastern region of the country. The findings presented in this paper focus on results from the State of Georgia in the United States. The framework for this study is by necessity a case based approach that looks at an original survey sample of 52 local government entities in the State of Georgia. The response rate of 22 is low and impacts the broader implications that can be gleaned from this research. However, as a case study, information from 15 local governments yielded descriptive and qualitative insights into the applications of electronic participation utilized in those governments budget and finance functions. The survey is ongoing for the balance of 2015 and more results will be reported as the data becomes available.

Before discussing the preliminary results from the survey it is useful to briefly highlight local government specific literature on egovernment in the United States and State of Georgia. Municipal budget developments have long been a focal point for extensive and serious research in the United States. As Rubin (2003) correctly observed citizens have concluded local government spending is perceived as uncontrollable and responsive only to special interests. She finds that the environment of the 1990's and 2000's set the stage for budget and finance officials to adapt to a new paradigm of accountability in local government finance. Ekstrom (2003) used case studies and surveys in smaller units of government in the United States and found local government officials open and ready to embrace budgetary innovations. Along this line of inquiry Ho (2011) revealed local governments quick to embrace Performance-Based Budgeting as a management tool for achieving programmatic change. Ammons, et. al. (2001) in a review of Southern cities found some gaps in applications of performance based approaches but found participant benefits outweighed some implementation issues. Rural local governments in the United States also rely on a primarily executive budget process but are open to a variety of processes linked to local tradition, legislative priorities and administrator influences (Sokolow and Hondale, 1984). Willoughby and Finn (2013) confirm varying degrees of organizational professionalism and technological sophistication in budget offices in the South. Increasingly local budget officials have embraced mechanisms like Nominal Group Techniques to bolster decremental or incremental budget changes (Gargan and Moore, 1984).

Hence local government budget and finance offices across the United States and in the South are poised to embrace and utilize varying degrees of sophistication in making decisions and enhancing citizen participation. This study uses these findings and observations as the starting point for examining how means of electronic participation in finance and budget decisions are being used in the 21st century.

7. Forms of participation and information communication technology and social media platforms

Various forms of citizen input into government decisions have existed for centuries and in the era of 21st century government have taken many forms. It is appropriate to catalog and discuss some of those approaches and then make a transition to their application in a budget and finance function of government.

In many respects the most basic form of citizen input is voting and the statement of preferences for particular political candidates who espouse a particular view consistent with citizen preferences. This mechanism is the hallmark of democracy but is done with a distance from the actual policies and regulatory and management decisions that governments make. The referendum is a plebiscite that is more typically revolving around an issue, policy or specific action to be taken by government. In the United States referendum tend to be more complicated mechanisms and are subject to the vagaries of communicating the nuances of the issue being decided and may or may not provide the necessary clarity or transparency to enhance participation by citizens.

Lobbying is in an American context is another prevalent form of participation in terms of hired or volunteer lobbyists who advocate for a particular issue or pieces of legislation with varying degrees of success. This process is a staple in American politics at the local, state and national levels but is also a form of participation that somewhat revolves around the active role of the individual citizen in the process. The issues of undue influence and the role of money become issues about how representative this form of participation may really be. Constituent services whether provide by individual elected officials or the government itself is also an important form of soliciting citizen input. Here again issues of access and impact are relevant. Also despite a proactive form of participation, this form of interaction tends to be reactive and has a flavor of special interest being advanced. This may also not be representative of citizen needs at large.

Concepts such as an ombudsman or other watchdog or oversight bodies are an important mechanism of accountability but this approach tends to be after the fact and reactionary. Some describe this as participation after the fact. Although significant for correcting or addressing problems or ensuring policies and programs are implemented, this approach is also done in a vacuum with citizens playing a largely passive role in these efforts. Regulatory forums that solicit citizen input are also a hallmark of democratic governments where actions by administrative bodies are seen as coproducers of products and services and citizen input is valued and processed accordingly. However, these mechanisms are often viewed as less than representative of the public and become a narrow focus for certain interests in the community.

Finally under the broader rubric of information sharing especially in a 21st century context is perhaps most relevant for this present study. Here governments and public officials actively promote and disclose and inform the citizenry about developments of public policy, programs and services. In a 21st century dynamic this can take the form of web pages, email, surveys, citizen forums, and other mechanisms. This is the nexus for electronic interplay between citizens and government. This paper posits that this is the arena for the most meaningful form of information sharing and citizen participation through open and easily accessed channels of participation.

This paper looks at the application of these mechanisms in regards to local governments' use of electronic forms of participation. At the outset it must be stated that all forms of participation outlined here are relevant and in fact offer a cumulative or summative impact on local government decision makers. But does the prospect of information sharing via an electronic platform really mean increased citizen participation?

8. Applications of social media and information communication technology in budget and finance

For the purpose of this study the definition of electronic participation in government focuses on delivery of government services and information in an electronic or digital format. The mechanisms necessarily include the Web, email, fax services, video conferencing, GIS, Skype-type services, blogs, wikis, telephone, and social media

applications. There are equally impressive and voluminous studies that have examined these various mechanisms with relevance for local governments in the US and elsewhere.

Borry (2011) looks at municipal web sites as tools for proactive dissemination of information. Bamberg and Lehtonen (2011) explore GIS systems for gaining neighborhood input. In addition Sandoval-Almazan and Gutierrez-Alonso (2011) look at the use of Twitter as a means of citizen mobilization. In what represents only a few treatments of electronic participation in budget and finance functions of government, Rios and Insua (2008) examined methods of elaboration in participatory budgeting and discovered limited sophistication in terms of decision support. Hence, this study sought to discover the use and level of sophistication in its survey of local government budget and finance offices in local government in the United States and specifically in the State of Georgia.

The focus for this study was not confined to one type of participatory mechanism but erred on the side of the applications of various social media platforms as the basis for this interaction. Specific applications in use of the web (passive or interactive), Facebook, YouTube and Video conference/communication, Twitter and Instagram platforms were of particular interest. The use of what can be broadly labelled as information communications technologies was analyzed in the survey from the vantage points of *Distribution* of budget and finance information, *Exchange of Information*, *Constituent Concerns/Dialogue* and *Transparency* of financial information.

It was hypothesized that there are two distinct spheres of influence that were facilitated by the use of information technologies. One was an external function where local budget and finance information was shared and distributed. The mechanisms for this interaction were information exchange (annual reports, audits, budgets available online), public hearings and other active forms of input, oversight in terms of audits and financial and budget trends, and voting in terms of active participation surrounding distinct budget issues or proposals. The second sphere was internal in nature. Namely how was this information utilized within the government jurisdiction to guide decisions in budget and finance matters (taxation and allocation decisions)? In this arena, how was public input from hearings processed, how extensively was public reaction to oversight addressed and were corrective actions taken, how was information produced by the government geared toward responding to citizen concerns or suggestions and finally what forms of lobbying for long term changes or corrective actions processed and utilized by local budget and finance officers?

9. Survey of local government in Georgia (USA)

The survey instrument consisted of a range of 20 questions that were both closed and open ended responses. The platform was Survey Monkey and was a purposeful sample gleaned from the Government Finance Officers data base (GFOA). The local governments ranged in size from large jurisdictions (over 100,000 in population) to smaller units of Government (under 20,000). The sample size was 52 units of government in the State of Georgia with a response coming from 22 units of government. The survey is underway and will be collecting data from local governments in states across the southern region of the United States. This present survey is only sharing results from one state in this overall survey. Both distinct municipalities and larger counties were included in the study.

For proponents of the use of electronic participation the results were disappointing. Only key findings/responses from the survey will be presented here. Approximately 47 percent,almost half of the local governments surveyed, reported none or limited use of electronic means of interaction with citizens for local budget and finance decisions. Some 28 percent reported a moderate level of usage. The primary utilization was identified as transaction based (payment of bills and fines) with only 14 percent reporting that electronic participation was actively used to solicit feedback from citizens. The platforms used were primarily identified as web (passive) and email and social media (Facebook and Twitter).Budget and finance functions available for electronic communication with citizens were identified in several limited areas such as information on budgets and expenditures, various financial reports, tax payment services, license applications and various utilities information (water or sewer).

The current means of overall participation were as follows: budget hearings (43%), Government Meetings (18%), Email (17%), Social Media for Tax and Expenditure Reporting (11%), Other Functions (10%) and 0% reporting the use of any surveys. When asked about the best use of electronic means of participation, respondents reported

that web site input, e-surveys, and more online payment options were preferred. A specific interest of this study was in the use of Social Media for budget and finance functions in local government. Although social media was identified as a useful means for informing the public on basic tax and expenditure data, there were limited applications (11%). When asked about the utility of social media for informing budget and finance decisions, 52% responded that they saw a moderate to high application in budget and finance functions. It was revealed that despite this positive orientation, most respondents viewed social media as a one way tool for presenting financial information (reports, performance dashboards, etc.) and not necessarily for engaging with the public. Yet a consistent viewpoint from open ended responses was that the presentation of this information via social media tools would raise the bar of public financial literacy for citizens. However, 27% of respondents saw no or little value in using social media related to financial and budgeting in local government.

The more telling response came in the form of answers to the questions about plans to more actively engage in electronic means of participation. Although 20 percent of the respondents said yes they are expanding usage, another 20 percent reported there were no plans to do this and 57 percent said they were uncertain. When asked to identify obstacles to increased usage they identified lack of an educated population, internal fears, lack of political support and the lack of sufficient IT support. Most respondents were open to bringing in consultants or university based resources to explore any initiatives.

The limitations of a low response rate and an incomplete overall survey somewhat confine the ability of this survey to make any broader claim about the state of the art in electronic participation for budget and finance in local governments in Georgia. The open ended survey responses revealed some important insights. What can be seen as a somewhat more positive testimony to expanded utilization came in the form of a variety of comments: a) "I find it valuable if data can be shared in a simple format for the ordinary citizen to understand;" b) While I appreciate the concept/approach, I believe it only complicates and slows down the process;" c) "More citizen input gives us better insights into what citizens expects from our government;" and d) Anything that can be transmitted to citizens from government and online would be more efficient."

10. Preliminary results and observations

In balance, the preliminary and limited survey results can be summarized as uneven, involve issues of capacity and reflect generally low levels of interest. If some conclusions can be drawn from this study it is that the ability of governments to engage more in electronic forms of participation with citizens in the arena of finance/budget decisions is largely one of capacity. Limited resources and staff oriented toward adopting various technologies seem to be a major problem for local governments. Also, the use of such mechanisms seems to have more support for transactional purposes rather than as a decision process. And finally a generally low level of interest by local budget and finance officials seem evident.

The last point is perhaps most significant in terms of the lack of enthusiasm or resolve for using existing information communication technologies. In fact while most local governments have an adequate web presence, use electronic communications with citizens it is still viewed as largely a one way communication from government to citizen as opposed to citizen to government, As many of the studies identified in this paper suggest there is a long way to go to move local governments toward a more active usage of electronic participation to help inform budget and finance decisions.

11. Conclusions and implications

What can be gleaned from this study and will perhaps be established as the other responses from the broader survey come in is that there needs to be an external driver for governments to fully embrace more widespread use of these available technologies. In many respects this points to the imperative to explore a more active adoption of the means of a participatory budget model to bridge local budget and finance decisions with public/citizen input.

Several studies have examined the linkage between participatory budgeting and citizen participation (Michels and DeGraaf, 2010). They conclude that adoption of participatory budgeting increases citizen responsibility, increases engagement in public life, encourages diversity of opinions and offers increased legitimacy of decisions. Their study posits that systems that incorporate elements of democratic citizenship (like participatory budgeting)are more important than direct input into public decisions. Hence they acknowledge that participatory budgeting may represent a backdoor or alternative route to democracy by virtue of its participatory

mechanisms (e.g. neighborhood forums and voting). Sintomer, et al (2008) have looked at the application of participatory budgeting in Europe and find that a "fourth power" arises or is supported through a participatory budgeting framework, namely that of direct or indirect decision making in public budget and finance decisions. And finally, in a well-developed multi case analysis, the author finds evidence to suggest participatory budgeting is a vehicle for reinvigorating political parties by responding to citizen demands (Cabannes, 2004). Moreover, he posits participatory budgeting is a mechanism to decentralize decisions and share decisions with social and civic movements. He also observes participatory budgeting is a platform for allowing other actors to enter into the realm of public decision making. He cites a form of "community based representative democracy "as an outcome of participatory budgeting systems. Finally he offers the observation that participatory budgeting enhances communications between citizen and the government and improves the dialogue between legislative leaders and their constituents. These previous findings inform the implications that arose from this present study in that a more active embrace of participatory budgeting may offer both an explicit and implicit means for improve participation in democratic societies.

The argument of this paper is that active adoption of participatory budget mechanisms will necessarily require local government to consider the best ways to implement such a participatory framework. This means active utilization of more and more sophisticated tools for electronic participation. Without such an impetus the broader uses of such electronic platforms for participation will be limited or nonexistent. What this study suggests is that in order for the citizen to be more fully engaged in local budget and finance decisions, hinges on the ability not so much on local governments to simply utilize technology with limited applications, but instead is to establish an imperative of citizen value for promoting such decisions in government. One possible venue for increasing this use is through the adoption of a participatory budget model that highlights and values citizen input for the good of the community at large.

The pressure for such a movement lies squarely on the back of citizens themselves. Therefore in some respects this paper comes full circle in arguing that without citizen demand for such input and dialogue it is unlikely local government budget and finance officials will move in this direction in the distant future.

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An Analysis of the Brazilian Challenges to Advance in e-Government

José Alberto Torres[1][2], Hélvio Peixoto[1], Flavio de Deus[2] and Rafael de Sousa Junior[2]
[1]Ministry of Justice, Brazil
[2]Department of Electrical Engineering, University of Brasilia, Brasilia, Brazil
alberto.torres@mj.gov.br
helvio.peixoto@mj.gov.br
flavioelias@unb.br
desousa@unb.br

Abstract: Governments all over the planet have acted to publish their information and services in an online environment. While the world observes a rapid advancement in e-government, the Brazilian reality is different: low percentage of transactional services and low adherence of its population to e-gov. Despite being among the ten largest economies in the world, Brazil is ranked 57th in the e-government development survey conducted biannually by the UN. This paper aims to unveil the elements that prevent the development of the Brazilian electronic government by analyzing the three dimensions proposed by UN in the conceptual framework of the E-Government Development Index (EGDI). The research showed that the primary challenge to e-government in Brazil is related to human education factors: adult literacy; combined primary, secondary and tertiary gross enrollment ratio; expected years of schooling; and average years of schooling. The second main barrier to Brazilian e-government is the technological development index, as despite recent improvements, Brazilian statistics are still lagging behind those of developed countries. Although the Inherent Human Capital Index (HCI) and the Telecommunication Infrastructure Index (TII) are primarily responsible for the current Brazilian ranking, the historical analysis showed that the trend line of these indexes shows stability over the past eleven years. Unlike what is happening with the HCI and TII indexes, the outcomes presented a worsening in the trend line of Brazilian electronic government services' maturity. These results can assist the Brazilian government to identify strengths and weaknesses in its e-government strategy, serving as a guide for public policies specifically targeted to address the main problems related to e-government and implement actions that would allow e-gov services to reach transactional and connected levels, as well as the implementation of a national identity management strategy.

Keywords: electronic government, online services, Brazil, EGDI, United Nations

1. Introduction

The impact of technology on society is increasing considerably and the Internet has become the de facto connector between people, organizations and the digital world. With the facilities provided by the World Wide Web, people have adopted new ways of communicating, which has led to higher expectations of information and service availability: online, anytime and anywhere. This reality has pushed governments around the world into taking action to publish on-line services and other information relevant to citizens (Urdiales 2004).

The concept of electronic government (e-gov) rightly embraces this initiative, using information technology as a way of delivering public services to citizens, businesses or other governments through the integration of processes. Other initiatives, such as the migration of public services to the online environment, encouraging the use of e-services by citizens, publication of government data on public portals and deploying strategies to provide confidence in the exchange of information, have been treated as guidelines for electronic government agendas in many countries.

Despite the rapid advance of electronic government in several continents, especially in Europe and Asia, we observe that e-gov has yet to take off in Brazil. Although Brazil is now recognized as the seventh largest economy (GDP) in the world, it is listed at 57th place in the e-government ranking published by the UN. Of the first fifteen largest economies in the world, only four are not listed among the top e-Government Rankings: Brazil, Mexico, China and India.

This paper aims to unveil the elements that prevent the development of the Brazilian electronic government by analyzing the three dimensions proposed by UN in the conceptual framework of the E-Government Development Index (EGDI). We use the statistical data published by the United Nations and by the Brazilian Government over the last fifteen years to present the key problems that have prevented Brazilian advances in the e-government arena. The paper is organized as follows: section two presents the UN survey methodology, and afterwards is the Analysis of Brazilian e-Government. Section four contains the discussion of the results analyzed, followed by the conclusion.

2. United Nations survey methodology

The UN conducts biannual surveys on e-government development among its member countries. The conceptual framework of the E-Government Development Index (EGDI) proposed by the UN is used to measure the willingness and capacity of countries to use information and communication technologies to deliver public services (UNPAN 2014).

The EGDI is a composite measure of the three most important dimensions of electronic government: Scope and Quality of Online Service (OSI), Development Status of Telecommunication Infrastructure (TII) and Inherent Human Capital (HCI). Mathematically, the EGDI value is calculated from the arithmetic mean of these three dimensions. Each of these three indices used to calculate EGDI is in itself formed by subindexes that can be extracted and analyzed independently.

TII is an arithmetic average of five indicators standardized via the Z-score procedure to derive the Z-score for each component indicator: estimated internet users, number of main fixed telephone lines, number of mobile subscribers, number of wireless broadband subscriptions and number of fixed broadband subscriptions. "*The TII has remained largely unchanged since 2002, except for the replacement of online population with fixed-broadband subscription and the removal of number of television sets in 2008; the replacement of personal computer (PC) users with fixed Internet subscriptions in 2012; and the replacement of fixed Internet subscriptions with wireless broadband subscriptions in 2014*" (UNPAN 2014).

Until 2012, the Human Capital Index was composed by adult literacy rate and the combined primary, secondary and tertiary gross enrollment ratio. In 2014, the survey introduced two new items: expected years of schooling and average years of schooling. According to the UN, the definitions of the four indicators of HCI used in 2014 are (UNPAN 2014):

- **Adult literacy** is measured as the percentage of people aged 15 years and above who can, with understanding, both read and write a short simple statement on their everyday life.

- **Gross enrollment ratio** is measured as the combined primary, secondary and tertiary gross enrollment ratio of the total number of students enrolled at the primary, secondary and tertiary level, regardless of age, as a percentage of the school-age population for that level.

- **Expected years of schooling** is the total number of years of schooling that a child of a certain age can expect to receive in the future, assuming that the probability of his or her being in school at any particular age is equal to the current enrollment ratio age.

- **Mean years of schooling (MYS)** provides the average number of years of education completed by a country's adult population (25 years and older), excluding the years spent repeating grades.

The equation used to calculate the HCI index is similar to the one used to calculate the TII index, i.e. an average of these four indicators standardized via the Z-score procedure. However, unlike TII, HCI uses a weighted mean, with a 1/3 weighting assigned to adult literacy rate and a 2/9 weighting assigned to each of the other three indicators.

In relation to the Online Service Index, its value is calculated based on a questionnaire that assessed each country's official national website, including the national portal, e-services portal, e-participation portal and websites of the related ministries of education, labor, social services, health, finance and environment, as applicable. This questionnaire was improved to encompass the new technological developments with a focus on (UNPAN 2014):

- the rising importance of a **whole-of government** approach and integrated online service delivery;

- the use of **e-government** to provide information and services to citizens on environment related issues;

- **e-infrastructure** and its increasing role in bridging the digital divide, with a particular emphasis on the provision of effective online services for the inclusion of disadvantaged and vulnerable groups, such as the poor, the disabled, women, children and youth, the elderly, minorities, etc.;

- the increasing emphasis on **service usage**, **multichannel service delivery**, '**open government data**', **e-procurement**;

- the expansion of **e-participation** and **mobile government**.

Based on these questionnaires, the governments' electronic services are classified in maturity levels. Currently, the UN uses four maturity levels to rank the countries in regard to the increasing maturity of their online services: emerging, enhanced, transactional and connected. The description of each level can be seen in Table 1 (UNPAN 2014).

Table 1: Maturity levels of e-government services according the United Nations methodology

Stage	Description
Level I - Emerging	The government provides public information in official websites and Citizens are able to obtain updated information about the government and its services online.
Level II - Enhanced	The government publishes websites that provide an enhanced one-way or simple two-way e-communication between the government and citizens. Some simple electronic services are still provided and enable citizens to submit requests.
Level III - Transactional	There is a considerable increase in online services and the government engages in transactional two-way communication with their citizens. Because online transactions are at this stage, the government needs some method to confirm the citizen's electronic identity.
Level IV - Connected	Government websites become proactive in requesting information and opinions from citizens, and e-services cut across all government agencies and departments. Government is now citizen-centric, and information, data and knowledge are shared among all government agencies.

3. Analysis of Brazilian e-government

In the last e-government development survey conducted by the UN in 2014, Brazil ranked 57th. This represents a two-position improvement over the research conducted in 2012, but a decrease of 24 positions compared with the better placement already occupied by Brazil, 33rd in 2005. The reality is even worse if the TII and HCI indexes are observed separately: Brazil currently occupies 61st position in the first index and is 78th in the second. Our hypothesis is that Brazil did not advance in human education and infra-structure – the enabling mechanisms for e-government. In order to demonstrate our hypothesis, this work scrutinizes the reality of Brazilian e-government based on the thorough evolution of the three dimensions of the UN EGDI index, i.e. HCI, TII and OSI indicators, along with all e-government surveys published by the UN (UNPAN 2003) (UNPAN 2004) (UNPAN 2005) (UNPAN 2008) (UNPAN 2010) (UNPAN 2012) (UNPAN 2014). The overall EGDI ranking was divided as a function of the country position in each of the elements of index to create an individual ranking in each element. This made it possible to evaluate the evolution of each index over the years, as can be seen in Figure 1, which presents the EGDI components evolution of the 7 surveys considered in this work. In addition to the analysis of the components evolution on the timeline, the data associated with each of these components were also evaluated. For this, we used data and statistics obtained from UN e-government surveys, UN human development reports and reports from the Brazilian Ministries of Finances and Education, as well as from the Brazilian Institute of Geography and Statistics. The study was further enriched with the addition of the information about official programs implemented by the Brazilian government in the social and technological areas that influenced the elements related to EGDI components. The joint and individual analysis of these data allowed us to identify the main barriers to the advancement of Brazilian electronic government.
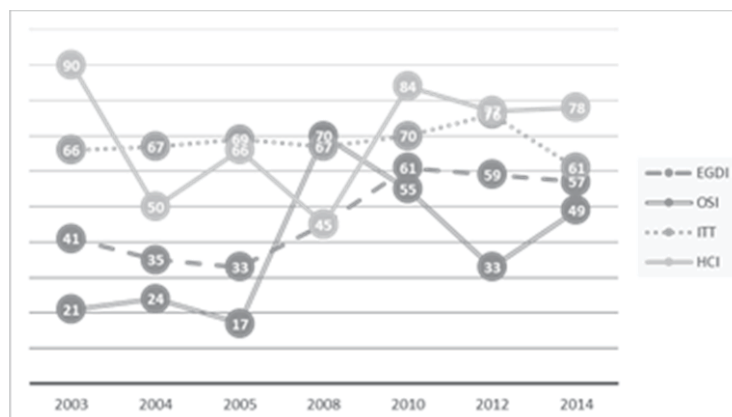
Figure 1: EGDI components evolution

3.1 Human capacity development

The HCI is the index that has the worst result among the three elements that compose Brazilian EGDI. In 2014 the country ranked 78th, 33 positions lower than the best position achieved by Brazil, when it reached 45th in 2008. The HCI analysis indicates a close correlation between this index and the Brazilian social indicators, more specifically those related to public education. Evidence of this is the fact that Brazil currently occupies 79th position in the Human Development ranking published by the United Nations Development Programme (UNDP 2014), one position worse than the 78th place occupied in HCI ranking.

According to official data from the Brazilian Institute of Geography and Statistics, the adult literacy rate has improved from 82.8% in 1992 to 91.4% in 2011. If only the youth literacy rate is taken into consideration, the result is even more encouraging because it has risen from 87.6% to 98.1% (Brazilian Institute of Geography and Statistics 2014). This result, among youth, gives rise to the prediction that with the population aging, the overall literacy rate in Brazil will tend to further improve over the coming years.

The second indicator measured by the UN to compose the HCI index is a combined primary, secondary and tertiary gross enrollment ratio. In this regard, data from the Brazilian Ministry of Education showed that there is a slight variation in the total enrollment number between 2007 and 2012. However, an important fact to be observed is that there is a decrease in the primary and secondary gross enrollment ratio and an increase in the tertiary gross enrollment ratio, probably due to the aging of the Brazilian population. The evolution of both indicators is presented in Table 2 (National Institute for Educational Studies and Research 2014).

Table 2: HCI evolution

Year	Years of schooling		Gross Enrollment Ratio	
	expected	average	Primary and Secondary	Tertiary
1980	14.1	2.6	-	-
1985	14.1	3.2	-	-
1990	14.1	3.8	-	-
1995	14.1	4.6	-	-
2000	14.5	5.6	-	-
2005	14.2	6.6	-	-
2007	-	-	53,028,928	5,302,373
2008	-	-	53,232,868	5,843,322
2009	-	-	52,580,452	5,985,873
2010	13.8	7.2	51,549,889	6,407,733
2011	13.8	7.2	50,972,619	6,765,540
2012	-	-	50,545,050	7,058,084
2013	15.2	7.2	-	-

Regarding the two new dimensions listed by the UN to compose the HCI index – expected years of schooling and average years of schooling – Brazil has shown considerable improvement over the past two decades. According to the UNDP, the average years of schooling in Brazil increased from 2.6 years in 1980 to 7.2 years in 2013, and the expected years of schooling increased from 14.1 to 15.2 in the same period. Despite these results, Brazil is still ranked among the worst positions for UN countries. As a reference, the average years of schooling in the United States was almost 14 years in 2013 (UNDP 2014).

3.2 Online service advancement

The UN maturity levels are defined as a way of measuring the degree of evolution of electronic services, functioning as a reference to compare the e-gov situation in different countries. According to the 2014 UN report, although 100% of Brazilian services have already reached the emerging stage, just 26% of services have reached the last – connected – stage. In the middle range stages, we have 68% of services rated as improved, and 28% as transactional. It is worth noting that a service can fall into more than one stage simultaneously.

The United Nations used to use a model based on five different maturity levels to evaluate electronic services. However, as presented in Table 1, since 2010 the model has been improved and the number of levels was reduced to four. Despite this slight difference in UN methodologies about the number of maturity levels, the data presented in Table 3 demonstrate that Brazilian e-gov services have had difficulty in reaching the last two

levels of maturity along all UN surveys. An analysis conducted with the top ten countries in the UN e-government ranking has shown that the implementation of an electronic identity management strategy is a key factor to enable the highest levels of maturity (Verzeletti 2014). According to the UN, the number of countries that are currently developing actions to create a centralized electronic identity to permit access to government services increased from 52 to 69 in the last two years (UNPAN 2014)

Table 3: Brazilian e-gov maturity levels

Year	Level I	Level II	Level III	Level IV	Level V
2004	100	85	69	44	13
2005	100	90	77	63	33
2008	7	75	64	27	7
2010	53	34	10	19	-
2012	100	64	48	57	-
2014	100	68	28	26	-

The necessity of a strong authentication method is mainly due to the transactional characteristics of the last two maturity levels of electronic services. In online transaction environments, as there is no physical presence of a person, it is essential to have a means to guarantee the identity of the subjects that are performing transactions with the government in order to ensure proper identification and prevent identity fraud. To illustrate this point, a study conducted by National Fraud Authority (2012) estimated the cost of identity fraud in the UK to be 1.2 billion pound in 2011 alone. The cost of fraud in the same category was estimated at approximately 311 million Australian dollars in Australia (Australian Payments Clearing Association Limited 2013) and US$20 billion in the United States (Javelin Strategy & Research 2013).

Another survey, conducted by the Organization for Economic Cooperation and Development (OECD) also confirms this reality. Performed with 18 countries associated to the OECD, the study showed that all governments that answered the questionnaire already have a national strategy for digital identity management or are currently developing a strategy. For most of these countries, the first objective to be achieved with the identity strategy is to promote electronic government services to the transactional stages and develop innovation in public and private services (OECD, 2011).

Based on these facts, it can be inferred that a lack of a national strategy for identity management in Brazil has prevented the improvement of Brazilian e-gov services. The current absence of this strategy has led federal agencies to adopt the silo-based model for identity management, where each agency has built its own user base in order to provide transactional services to citizens. This practice has generated several interoperability difficulties due to independent identification databases and has potentially created a lot of inconsistencies. To illustrate the problem, there are currently several federal databases that have more registered users than the total Brazilian population. As an example, consider the National Social Information Registry (CNIS), which contains more than 300 million people, and the National Health Card Registry, which contains about 264 million citizens. The Brazilian population is about 202 million.

3.3 ICT infrastructure

As already mentioned, the ICT component incorporated a few changes over the years and is currently evaluated based on five indicators: estimated Internet users, number of main fixed telephone lines, number of mobile subscribers, number of wireless broadband subscriptions and number of fixed broadband subscriptions.

The analysis of data presented in Figure 2 points to an improvement in most of the elements that make up the ICT index, especially the number of estimated mobile subscribers, which increased from 20 to over 120 per 100 inhabitants, and the number of estimated Internet users, which rose from about 8 to 50 per 100 inhabitants. The index of fixed telephone lines remained almost stable between 2003 and 2014, and the personal computers statistic has not been used by the UN in its calculation since 2010 (ITU 2014).
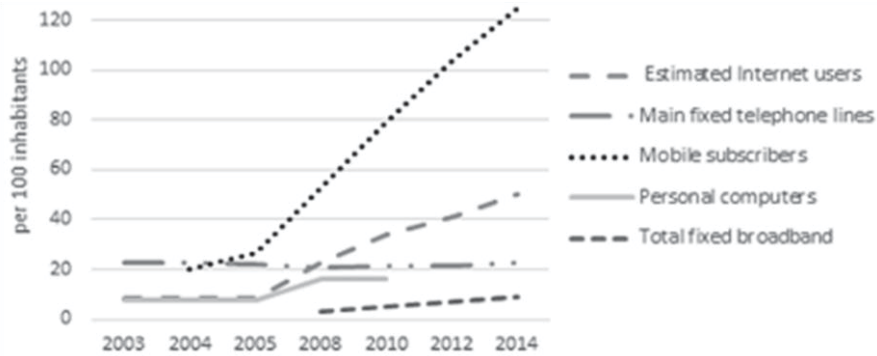
Figure 2: ICT components evolution

One can see that the stagnation in the number of fixed lines is a consequence of the Brazilian mobile phone's leapfrogging, enabling the population to skip the fixed-line technology of the 20th century and move straight to the mobile technology of the 21st. This trend is also observed in the spread of Internet use among Brazilians, since current mobile technologies allow data communication in addition to traditional voice communication.

Based on these facts, the great challenge of Brazil seems to be the indicator related to fixed internet broadband. An important observation is that approximately 10 in every 100 Brazilians have fixed broadband at home, representing about 20 million people. Although the current indicator value is 100% higher than the value published in 2008, the statistic is still relatively low. For the sake of comparison, over 75% of the European population has fixed broadband Internet access. In countries such as Holland, Sweden and Norway, this percentage tops 90%. These numbers are much higher than the reality of Brazil and in many Latin America countries. These data confirm that fixed internet broadband is certainly one of the indicators that keeps Brazil in the e-government ranking's intermediate positions.

4. Discussion

The fragmented analysis of indicators revealed that the uncomfortable position of Brazil in the UN e-government ranking is a consequence of its poor placement in all components of the index. What it showed is that, despite the considerable gap between the best and the worst ranking positions among the three components (49th in the OSI and 78th in the HCI), in none of the indexes does Brazil currently occupy a prominent position.

In relation to Human Capital Index, what is observed is a clear improvement of all the sub-indicators. This reality is closely related to a series of public policies implemented by the Brazilian government over the past decade. The last important initiative was the enactment of Law 12858/2013, which states that 75% of oil royalties and 50% of the Pre-Salt Social Fund shall be used exclusively for public education and health, with priority in basic education.

According to Art. 211 of the current Brazilian Constitution, municipalities are responsible for providing elementary education and early childhood education to the local population. At the same time, primary and secondary education is mainly a state level responsibility. The Federal government, therefore, does not act directly in these early educational stages, but works in cooperation with states and municipalities.

Federal, state and municipal levels have all signed a National Pact for Literacy, which encompasses policies to ensure that all children will have access to education and be literate by the age of eight (Brazilian Federal Government 2013). Another initiative is the National Pact for Strengthening High School, which is the articulation and coordination of actions and strategies between the Union and State governments in the formulation and implementation of policies to raise the standard of quality of Brazilian High School in its different modalities (Brazilian Ministry of Education 2013).

In addition, the federal government has acted directly to facilitate access to higher education, increasing the number of enrollments in federal institutions from 353,235 to 1,137,851 over the course of 10 years (National Institute for Educational Studies and Research 2014), and acting as sponsor to provide scholarships in private institutions to more than 300,000 people in 2014 (Brazilian Ministry of Education 2014).

Regarding the Telecommunication Infrastructure Development Index, a series of initiatives taken by the federal government can also be observed. For example, consider the Brazilian National Broadband Program established through Decree 7175/2010 (Brazilian Federal Government 2010), which has the main objective of facilitating and extending access to broadband Internet in the country, especially in the poorest regions.

To reach the goal of 40 million households connected to the World Wide Web by 2014, the Ministry of Communications has been active on several fronts, such as the expansion of the public fiber network and even promoting tax reduction on smartphones. Also implemented has been the so-called "popular broadband Internet with subsidized cost" (Brazilian Ministry of Communications 2012).

As a complement, Brazil included in the bidding for use of 4G frequency the obligation that the winning companies have to expand their internet coverage in outlying and remote areas. If 30% of Brazilian municipalities had voice and data service coverage in June, at the end of 2014 this coverage will have to rise to 60% of all cities (Brazilian Federal Government 2014).

As explained, despite unsatisfactory results presented in the Human and Technological components, Brazil has taken a series of actions in order to strengthen these indicators. However, regarding the EGDI Components Trends, in particular the Online Service dimension, the reality is different. While the best-placed countries on e-government ranking discuss the progress in electronic identity interoperability among different countries, Brazilian e-gov is still discussing the national open data program. The only relevant action from the government to provide a single electronic identity consists of the National Program of Civil Identity Registration, established by law in 1997, but it is still competing for priority and resources, not showing any concrete results (Torres 2014).

The fact that Brazil is not demonstrating improvement of e-government services is even more worrying when you look at the indicators of the trend graph presented in Figure 3. It can be seen that while the human factor ranking remains a stable and the ICT index has a slight improvement, the online services component has a tendency to worsen.
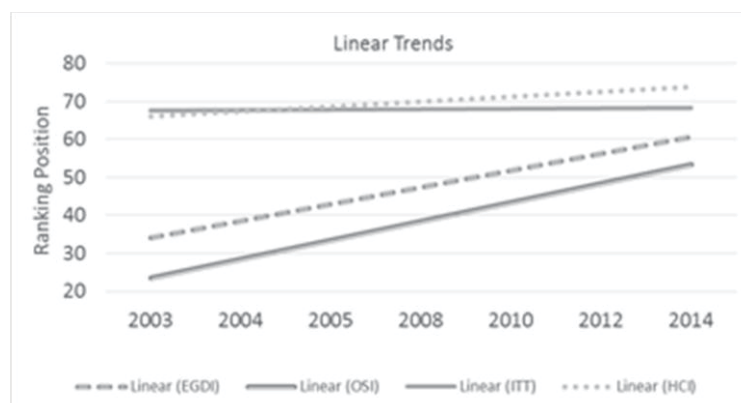
Figure 3: EGDI components trends

5. Conclusion

When it comes to electronic government the first thing that comes to mind is the technological component. Thus, the fact that Brazil currently occupies an intermediate position in the UN e-government ranking could have been linked to low technological development in the country.

However, the calculation of Electronic Government Development Index, the main reference to ranking the countries, is based on three components, one being the human factor. And it is precisely this component, which deals with adult literacy, combined primary, secondary and tertiary gross enrollment ratio, expected years of schooling and average years of schooling, that Brazil has the worst results – 78th in ranking.

The second barrier to Brazilian e-government is the technological development index, since, despite the recent improvement of the indicators that compose the index, the Brazilian statistics are still lagging behind the developed countries. Proof of this is the fact that only about 10% of the Brazilian population currently has residential broadband access.

Although the HCI and TII indexes are primarily accountable for the current position of Brazil, this study pointed out that the government has, over the recent years, developed a series of actions that have promoted an improvement in these indicators, even if these actions have not been sufficient to improve the country's position in the ranking. As noted, the historic trend line shows a stability trend in both indicators.

On the other hand, when the online services component is analyzed, government consistent actions were not observed. Despite being the component where Brazil currently has the best position (49th), the trend line shows that there is a worsening forecast of this index over the years. This trend line is very similar to that observed in the EGDI indicator in the same period. The main issue is that, unlike what is happening with the HCI and TII indexes, an improvement is not seen in the level of maturity of Brazilian electronic government services, regardless of the improvement or not in the ranking position. This reality brings out the need for the Brazilian government to develop policies and implement actions that allow e-gov services to reach the transactional and connected levels with the implementation of a national identity management strategy.

An important point to be observed in the statistics is that the improving ratings related to the human and technological index, such as adult literacy and average years of schooling, or to the increase in access to broadband Internet in the country, for example, are results of actions undertaken primarily to increase Brazil's position in the Human Development ranking, and not the position of the country in the E-Government Development ranking. Facing this reality, the results presented in our paper become even more relevant as they allow a specific look at the advancement of e-government. These data can assist the Brazilian government to identify weaknesses and strengths in its e-gov strategy and still serve as a guide to develop and implement public policies specifically targeted to attack the main problems related to these area. For future work, we can expect the revision of Brazilian action plans, analyzing how the proposed actions can or cannot address the problems identified in this study.

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Smart Government Solutions in Emerging Economies: Making the Leap Ahead

Tony Verheijen[1], Zubair Khurshid Bhatti[1] and Jody Zall Kusek[2]
[1]World Bank, Washington, USA
[2]University of Maryland, USA
averheijen@worldbank.org
zbhatti@worldbank.org
jkusek@icloud.com

Abstract: Research on service delivery management reform remains OECD-country centric, which means it has limited applicability for emerging and developing economies that need to make a quantum leap in making basic services of sufficient quality available to all citizens. This paper reviews the experience gained so far in implementing a technology driven and citizen-centric service delivery reform model. Using relatively cheap technology, smart phone and dash board technology, the Smart Proactive Government model presented has, in a relatively short period of time, made inroads in intractable governance contexts such as India, Pakistan and, more recently, Albania. This contracts with the mixed results achieved with the introduction of 'big IT systems' in public sector management. While the authors recognize that numerous challenges remain to be overcome, the approach presented constitutes a new way of using technology in improving the effectiveness and quality of public sector governance.

Keywords: ICT, cell phones, governance, public sector reform, change management, innovation, citizen engagement, performance monitoring

1. The wrong debate? OECD-driven approaches to service delivery management reform

Global academic and professional debates on improving public service delivery remain focused on OECD anchored approach to reforms. Fromreinventing government debate (Osborne and Gaebler, 1992) to the UK-inspired 'deliverology' (Manning and Watkins, 2013) or New Zealand-style corporatization and privatization of public services (see, for instance, Boston, 1996), most of what drives debates on public sector service delivery, or its transformation to private sector delivery, originates from and/or is inspired by OECD country models. This also includes the current ideas around use of technology. Most of the discussion on the latter subjectis around the impact of the automation of government systems, often large, for more effective accounting, budget management, human resource management or procurement. More recently, the debate has shifted to the provision ofe-services, including the introduction of one-stop shop solutions.

There are two issues with this approach. First, it is driven by a top-down perspective, rather than being citizen and client centric. Given the time lag between top-down reform initiation and the improvement of service results, top down reforms more often than not carry over-optimistic expectations resulting in disappointment when results take time to become visible. Second, the OECD-anchored approach is driven by the notion of 'good enough' public services;reforms are expected to improve service delivery starting from what an already acceptable (even if far from perfect) level.Giving autonomy to service providers or privatizing public services may seem like a radical departure from the status quo in OECD contexts. However, in essence these reforms are largely incremental and seek to establish the best delivery model for priority basic services within fiscal constraints.

This paper starts from the notion that while the top-down approach may be logical and acceptable in most OECD countries, this is not the case for many emerging economies (e.g. India, Pakistan, Indonesia, Kenya, South Africa), expected to be drivers of economic growth globally in the future. Many of these countries have public service delivery systems which do not qualify even remotely as 'good enough' and citizens are impatient to see results and improvements 'yesterday'. In most emerging economies, the relation between the state and its clients is equally unsatisfactory, as expressed by poor performance on global indicators on governance, business environment and public sector management. Countries like India, Pakistan, Indonesia and Kenya rank poorly on these indicators (World Bank 2014a and http://info.worldbank.org/governance/wgi/index.aspx#home). Some others, like Brazil and Chile, fare better, but even there, expressions of severe public discontent with public sector performance have recently abounded (see for instance the protests around public spending for the Football World Cup and the implications for public services in Brazil).

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As we identified in our recently published book 'Logged On, Smart Government Solutions from South Asia' (Bhatti, Kusek and Verheijen, 2014, chapter 1), there are five global shifts that create new possibilities to change fundamentally broken public service delivery systems and to move from a top-down to a citizen-centric approach. These shifts revolve around; i) the universal availability of technology, which allows even many of the poorest citizens to own a mobile phone; ii) our new ability to measure results in real time (by using this technology); iii) the breakthrough of 'open government' (starting with previously 'closed' systems like India and Mexico) (see discussion in Florini, 2007); iv) the advancement of social media, which changes the game around social mobilization, and v) the emergency of a generation of political leaders willing to engage in using these new conditions to change the political game.

We will discuss the evolution of a new approach to public service delivery management built around these five shifts and review lessons learned so far with its application, which is now moving well beyond the South Asian countries where the concept and ideas originated. We will also argue why this is a potentially a more powerful way to use technology in bringing about systemic changes, rather than starting with expensive investments in IT systems that all too often fail to deliver – our argument centers on how the focus should be first on using technology to push behavioural change.

2. The specificity of emerging economy challenges: Limited fiscal space, multiple demands and rising expectations

Emerging economies face multiple challenges regarding the quality and availability of public services. South Asia, with a growing population and limited fiscal space for investment in improving public services, is the most visible example of such challenges, though emerging economies like Brazil, Kenya and South Africa face similar issues. In all these cases, leaders have found that traditional public management approaches have been of limited help in providing a solution. The first and most fundamental problem that stands in the way of solutions is the disconnect between government systems when they were designed and the needs that they are now expected to fulfil. There has been little investment in public sector systems in most emerging economies, and that investment is certainly not in tune with the transformational demands of emerging economies. The image of a 21st century private sector co-existing with a mid-20th century administration has become a caricature in countries such as India, but one that remains relevant.

South Asian countries are a particularly telling example; they have retained public sector management systems that were anchored in the traditions of former colonial powers, albeit moulded in local traditions. These systems focus on respect for due process and hierarchy and reward years of service over merit. While traditional public service systems in OECD countries also had some of these features, most of them have gradually opened up to outside competition for employment. However, as of today the Indian, Pakistani, Bangladeshi civil service systems remain firmly closed, with entry at the junior level and socialization through the ranks. This is equally true for systems in, for instance, Indonesia and Turkey, though less so in Brazil and South Africa.

There were good reasons to establish and mould civil service systems in this way, as it protected the public service from undue political influence and matched the then main objectives of the state. In the same way, competition at entry was deemed the best way of enshrining merit. Such an approach works well when the main function of the machinery is ensuring security and stability but is out of sync with a growing focus on service delivery, which requires responsiveness, autonomy and a focus on results. In response, many experts (e.g. Schick, 2003) have argued that developing countries need to first consolidate and fix what is wrong with existing systems, that is, they need to reset and reboot, including reforming recruitment and career management systems and modernizing management. However, such an approach is out of synch with today's pre-occupation with 'instant results'. The counterargument to Schick is that if systems have not been fixed in the last decades, time is running out fast for this to be done.

3. Technology and the emphasis on 'big systems'

Solutions based on the application of technology have been tried and tested in emerging economies, but results have often been disappointing. The expectation that the introduction of 'big systems' resolves all ills of underperforming administrations, the automation of processes without fixing the fundamentals in public management systems and the emphasis on supply side reforms,are among the main reasons why the impact of technology has often been more limited than expected. Other constraints are resistance to the use of technology by senior officials, creating dual administrative processes where paper trails cannot be fully eliminated.

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The introduction of complex IT systems has frequently been seen as a panacea for 'frozen' organizations and systems and not just in the public sector. Yet, stories of failure, including in many advanced economies, continue to abound alongside positive examples of streamlined processes and more transparent public resources management. As a good example of both, the comprehensive Evaluation of World Bank Financed programs to support the roll out of Integrated Financial Management Information Systems (IFMIS) (Dener, Watkins and Dorotinsky, 2011) provides a rich illustration of what it takes to make such reforms deliver. Case studies examined in this context also show a discrepancy between results achieved between countries, with important emerging economies such as Turkey and Pakistan scoring significantly worse in system implementation that others, and African countries posing as a negative outlier mostly (Dener, Watkins and Dorotinsky, 2011, pages 51-66).

Dener, Dorotinsky, and Watkins (2011) identify poor political ownership, weak internal technical capacity and lack of attention to detail in system and planning as critical risks for this kind of potentially transformational projects. In contrast, in countries where political and administrative ownership was high, due diligence was exercised in reform preparation and design and roll out and capacity was built throughout the administration fared much better.

It follows from the above study that the introduction of large and complex IT systems poses strong risks in administrations where underlying issues of organization, management and performance have not been addressed. Such projectsare not only risky, generating poor value for money (given the high cost of such systems), but also detract attention from sorely needed deep reforms (e.g. the Pakistan Tax Administration assessment (World Bank, 2012)). Poor implementation records are often exacerbated by problems in the management of system procurement, which frequently leads to drawn out complaint and litigation processes. As in the previous discussion on broader public management reforms, the importance of getting the foundation for broader reforms right emerges as a critical concern. In addition, given the lengthy timeframe for implementing complex IT-based reforms (with an average lead time of 5-7 years, based on the 94 IFMIS cases quoted above), expectations that these can address the 'here and now' issues needs to be carefully managed.

On the issue of supply side solutions, i.e. government initiatives to make services available on line, there is a plethora of examples of countries automating access to public services, in particular where obtaining official documents and permits is concerned. Combe and Browne (2006) provide an analytical framework for e-governance applications related to public service delivery (as different from e-readiness assessment, which focuses on technological advancement), presented in figure 1 below, that puts e-service delivery in context. Government e-service processes, once initiated, often tend to advance up to the transactional (stage 3). However, a move towards the transformational stage (stage 4) is significantly rare (see Verheijen, 2007, p. 36-38 on EU member state cases). For e-services to works, a move from a convenience and provider of equal access to services to a transformational change where it changes the nature of the relation between government and citizens (from provider – recipient to a partnership based on continuous feed-back), the introduction of interactive features, such as portals and dashboards, is essential.
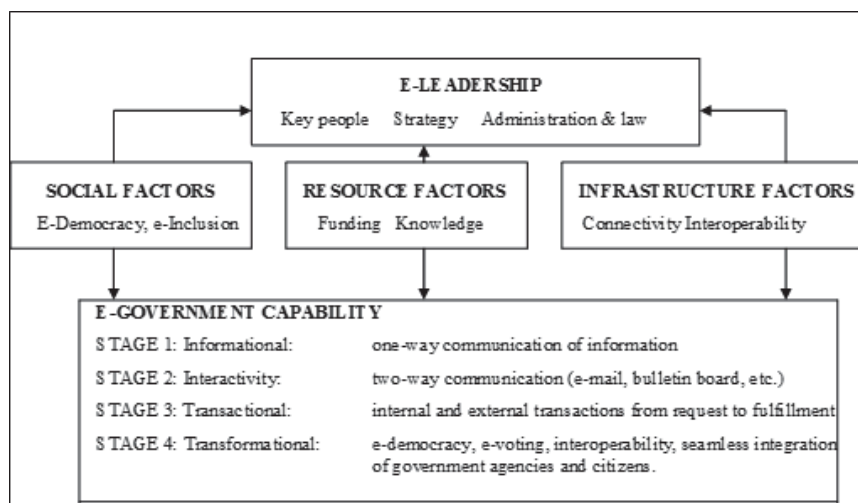
Figure 1: Analytical framework for e-Governance applications (see World Bank 2007, p. 35)

The logic behind the supply-driven element of IT-based innovation in service delivery is that supply will create demand. Based on demand, officials are expected to be forced into providing services more diligently, driven by centrally set deadlines and service standards. The creation of one-stopshops is an important element of such reforms, as these reduce transaction cost for citizens and create a perception of better and more equitable access to services among citizens.

One-stop shops, however, are useful mainly for services that involve obtaining documents and permits, and depend, in terms of their impact and effectiveness, on the reform of back office processes. They cannot address service delivery challenges in more complex areas such as health, education, security and social protection.

Like other elements of service delivery management reform, e-services definitely help, yet their impact depends on other, more complex, change processes happening within administrations and is limited to a sub-set of government services.

Technology is seen as having a vast potential to improve the quality and efficiency of service delivery. Yet, more often than not this is a potential that is not realized. In 'Logged On' we make the case for a different approach. We do this without the aim to replace some of the more traditional approaches and paradigms that have their place and logic, but by arguing that there is an unfulfilled potential in using universally available cheaper technology to help establish feed-back and performance improvement loops that have the potential to overcome some of the barriers governments face in getting better services out to citizens.

4. Can a different approach to using technology transform frozen public service delivery systems?

4.1 The experience

Frustration with broken government delivery systems has been spilling over to the streets of many emerging economies and this is a growing trend. Numerous examples of this are quoted in our recent book (Bhatti, Kusek and Verheijen, 2014, pp. 4-7). Connectivity, better access to information and social mobilization tools have created a sense of shared frustration among emerging middle classes as well as poor and disadvantaged groups, which in many instances have seen a failure in having solid growth performances translate into service delivery gains. While politicians in the past may have been able to ride out the storm and also had genuine excuses of poor data on service delivery performance, this is no longer the case today. Smart phone technology combined with enhanced data processing and analysis capacity makes it possible for leaders to obtain real time performance data, even in large states and provinces.

The Smart Proactive Governance model that is emerging as a new approach to citizen-government dialogue is reducing the information monopoly that used to make field level officials all powerful, both because their superiors were unaware of what they were doing, and because citizens lacked the ability to question how they were treated. The approach builds on the smart use of relatively cheap technology in all aspects of the public service delivery cycle, with different types of technology addressing specific components of the service delivery cycle. It brings together different notions, of a private sector-inspired proactive feedback approach, innovative data processing and analysis and result oriented management. All of these existed previously, but until recently were never brought together in a comprehensive reform model that could address both routine service delivery (the ubiquitous permits, licenses,etc.) and complex services such as agricultural extension, health, policing and education.

4.2 The model

The Smart Proactive Government model laid out in'Logged On' (Bhatti, Kusek and Verheijen, 2014) provides a new concept for transforming service delivery based on innovative use of technology. It integrates the Proactive Governance concept (developed and tested in Pakistan Punjab) with smart phone based tracking of government field workers and the use of IT-based service delivery dashboard to create a holistic approach to improving public service delivery cycles. While Pakistan Punjab has provided the most complete test case for the model, similar holistic approaches are being pursued in India (e.g. Madhya Pradesh and Karnataka).
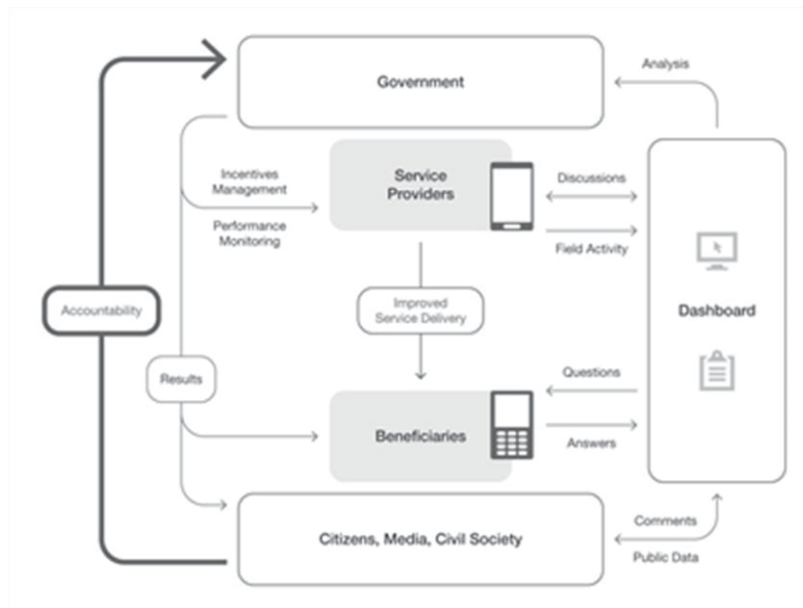
Figure 2: The Smart Proactive Government model (see Bhatti, Kusek and Verheijen, 2014)

The model presented above is a classical representation of the policy and service delivery cycle, where the right hand side (the interlinkages between beneficiaries and the dashboard and service providers and the dashboard respectively) is 'new'. There are four critical new elements in this model.

Element 1: proactive feed-back

The input generated through pro-active solicitation of feed-back of citizens on specific government services provides a real time picture of how clients experience the provision of services. It is the proactive element of the process that is different from the more classical 'complaint' and 'charter' mechanisms that carry a risk of gaming and do not draw out feed-back on what elements of the service delivery process perform adequately.

The origin of this mechanism lies in Pakistan Punjab. While this may seem like an unlikely source of innovation, the Government of Punjab had for a number of years experimented with 'deliverology' to improve services in health and education, mostly to combat widespread absenteeism and favouritism in public service delivery (see the analysis presented in Callen, Gulzar, Hasanain and Khan, 2013). The effort made in health and education blended with attempts to reform property registration systems, seen as one of the most corruption-infested areas of public service delivery. The experiments related to the latter used one-stop-shop approaches and digitization of records as a way to marginalize the low level officials that 'owned' property registers. Government officials leading reform efforts realized that a supply-side only approach was not delivering (enough) results. This led to a rethink of method and the introduction of proactive feedback or the Citizen Feed-back Model. Robocalls using the Chief Minister's voice to inform citizens that their feed-back will be solicited were introduced as a trust building mechanism to entice citizens to respond and provide feed-back. While initial responses were as low as 10 percent of solicited respondents, numbers starting growing as communications from government made it clear that this feed-back was being used to change the behaviour of officials.

The government of Karnataka (India) has applied elements of the proactive feed-back approach in its beneficiary verification system in the health sector, which includes verifying with beneficiaries if a service was delivered and tracking the impact of this process on maternal health. While a simplified version of the Pakistan Punjab approach, in essence it relies on the same feature of proactivity and the use of cell and smart phones.

The government of Albania has recently introduced a similar approach (like in the Punjab case, as part of a broader effort to change service delivery management) focusing on the health sector and on property registration (World Bank, 2014).

Element 2: Information on service delivery performance: using smart phones

The next new element in the model is the mandatory use of GPS technology in smart phones to get government field workers to report on their actual work performed, allowing to corroborate some of the feed-back obtained through the proactive governance model.

This in itself is not new. Development organizations have used both smart phone technology and satellite imagery to verify delivery of project objectives in hard to access locations, notably in Afghanistan, where third party monitors use imagery collected with smart phones to provide proof and assessment of quality of construction (see for details, World Bank 2014b). However, applying the same principle in a holistic manner to complex aspects of public service delivery isa different proposition.

Smart phones were made available to government field workers in Pakistan Punjab to record their own field visits (including GPS coordinates) and to provide proof of services delivered. While one may have expected resistance from the officials (as in previous cases when monitoring devices were used, e.g. in the Rajahstan health worker internal accountability experiment documented by Banarjee, Glennester and Duflo, 2008), it appears that manipulating smart phones or smart phone data is a much harder undertaking than breaking attendance monitoring devices (Bhatti, Verheijen and Kusek, 2014, p. 101).The lower (and falling) cost of smart phones, easier maintenance, and immediate transmission of data also helps to mitigate risks of sabotage. Other concerns, for instance, over privacy and data manipulation, do exist, but these are risks that can be managed.

Element 3: Dashboards

The third 'right hand side' mechanism, the use of interactive dashboard that can collect, catalogue and analyse information, is also not new. Atlanta, Georgia (USA) experimented with dashboards to drive service delivery improvements as early as the last decade (Edwards and Thomas, 2005). However, dashboards at that point could not be driven by real time data, which posed serious limitations. The real time nature of available data is what makes today's dashboards significantly more powerful and relevant. Smart software designers and powerful servers are essentially needed, along with an ability of leaders to ask the right questions. Dashboard technology is being used in a number of the cases we have reviewed. Apart from Pakistan Punjab, Karnataka and Madhya Pradesh also use dashboard technology to analyse and assess service delivery data. The government of Albania is also planning to establish a dashboard system to process and analyse incoming data from two sector pilot applications (World Bank, 2014, p. 7)

Finally, dashboards can also be used to communicate performance information to the general public. This is a powerful tool in itself to push for performance improvements. A sample of communication materials is presented in figure 3 below.
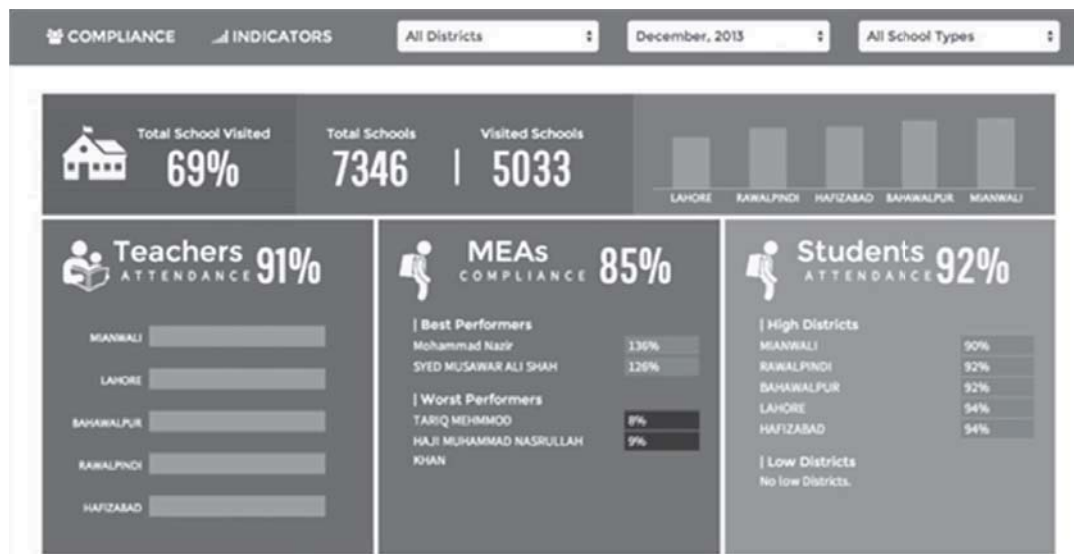
Figure 3: Design for dashboard output for public communications (Punjab, Pakistan)

Element 4: Modifying behaviour: Using data

In the end, the model and approach stands and falls with the extent it is actually used to change behaviour of service delivery staff. If politicians cannot convince senior officials to take data and information seriously, or, if the line of command does not effectively transfer messages down and ensures that inadequate performance and unethical behaviour has (disciplinary) consequences, no model, however well-designed, will have an impact on public service performance. Without a commitment from management at all levels to pass the message and push behavioural change, credibility of any reform efforts will soon be lost and citizens would be one illusion poorer. Hence, using the smart proactive government model in combination with performance management tools can be a particularly powerful proposition. Disciplinary action against misconduct or demotion in case of systematic underperformance is one element of a government (employer's) response, but rewards and incentives should equally be applied to those that perform strongly. This is where the innovative side of the model meets with more traditional discussions on performance in public management. On this aspect, countries like Indonesia and Chile, as well as Brazilian states have interesting experiences to offer. Indonesia and Chile have experimented with 'collective' performance awards, while awards granted in advanced reforming states in Brazil (e.g. Minas Gerais) blend rewards for individuals with institutional performance.

There is a rich and growing literature on performance related rewards in the public sector and the jury is still out on their impact. Much of the debate around performance awards is about objectivity and team performance vs. the individual (World Bank, 2014c). However, the real time performance data generated through the application of the smart proactive government model could addressthe objectivity and granularity challenge and pave the way towards a more targeted and effective application of performance awards.

4.3 Risks and transferability

The model laid out in the previous section has a strong potential to drive real change in public service delivery performance. In Karnataka a further roll out of beneficiary verification is planned, based on the assessment of the previous pilot. New systems, building on the same logic laid out in the previous section, are being developed in other Indian states, such as Assam and Mizoram. In Pakistan, Sindh province is planning the introduction of the approach and the Prime Minister has issued a decision calling for the mandatory introduction of the smart proactive government model in all federal government services, starting with the proactive feed-back elements. Outside South Asia, Albania is piloting the implementation of a model similar to that operating in Pakistan Punjab, including in this case the establishment of multi-service one stop shops for issuing documents and permits. Hence an idea that originated only 5 years ago is attracting growing attention and interest. A more important question, however, is whether it also has staying power. A first indication of citizen perception of the model can be obtained from a recent basic impact evaluation on the Punjab feed-back model. This evaluation included a telephone based sample of 20,000 citizens initially contacted in proactive feed-back requests and provided some useful insights into what the model could deliver.

While the survey was basic and did not include a counterfactual, it nevertheless yielded some important insights on how citizens respond to the model and approach. The perception of the model and the proactive engagement by government was positive.Overall the main conclusions are; i) a perception of improved service delivery; ii) improvement (in particular) on timeliness of service and attitudes of officials, given the nature of major services like emergency response in tertiary care hospitals and; iii) a significant difference between various types of services, with police services underperforming on all aspects. Follow up surveys will need to establish whether these patterns hold up over time including experimental evidence to tease out impact in a more rigorous manner, but nevertheless the results send an important signal to policymakers that attention to service quality (as expressed in timeliness and attitude) needs to remain strong: in the end perceptions of timeliness and attitude will drive appreciation of government services and the impact that the approach will have.

This brings us back to some of the risks identified so far. Privacy concerns and data protection risks are one element that will need to be addressed, in particular to mitigate against any risk of retaliatory behaviour of officials. Risks of gaming by officials (and the system of 'middlemen' that exists in South Asia) to undermine the feed-back generation process are equally important. Smart monitoring of patterns of phone number registration can help mitigate this risk. However, the main risk is that once the novelty of the system wears off, political and administrative leaders stop paying attention and behaviours may revert to the status quo. While this is certainly an issue of concern, the general trend of growing citizen demand for better services and its increasing

prominence in election campaigns, provides a powerful incentive for politicians to continue service delivery improvement efforts. It is a fact that leaders that drive such reforms rarely get voted out of office, at least not in India, Pakistan, and Brazil.

5. What more do we need to learn?

What we have learned through the experience in designing and supporting the application of the Smart Proactive Government model is that there is more to the use of technology than introducing large IT systems and automating document and permit issuance processes. Put in the right context and framework, and with the support of leaders willing to think out of the box, inexpensive technology can generate both service delivery improvements and, eventually, significant efficiency gains to fiscally constrained governments. Building on this notion, technology may in the end deliver on the service delivery promise it always held, but so far has not fully realized. A further critical application relates to the design of development and investment projects: standard set-piece projects are not amenable to the constant iterative design improvement focus of these interventions. As interest in alternative models of reforming public service delivery systems grows, the question of how to frame the interaction between the approach presented here, based on change management and incentives for behavioural change and the formal systems already in place will arise. Ideally, one would expect the dynamic around the Smart Proactive Government model to push change in the formal legal and organizational public management system. This is not an impossible notion: In the case of Indonesian Bureaucracy reforms, for instance, a parallel system of rewards and indeed of job classification was introduced with the hope to have the original out-dated (but seen as non-reformable) system 'wither away'. This in the end did not happen. However, the existence of a parallel system did generate the pressure that enabled the broader legislative changes that had been stalled for decades. Could this hold in the cases discussed here and will the pressure generated by a performance driven model be sufficient to make deficient but firmly rooted organizational and legal realities crumble? This will be one of the most fundamental questions to which we will seek an answer as the Smart Proactive Government model gets rolled out and applied in a growing number of contexts.

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IT Project Prioritization and Scoring System for Thai Public Sectors

Nawaporn Wisitpongphan and Tawa Khampachua
Research Center of Information and Communication Technology, King Mongkut's
University of Technology North Bangkok, Bangkok, Thailand
nawaporn.w@it.kmutnb.ac.th
tawa.k@fte.kmutnb.ac.th

Abstract: Many public sectors struggle to balance the long list of demand for implementing new information technology (IT) projects while maintaining/improving existing systems that support the core services. Determining how to prioritize several projects for many departments and various groups of users with different educational background is non-trivial. Often times, the person with higher rank gets to choose which projects should be implemented first and the organization ends up with biased project prioritization. In this paper, we introduce a Project Dependency Map and Scoring system (PDMS) for IT project prioritization and ordering. Unlike Program Evaluation and Review Technique (PERT) which is widely adopted for ordering tasks in a project, PDMS can be used to prioritize and order multiple projects for a long term IT investment planning. Dependency between projects along with the project type determine the order of the dependent projects, whereas independent projects can be prioritized and ordered according to the well-defined scoring system based on three different aspects: necessity, readiness, and worthiness. The quantitative scoring scale is derived from more than 4 years of experience working as the IT consultants in implementing IT Strategic Plan for five different public sectors and state enterprises of different sizes and functions. The result of the PDMS, can be indirectly measured by evaluating the number of successful projects which are executed and completed on time. Finally, we applied the PDMS approach at the Dairy Farming Promotion Organization of Thailand (DPO) and found that such approach was well accepted by the ICT board members.

Keywords: IT projects, prioritization, project dependency map, ICT master plan

1. Introduction

IT Investment has gradually become an essential part of the government budget spending in Thailand. Every year in January, each public sector and state enterprise have to propose the IT strategic plan and defend the budget for the IT projects to be implemented in the following year. The plan includes list of IT projects, budgets, and a brief explanation stating the importance of each project. Failure to include the project into the proposal could severely degrade or slow down the operation within the government unit. On the other hand, proposing too many projects could result in inefficient project delivery or unimplemented projects. However, ordering the importance of more than 20 IT projects over the course of 5 years is not a trivial task especially when there are many independent projects which belong to multiple groups of users. There are always questions from the Information Communication Technology (ICT) board members about the project prioritization. Often time, verbal explanation and reasoning is not sufficient. Hence, the project prioritization and ordering strategy is the most challenging task in a typical 5-year IT strategic planning because the project detail and budget estimation need to be ready at least a year in advance.

Several existing solutions to project prioritization (Brandon, 2006, Cooper et al., 2000, Ghasemzadeh and Archer, 2000, Gosenheimer, 2003, Ward, 1990) call for evaluating a number of common criteria: level of strategic alignment, level of risk, opportunity for success, expected benefit or return, etc. The scale for each criterion is often qualitative, e.g., the project could yield {very little, little, some, or a great deal} of benefit to the customers. While this qualitative measurement approach could roughly capture the importance of the project, its results could be biased granted that people from different departments or backgrounds may have different views about the project. There are also several quantitative measurement tools which can be used to evaluate the worthiness of the IT project investment. Benefit-Cost Analysis (BCA), Return on Investment (ROI), Internal Rate of Return (IRR), and Net Present Value (NPV) are some of the most common methods used (Cassidy, 1998). However, Denbo et al. (2003) argued that using such tools separately would lead to incomplete answers, so they proposed an approach which integrates a variety of measurement tools to provide a more complete measure of priority value. More specifically, their model integrates both strategy and investment values to produce a quantitative ranking of IT project. The "Return" considered in the model is not just return from the financial aspect but also from strategic alignment and resourcefulness point of views.

Conversely, Zheng et al., (2011) claimed that integrating different factors into a single or a few priority numbers may have hidden relevant information that may be used to distinguish project priorities. While there have been some attempts to alternatively visualize different aspect of a project (Tegarden, 1999, Zhang, 2001), such

approaches can only represent information at a project level but not as a whole. The multidimensional perceptual map approach (Zheng et al., 2011), on the other hand, can represent the overall picture of the projects along with important criteria that truly capture the differences in priorities. However, this approach, despite the existing prototype, is quite impractical because of the limited access to the prototype itself and the difficulties in deriving the proposed visual project representation.

In this paper, we proposed an approach called a Project Dependency Map and Scoring system (PDMS) which is capable of handling the prioritization of dependent and independent projects separately. Dependent projects, which rely on the completion of other projects, will not be considered for prioritization, but its order in the strategic plan will be determined based on the priority of its dependent project. On the other hand, prioritizing independent projects requires a combination of quantitative scale as well as benefit-cost analysis in order to evaluate three important criteria: necessity, readiness, and worthiness. The results of the PDMS is the project dependency map which provide visual display of the project ordering by years.

2. Background on information technology management in Thailand

Information technology projects implemented in every public sector in Thailand have to be included in the ICT master plan so that they can get sufficient budget for IT development from the government. Hence, it is crucial that the list of projects they proposed to the committee each year really reflects what the organization/unit really needs. Performance in terms of how well they have managed the budget and how successful IT projects in the previous year are is also two key factors in determining the amount of budget they will be allocated in a following year. Hence, project prioritization and scheduling is very important.

2.1 Existing IT project prioritization in Thailand

While it is mandatory for each public sector to do the project prioritization as part of the IT strategic planning, this procedure is internal and is not typically published in the public version of the ICT master plan. However, having been involved in writing an ICT master plan for several public sectors, we can derive the following criteria used for project prioritization. Table 1 shows the criteria considered when ranking IT projects in five different public sectors that we have been involved in implementing ICT master plan.

Table 1: Project prioritization criteria adopted in 5 different public sectors in Thailand

Prioritization Criteria	Government Units		State Enterprises		
	Rights and Liberties Protection Department (RLPD)	Social Security Office (SSO)	Tourism Authority of Thailand (TAT)	Pawn Office (PAWN)	Dairy Farming Promotion Organization (DPO)
Business strategic alignment	X	X			X
IT strategic alignment	X	X	X		X
Risk	X	X	X	X	X
Benefit		X	X	X	X
Project Requirement		X			X
Dependency	X		X	X	X
Budget			X	X	X

According to Table 1, most sectors share similar criteria. However, if we explore the procedures in evaluating each criteria, we've discovered that the rating scale of RLPD, SSO, TAT and PAWN are qualitative. For example, TAT classified the benefit into 5 levels, i.e., level 1 means the project yield very little benefit and 5 means the outcome of the project can generate a lot of benefit. Hence, qualitative scale may not reflect the actual importance of the project due to the different perception each person has on each criterion. Therefore, when we had an opportunity to write the ICT master plan for DPO in 2014, we proposed a well-defined quantitative scale as well as some extra protocol (see section 3) that allows anybody regardless of the departments they are from to provide similar scores for each criterion.

2.2 Worthiness model

In Thailand, State Enterprise Policy Office (SEPO) is in charge of evaluating the performance of all the state enterprise in various aspects including information system management within the organization. According to

SEPO's 2014 annual report, 26 state enterprises (72 %) fails to evaluate the worthiness and benefit of the IT project. This is the main reason why the projects do not get approved or get delayed in the process by the government. Hence, SEPO suggests a few methods which can be used to quantify the worthiness of the project.

2.2.1 Benefit-cost analysis (BCA)

The Benefit-Cost Analysis is an approach to estimate the monetary return for every one unit of investment by weighting the benefit against the cost of a project. However, converting benefit to monetary values can sometimes be non-trivial as benefit may not be in a form of *business profit*, but rather in a form of *operational profit* e.g., workload is reduced by 5 days per month, number of staffs required for a job is cut down by half, etc. To illustrate how one can convert *operational profit* into a monetary value, let's consider the Management Information System (MIS) Project at Dairy Farming Promotion Organization of Thailand (DPO). The cost of the project is worth 300,000 Baht. Because MIS is a software which aims to support the performance evaluation operation within DPO, there is no business related profit incurs from this project. However, with the help of MIS, the policy and planning department can reduce the time to generate the report for a monthly meeting from 10 days to 1 hour. The number of staffs required for this job is 4. Let also assume that the average income per staff per month is 20,000 Baht. Therefore, 10 days of work is roughly half a month (20 work days per month). Hence, the operational profit per year is 4 x (0.5x 20,000 Baht/month) x 12 month/year = 480,000 Baht/year. The Benefit-Cost Ratio (BCR) achieved for this project is:

$$BCR = \frac{\text{Estimated Benefit}}{\text{Estimated Cost}}$$
$$= \frac{480,000}{300,000}$$
$$= 1.60$$

For simplicity, PDMS use to this technique to derive the worthiness value of a project.

2.2.2 Net present value (NPV)

NPV is a tool for determining whether an investment will result in a profit or loss by transforming future benefits and costs to their "present value". The idea is that time has an impact on the value of the money, e.g., 1,000,000 Baht today is worth more than 1,000,000 Baht in the next 10 years. The value of money decreases because of the inflation which comes in a form of discount factor in the formula. The NPV of an investment is determined by calculating the present value (PV) of the total benefits and costs which is achieved by discounting the future value. The relationship between the present value and the future value can be described by the following formula:

$$PV = \frac{F}{(1-i)^n}$$

,where PV = Present Value, F = Future Value, i = discount rate, and n = number of years. Given the time period of N years, the net present value (NPV) is given by

$$NPV(i, N) = \sum_{t=0}^{N} \frac{F}{(1-i)^t}$$

2.2.3 Return on Investment (ROI)

Return of Investment (ROI) is a metric which expresses how much financial benefits exceed the initial investment. Typically, it is a measure which can help support the executive in making decision about project investment as it is used in determining whether a project will yield a profit or a loss. The formula for determining ROI is:

$$ROI(\%) = \frac{Net\ Present\ Value\ of\ Savings}{Initial\ Investment} \times 100$$

,where the Net Present Value of Savings is a cumulative earning which is a result from the considered project.

3. Project dependency map and scoring system

Prior to prioritizing IT projects, it is essential to understand the type of projects which needs prioritization. We should note here that projects that will input into PDMS needs to be the projects that have been internally approved by ICT board members and are to be included in the ICT master plan. Typically, there are 3 types of projects: (1) *Mandatory projects* are ones that need to be implemented annually, e.g., replacing inefficient network devices and computer equipment, IT skill training, hiring IT consultants, updating websites, etc. While this type of projects need not be prioritized as it should appear in the action plan every year, details of the projects need to be written clearly before it could get an approval for the requested budget. (2) *Independent projects* are projects that can be implemented right away and may or may not require data or information from existing Information Systems (IS). These projects can be *up-stream projects* which should be implemented before other dependent projects can be launched. They can also be a stand-alone project which does not relate to any other projects. (3) *Dependent* or *down-stream projects* are projects that need to be launched only after a successful implementation of the corresponding dependent or up-stream project. This type of project can also be an up-stream for other projects. In which case, such project is called a *mid-stream project*. Figure 1 illustrate example of a Project Dependency Map (PDM) of up-stream and down-stream projects taken from the ICT master plan of Dairy Farming Promotion Organization of Thailand (DPO).
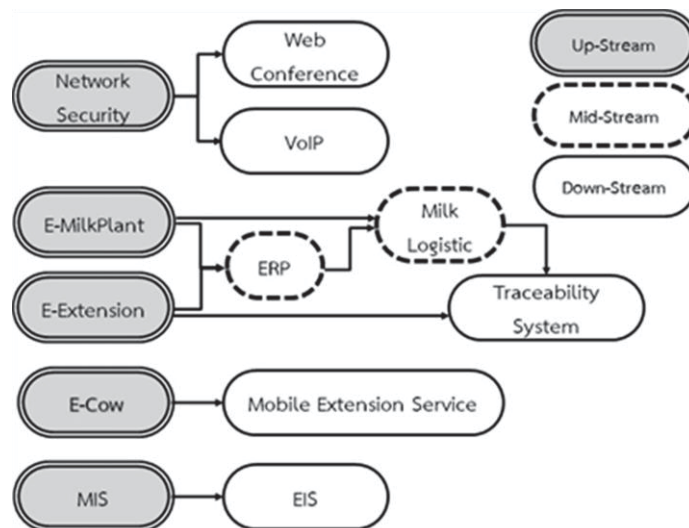
Figure 1: Example of a project dependency map

3.1 Project dependency map

Determining the dependency of multiple projects can be a non-trivial task in the absence of the detailed project description. Hence, it is important to straighten out the detail of each projects as much as possible during the brainstorming session. Dependent software projects are ones that require data exchange between the systems. On the other hand, dependency between hardware projects is not that straight forward because it requires some technical understanding of the overall IT infrastructure.

To further elaborate how one can create a so-called project dependency map, we will refer to our own experience in implementing a 5-year ICT master plan for DPO. After two months of site survey and four braining storming sessions with executive and operational officers, the master plan will include a total of 12 projects which are not mandatory. Among these, there are five independent projects which are up-streams to seven other projects. These independent projects includes (1) Network Security: improving network security within the organization (2) E-MilkPlant: Developing a software to support the milk production process in the factories (3) E-Extension: Developing a software to support the extension services: helping farmers performing artificial insemination, vaccination, and milk collection. (4) E-Cow: Migrating the existing stand-alone farm management

software to a web-based system. (5) Management Information System or MIS: Developing a software which gathers information from various departments and displays graphs of important business data.

As for the down-stream projects, dependency to the up-stream projects can be explained as follows:

▪ DPO has recently upgraded speed of the network from 1 Mbps to 20 Mbps using Multiprotocol Label Switching (MPLS) between 6 different sites with additional Fibre-to-the-x (FTTx) backup links to the data centre. Therefore, all the necessary *network security* equipment which can degrade the network performance such as firewall, intrusion detection/prevention system, anti-virus, etc. need to be put in place prior to installing a real-time delay sensitive multimedia service such as *VoIP* or *Web Conference*.

▪ *Traceability System* is a required system for competing with dairy industries from other member countries of the Asian Economic Community (AEC). According to the AEC roadmap, products sold in ASEAN countries should be traceable all the way back to the origin. Hence, it is important to keep track of the milk right from the very beginning of the process, starting from the point where the raw milk is delivered to the pick-up point (co-op or factory) using *E-Extension* and *E-MilkPlant* systems.

▪ *Enterprise Resource Planning (ERP)* is a software program which includes multiple modules: fixed asset management, human resource management, accounting, sales and marketing, inventory control, and pay roll systems. Hence, any cost/income incurred during the production (*E-MilkPlant*) and service   (*E-Extension*) should be an input into *ERP* system. In addition, data from the inventory control and sales module of the ERP would be useful for tracking the milk product from the manufacturing process all the way to the point of sales. Hence, *ERP* is the mid-stream projects which should sit between *E-Extension/E-MilkPlant* and *Traceability System* projects.

▪ Prior to implementing *Traceability System*, a much needed functions is the traceability within the production line. Hence, a *Milk Logistic* system would serve as another mid-stream project which sits between *E-MilkPlant* and *Traceability System* projects.

▪ *Mobile Extension Service* system is a mobile application that links data from the *E-Cow* systems to a mobile device. This application aims to support extension officers in providing necessary services to dairy farms by allowing officers to remotely access important information about the farm of interest.

▪ Finally, the *Executive Information System (EIS)* supports senior executive information and decision-making needs. Therefore, this type of system typically requires input from *MIS*.

3.2 Scoring criteria and scale

Very much like other prioritization schemes adopted in other public sectors, the criteria considered in PDMS are necessity, readiness, and worthiness. However, PDMS has a well-defined scoring system which can be described as follows:

3.2.1 Necessity

Is a measure of the expectation in obtaining the output/outcome of the project. The output/outcome may be expected by other down-stream projects or are what the public sectors need to have in order to support a certain policy or strategy. The scoring system of this criterion is as follow:

5 points –   The project has to be implemented immediately because there are more than 2 down-stream projects.
4 points –   The output/outcome of the project is expected in the next two years or there are 2 down-stream projects.
3 points –   The output/outcome of the project is expected in the next three years or there is 1 down-stream project.
2 points –   The output/outcome of the project is expected in the next four years.
1 points –   The output/outcome of the project is expected in the next five years.

3.2.2 Readiness

Is a measure of the readiness in terms of data, understanding of the requirement, and human resources. Technical readiness will not be considered in this metric because infrastructure should have already been ready for the execution of all the independent projects. If ones find that the infrastructure is not ready, then ones

should classify the current project as being independent and create another up-stream hardware project necessary for supporting the implementation of the current project. The scoring system of this criterion is as follow:

5 points –   The unit/organization is ready in every aspect.

4 points –   The unit/organization clearly understand the requirement of the project and has enough data for implementation. However, it lacks personnel to supervise the project at a current time.

3 points –   The unit/organization understand the requirement of the project to a certain level, but it does not have necessary data nor personnel to supervise the project at a current time. However, the data can be collected during the implementation phase.

2 points –   The unit/organization roughly understand the requirement of the project and it does not have necessary data nor personnel to supervise the project at a current time.

1 points –   The unit/organization is not ready in every aspect.

It is important to note here that public sectors in Thailand normally outsource most of the software development projects. Therefore, the IT staffs or project managers only need to coordinate and manage outsourcing.

3.2.3 Worthiness

Is a measure of the benefit obtained from the projects expressed in terms of the cost-benefit ratio, explained earlier in section 2. There are two types of benefit (1) operational benefit: reduced workload, expedited process, reduced resources, etc. (2) business benefit which is simply a profit. The scoring system of this criterion is as follow:

5 points –   The cost of the project is low when compared to the benefit that the unit/organization will receive. The project has Benefit-Cost Ratio of 2 or greater.

4 points –   The cost of the project is low when compared to the benefit that the unit/organization will receive. The project rewards high operational benefit but may not incur any business benefit. Benefit-Cost Ratio is between 1.5 and 2.

3 points –   The cost of the project is moderate. The benefit that the unit/organization will receive in terms of better operation or profit is high. Benefit-Cost Ratio is between 1 and 1.5.

2 points –   The cost of the project is moderate. The benefit that the unit/organization will receive in terms of better operation is high, but there is no profit. Benefit-Cost Ratio is less than 1.

1 points –   The cost of the project is relatively high when compared with either the operational or business benefit generated from the project. Benefit-Cost Ratio is less than 0.5.

3.3 Determining project priority scores

Finding consensus in a large group with diverse background is another challenge. In PDMS, IT experts, executive, as well as projects' owners get together in a brainstorming meeting to vote for the *project priority score* which is the sum of the *necessity, readiness*, and *worthiness* of each project. The higher the project priority score, the sooner the project will be implemented. From our experience, scores from blind voting often lead to indistinguishable priorities especially in the case where the participants have different levels of knowledge about the projects. Therefore, we proposed that before voting take place, the project owner or IT consultant presents the overview of each project and suggests the pre-evaluated scores of all the three metrics: necessity, readiness, and worthiness along with the reasoning. After the presentation of each project, participants provide their own set of scores using the scale provided in 3.2 and the perceived information from the presentation. The participants whose scores differ from the initial scores will be asked to provide explanations for their votes in a brainstorming session. Subsequent votes will be taken until there is some consensus, see Figure 2.
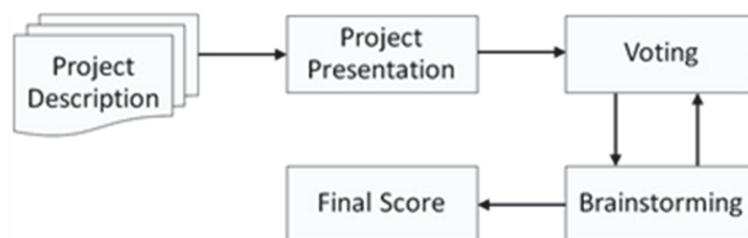
Figure 2: PDMS's scoring system

3.4 Prioritization

Once there is an agreement on the scores, independent projects are then prioritized based on the given scores. The higher the score, the sooner the project will be implemented. The IT experts should then decide on the number of projects which can be handled in a year and convert from the score to the year of implementation. Depending on the number of down-stream projects, year of implementation should not be later than the 3rd year of the master plan. Once the year has been decided for the up-stream projects, years of implementing the down-streams project can use the following criteria.

- If the up-stream project is a hardware project, the mid-stream or the down-stream projects can immediately follow the up-stream project as soon as the project is done, i.e., in the following year.

- If the up-stream project is a software project, the mid-stream or the down-stream project should be delayed by at least 2 years so that users have time to test the output software. However, if the up-stream and down-stream projects are very similar in detail, the down-stream could be considered for implementation in a subsequent year.

- The implementation year of the mid-stream or down-stream project will depend on the delay of the longest path in the PDM.
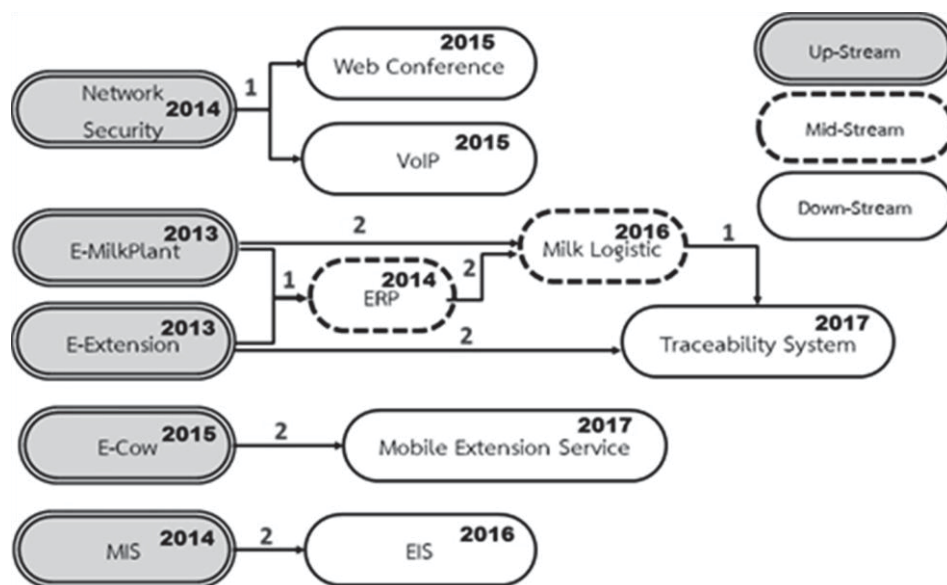
Figure 3: Implementation plan

Figure 3 shows the result of the prioritization. Notice that hardware projects (web conference and VoIP) can immediately be implemented as soon as the security devices have been installed. The traceability system, on the other hand, is a down-stream project of milk logistic, ERP, E-MilkPlant, and E-Extension projects, hence we should consider the delay of the longest path via ERP and milk logistic projects. Doing so results in delaying the traceability system project to the year 2017. Similarly, milk logistic system should only be implemented after a successful implementation of ERP. Finally, mobile extension service and EIS should be delayed by 2 years from the implementation year of their corresponding up-stream projects which are E-Cow and MIS, respectively.

4. Discussion and conclusion

This research aims to solve the problem of IT project prioritization by using project dependency map to filter out projects that need not be prioritized and using a well-defined quantitative scoring system for reaching consensus in diverse committee members. After adopting our proposed PDMS at DPO in early 2014, we have discovered that there is less resistance from all the stakeholders within DPO including ICT board members during the public hearing. However, we still need to further evaluate our proposed technique by measuring the level of success of the ICT master plan. Our future direction is to incorporate IT staff workload into the model and come up with a tangible way of evaluating the complete model of PDMS.

Acknowledgements

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E-Political Marketing Tools in Modern Democracies: The Nigerian Perspective

Rowland Worlu[1], Afolabi Tolulope[2] and Charles Ayo[3]
[1]College of Business and Social Sciences, Covenant University, Ota, Nigeria
[2]College of Science and Technology, Covenant University, Ota, Nigeria
[3]Department of Computer and Information Sciences, Covenant University, Ota, Nigeria
rowland.worlu@covenantuniversity.edu.ng
ibukun.fatudimu@covenantuniversity.edu.ng
charles.ayo@covenantuniversity.edu.ng

Abstract: Despite an increasing presence of political consultants, all indications are that elections- promotional activities are relatively static in some countries. These election promotional activities in some nations include professionally produced television advertising; media relations experts who wage spin control; and planned events such as leader tours and television debates. Nowadays, campaigns are conducted by telephones instead of foot soldiers or door to door canvassing. Perhaps the most visible modernization in recent years has been parties' mediocre websites that provide daily campaign updates and which is sometimes mirrored by candidates' amateurish online presence. But, to what extent is American style of political marketing creeping into other countries' electioneering campaigns (Nigeria inclusive). This is the crux of this study. The study surveyed 400 political marketers from the two dominant political parties in Nigeria to identify the e-political marketing tools currently used to reach their electorates on one hand, and factors affecting the choice of the tools on the other. The result shows that there are two categories of e-political marketing tools in use. These are Internet marketing tools and mobile marketing tools. In the same vein, the factors that influence the choice of the tools are impact, convenience, expose reach, cost, time, and frequency. Based on these findings, political managers are advised to take advantage of the tools which are in tandem with global best practices in modern democracies.

Keywords: e-political marketing, campaign tools, democracy, elections, voters, Nigeria

1. Introduction

A campaign is a planned coordinated integrated series of promotional efforts built around a single theme or idea and designed to reach a predetermined goal. Though often associated with advertising, the concept applies much more to all aspects of promotion. (Stanton, 2002). Political campaign is a critical activity in every electoral politics. Scholars see it as the rush of media items leading up to polling day (Stockwell, 2004). Campaigns are multi- disciplinary in nature and draw methods from marketing, political science, media theory, and many other disciplines as well. E-political marketing originated from political marketing as an aspect of social media marketing.

In other words, political marketing has colonized the study of the political campaign over the last three decades (O'Shaughnessy, 1990; Newman, 1994, Johnson, 2001). However, the political campaign uses not only techniques derived from mass marketing and public relations but also social media and network marketing. Election campaigns, therefore, is currently receiving impetus from political marketing tools.

Political parties and their candidate employ modern campaign techniques to manage their interactions with the public via the social media not only to ensure victory in their elections, but also provide good governance if they win. Innovative aspect of this campaign is the use of new technologies such as facebook, youtube, flicker, etc.

All e-political marketing tools used for electioneering campaigns seek to persuade target audiences by managing the message communicated to them via the social media. While the political effect of the social media is still fussy, campaigners seek to communicate their message via all channels used by the target audience: Internet and mobile media.

Finally, audience segmentation, canvassing, and contact with telecom service providers can generate a list of target individuals who can be engaged in interactive communication by direct mail, phone banking, and e-mail (Stockwell, 2004). Political parties therefore, use the obvious e-political marketing techniques like Internet in targeting and segmenting audiences. Thus, it can be seen that political campaigns have driven the understanding of marketing, which is concerned with the identification of consumer needs and satisfaction of such needs at a profit.

Inspite of the foregoing, however, the specific e-political marketing tools that dominate electoral campaigns in democracies around the globe are not well-known. This is the crux of this paper. The major aim of this study, therefore, is to draw scholarly attention to the e-political marketing tools that shape electoral politics by relying on the evidences from Nigeria which is the largest democracy in Africa. The second objective is to determine the factors that affect the choice of these tools. In pursuing these objectives, 400 political office seekers in the current 2015 general election were surveyed in Nigeria.

2. Theoretical framework

Marketing can be defined as the act of identifying and meeting human and social needs. This also includes being profitable. In this sense, therefore marketing is "meeting needs profitably" (Kotler and Keller, 2006). The concept of marketing is no longer restricted to the domain of exchange of goods and services alone but the distribution of ideas (Mone and Bazini, 2013).

Political marketing on the other hand refers to certain forms of political communications within electoral campaigns (Harris et al., 2002). Political marketing was first used by Kelley in (1956) but the idea of Political marketing originated with the broadening "debate" of Marketing in the 1970's by Scholars such as (Kotler, 1999).

Presently more sophisticated techniques have been adopted for political marketing. These include the media supplying the political information that voters base their decisions on. Problems are identified in the society and this serves as medium for deliberation. Citizens, therefore have the chance to get involved with the political affairs and help democracy grow by increasing the number of information sources and the amount of information available to voters. On the conceptual level, Political marketing is yet to be universally accepted among political scientists, though there are group of political scientists which believe that it brings "distinctive strengths lacking in orthodox political science treatments" (O'Shaughnessy, 2001). Political marketing can also be described as "a potentially fruitful marriage between political studies and marketing" (Lees-Marshment, 2001). Given this great importance of political marketing therefore, "there is a crucial need for political marketing concepts to be based "…on both pillars: marketing and political science" (Henneberg, 1995).

In literature, Political Marketing is more researched in UK and USA compared to other countries such as Sweden. Swedish accounts of election campaigns are mainly descriptive with a focus on political explanations of events. Apart from Stromberg (1967) there is only limited research on local election campaigns (Harris et al., 1996).

Literature reveals that there are distinct opportunities for political marketing techniques in Sweden and it proposes to assist greatly in bridging the gaps between the politicians and the voters (Harris et al., 1996).

There are differences in election campaigning between the United States and Great Britain. This is evident in: the election system, the role and status of the parties, and, most importantly, the media system. In the United States, there is moderation in the sense that parties play less role and television advertising is the major campaigning tool while in the British experience, the parties still are the major political players and television advertising is not allowed (Kavanagh, 2014).

E-political marketing is an aspect of social media marketing that uses social media marketing platforms to solicit for the mandate of electorate or voters in election processes. Examples of such platforms are facebook, twitter, flicker, youtube, etc. E-political marketing or online politics involves every method of doing online advocacy, which includes using medium such as website, blogs, facebook, twitter, youtube as promotional or organizing tools (Colin, 2011). Due to these mediums, democracy has become more pervasive throughout the world, but evidence points to a growing, widespread crisis of legitimacy of governments, parliaments, political parties, and politicians in most countries. This is due to the fact that the Internet is seen as the ultimate technology of freedom, its diffusion among citizens is known to be a saviour for the political ills.

In this connection, Rogers (1983) defined innovation diffusion process as the spread of a new idea from its source of invention or creation to its ultimate users or adopters. In other words, the diffusion of innovation is the process by which the innovation is communicated within social system overtime. This process involves the stages of awareness, interest, evaluation, trial, adoption and post adoption confirmation (Rogers, 1983). There have also been warnings on the dangers of electronic democracy due to its ability to fragment citizenship and helping the elites and demagogues to capture public opinions (Anderson and Cornfield, 2003).

The above notwithstanding, the Internet is an appropriate platform for informed, interactive politics, stimulating political participation and opening up possible avenues for enlarging decision making beyond the closed doors of political institutions (Sey and Castells, 2008). It is also important to note that while the vote of an individual has almost no effect on election results, the votes of social groups might. This gives social interaction and groups, which are principally facilitated, by social media networks which play important roles in elections (Shachar and Nalebuff, 1999).

In Nigeria, Voter's support is the best political marketing strategy used by Political organizations, followed by Positive Publicity to win elections (Gbadeyan, 2011). Study also reveals that marketing strategies of Nigerian political parties contain product, price, place, promotion, people, process and physical evidence elements. Nigerian parties are found to be essentially product and sales-oriented in their approach. In addition, there are significant differences in the contents of the marketing strategies employed by Nigerian parties compared to foreign countries (Worlu, 2010). According to Bundi (2011), e-political marketing tools can be noted as follows:

▪ Mobile Marketing:

This makes use of mobile phones-technologies, and applications to disseminate information to voters, whether prospective or current. Huge opportunities await organizations that understand the potential of affordable mobile stores, advanced applications, and wide-spread usage. Political entities now understand the power of mobile devices in reaching millions of voters. These devices are phone banks, telemarketing, robocalls, etc.

▪ Internet Campaigning:

The internet has revolutionized campaigning as many Nigerian political marketers purchase banner advertising on popular websites, send unsolicited electronic mail to voters and use e-commerce software to accept donations online. Internet campaigning by political marketers occurs through various forms such as facebook, twitter, LinkedIn, e-mail, flicker, banner ads, etc. For many political parties, electronic mail greatly facilities long-distance communications with party supporters, candidates, electors, and organizations. Grassroots campaigners also emphasize the internet as much as possible.

▪ Phone Banks:

This is essentially the tool of telemarketing. Here, campaigns are done by hiring private calling centres or asking the party centre to coordinate phone calls in-house.

The phone banks also involve paid callers operating on a quota system and have/cost advantages such as predictive dealing that filters out unusable telephone numbers. Nevertheless, phone banks have become a permanent fixture in most elections because of the number of calls that can be completed.

▪ Online Pr And Article Marketing

It is important for political marketers to also take advantage of Online PR and Article Marketing where journalists like to get pitched via email. In addition, they use facebook, likedln and twitter, to search out potential stories about a political product, and publish good stories out of it. Political marketers can take time to create and distribute press releases and articles that help promote his political product through these channels, both online and offline.

▪ Robo-Calls

This refers to the pre-recorded messages from candidates, or campaign workers to electors using automated phone calls. A single telephone computerized auto-dialler can contact up to ninety electors per hour. These robot calls provide advance notice of a direct mailing, remind supporters about early voting options, encourage electors to turn out to vote, and generally target message to specific groups.

▪ Video Imaging

Today, images can be manipulated using graphic design software, and computer- generated images can be electronically inserted into television broadcast and pictures.

Findings of previous studies reveal that there are prospects and challenges of e-political marketing as a tool for political advertising in Nigeria. One of the prospects is that e-political marketing can reach a very broad audience while one of the challenges is that the ability to constantly deliver messages via the electronic medium is difficult because of the level of infrastructural development in the underdeveloped areas. Also that extent to which the political parties in Nigeria use e-political marketing is minimal and it is therefore recommended that political

parties in Nigeria should give due attention to e-political marketing (Asemah and Edegoh, 2012). According to (Dagonaet al., 2013) there is a significant positive relationship between face book usage and political participation among the youth in Nigeria and it affords persons of different perspectives the ability to unite and engage in political discourse.

3. Research method

The results reported here are based on a study of the two Nigerian dominant political parties actively employing the e-political marketing tools in their campaigns for the 2015 general elections. Two hundred political aspirants were purposively selected from each of the two parties [i.e. Peoples' Democratic Party (PDP) and All Progressive Congress (APC)] to serve as a representative sample from the list of candidates who won their parties' primary elections as confirmed by Independent National Electoral Commission (INEC). The 200 contestants from each party were selected from local, state and national levels. This selection process was designed to reflect uniquely hierarchical inputs and levels of election in Nigeria. Only two states were selected from each of the six geopolitical zones in Nigeria and Abuja - the Federal Capital Territory. (See table 1.0 below)

Table 1: A stratification of study population to effect a representative sample.

			PARTY SAMPLING	
S/N	ZONE	STATES	PDP	APC
	North East	Bauchi	15	15
		Gombe	15	15
	North West	Kano	15	15
		Katsina	15	15
	North Central	Niger	15	15
		Kogi	15	15
	South South	Rivers	15	15
		Benin	15	15
	South East	Imo	15	15
		Abia	15	15
	South West	Lagos	15	15
		Ekiti	15	15
	FCT	FCT	20	20
	TOTAL		200	200

Source: Field Survey, 2015.

4. Research questions

The major research questions that guided this study are:

▪ What are the e-political marketing tools in modern democracies?

▪ What factors influence the choice e-political marketing tools by political marketers?

5. Development of measures

To identify the e-political marketing tools in contemporary democracies, a five-item likert scale adopted from previous studies (Worlu, 2010; Clark and Push, 2001) was used to capture the choice of respondents on the e-political marketing tools, in modern democracies, with particular reference to Nigeria. A five-item Liker Scale was chosen because; it is apt in capturing the choice of respondents in a structured instrument (Clark and Push, 2001).The measures used to identify the e-political marketing tools were chosen on the basis of the literature or secondary data surveyed.

6. Instrumentation

A combination of three survey instruments was brought to bear in the study. The first was the observation of the campaign trends building up to 2015 elections. The second was the focus group interview conducted on a cross-section of the respondents; and finally, the most prominent was questionnaire. The questionnaire was both structured and unstructured. The essence of the structured questionnaire was to enable respondents choose from a range of tools already in use around the world and applied to Nigeria. The unstructured instrument is aimed at enabling respondents to identify, from their experience some specific tools that have not been captured in the structured instrument segment of the instrument.

In view of the above, 400 copies of the questionnaire were distributed to both the APC and PDP respondents to confirm from their experience the various e-political marketing tools that are currently in use by politicians and if these tools are capable of creating significant level of awareness for political products.

A total of 375 copies of the questionnaire were returned. Out of this number, 367 were considered usable, resulting in a net response rate of 90.3%. This result constitutes a very high response rate, considering that collecting data for such a country-wide study with a large population is difficult due to the numerous obstacles associated with such exercise (Douglas and Craig, 1983).

The questions used in this research represent a qualitative adaptation of this study in a 5 item likert scale in Nigeria's political context. This method is chosen because it is well suited for obtaining in-depth narrative responses, especially for providing broad insight into a party's involvement in e-political marketing.

7. Validity and reliability of measures

The possibility of threat to validity in this study was reduced by presenting a description of the e-political marketing model. The proposed model illustrated external and internal validity and assumptions guiding overall research reliability and potential for generalizeability.

8. Analysis and result

The returned copies of questionnaire constitute a high response rate and provide confidence that non-response is not an issue (Weiss and Heide, 1993). Demographic characteristics of the total sample in the study are presented in table 1.1 below: The analysis was conducted by using descriptive statistics: tables, frequencies, percentages, etc. This was aided by Stasticsical Package for Social Services (SPSS).

Table 1.1: Sample characteristics of Respondents

	PDP	APC	TOTAL
Number of target respondents	200	200	400
Share of actual respondents	186	181	367
Share of respondent rate (%)	93	90.5	91.6
Share of male (in %)	59.5	55.0	54.9
Share of female (in %)	40.5	45.0	47.1
Average age in years (standard deviation in bracket)	(18.78)	(17.09)	(17.44)
Share of respondents who completed university education (in %)	46.4	43.5	43.8
Share of respondents who are married (in %)	63.6	56.2	55.4
Share of respondents who hold office in the party (in %)	82.5	75.5	78.2

Source: Field Survey, 2015.

In all parties, more than half of the respondents were male with the share of male respondents being highest (59.5%). The party subsamples are similar with respect to the age of the average level of education, marital status, position in the party. Our main motivation for limiting the survey to certain states within a geopolitical zone was only the concentration of the membership of the parties being studied in these areas.

Table 2 below presents a list of e-political marketing tools as identified by the respondents:

Table 2: Frequencies of identified e-political marketing tools

S/N	RESPONSES	PDP	APC	TOTAL FREQUENCY	PERCENTAGE
	Facebook	186	181	367	100
	Twitter	182	180	362	98.6
	Flicker	151	123	274	74.7
	Youtube	164	156	320	87.1
	Direct unsolicited e-mail to electors	179	173	352	95.9
	Purchase of banner ads on popular websites	163	168	331	90.1
	Use of e-commerce software to accept donations on-line	159	161	320	87.2

S/N	RESPONSES	PDP	APC	TOTAL FREQUENCY	PERCENTAGE
	Phone banks	183	170	353	96.2
	Political telemarketing	185	180	365	99.5
	Robocalls	175	164	339	92.4
	Video imaging	174	171	345	94.0
	Digg	125	133	258	70.3
	LinkedIn	154	161	315	85.8
	MySpace	133	141	274	74.7

Source: Field Survey, 2015.

9. Interpretation

On a general note, all the respondents agreed that facebook (100%) is much more in use than every other tools. This is followed by political telemarketing (99.5%), and twitter (98.6%) in that order. Relatively, the least employed e-political marketing tool is digg. This is understandable because it is a platform to dig good stuff and release breaking news. It is all about discovering and sharing websites. In which case, users 'digg' for web content and submit links to Digg. These contents range from technology to sports, and there is no editorial monitoring for quality in most cases.

Table 3: Factors affecting the choice of e-political marketing tools

S/N	RESPONSES	PDP	APC	TOTAL FREQ.	PERCENTAGE (%)
	Convenience	186	181	367	100
	Exposure Reach	184	182	366	99.7
	Impact	186	181	367	100
	Frequency	182	180	362	98.6
	Time	184	179	363	98.9
	Cost	185	181	366	99.7

10. Interpretation

From table 3 above, it is crystal clear that convenience (100%) and impact (100%) form the greatest considerations in choosing a particular e-political marketing tool. Next considerations are exposure reach (99.7%) and cost (99.7%) of the tools. These considerations are followed by timing (98.9%) and frequency (98.6%).

It should be noted that Reach (R) refers to the number of different persons or households exposed to a particular media schedule at least once during a specified time period. Frequency (F) is the time times within the specified time period that an average person or household is exposed to the message. Impact (I) is the qualitative value of an exposure through a given medium. (Kotler, 1999).

11. Summary of findings

The e-political marketing tools identified by the respondents under the mobile marketing category are: Phone banks, Telemarketing, Robocalls

Internet Marketing:

This involves the use of the social media channel in the internet to pass information to voters. The channel involves the following tools as identified by the respondents: Facebook, Twitter, Flickers, and Youtube

These e-political marketing tools can reach millions of the target market. To advertise on facebook, for example, a political party may need to set up a corporate profile page.

The factors that influence the choice of a particular tool include: Impact, Convenience, Exposure Reach, Cost, Time, Frequency

12. Implications for political managers

Analysis of the responses indicates a number of critical imperatives for the management of political activities. First, politicians should take advantage of e-political marketing tools to increase voter awareness and participation. Second, impact and reach should be the motive.

Interestingly, political parties in Nigeria are becoming more organized in their campaigning activities, to some extent. The 2015 general election is witnessing substantial co-ordinated activities among the political parties, particularly the dominant ones.

The inclination towards marketing in the management of political campaigning should lead to the use of consultants who have competence in the deployment of e-political tools, particularly in telemarketing and other tools that have been identified.

It is also imperative to have internal staff, supporters, and campaign officials trained in the art of market segmentation, targeting, telemarketing campaigns, and other internet technologies.

13. Conclusion

Several conclusions can be drawn from further research because innovations in electronic technologies are frequent. In most cases, each e-technology is improved upon at regular intervals. This calls for regular researches in the area.

Again, e-political marketing tools identified in this study have a mixed application in some democracies. Video imaging is not common in Canada, for example. But that can be mixed with robo-calls in Nigeria.

Overall, there are indications that in a multiparty presidential system like Nigeria, the ruling party enjoys a number of advantages in the use of e-political marketing tools. However, it must be noted that internet preservation is low in Nigeria due to noted that internet penetration is low in Nigeria due to infrastructural deficit. Moreover, rural dwellers are more in number. This means that e-political marketing suffers obvious limitations. This is why other tools need to be employed by political marketers, besides the e-political marketing ones.

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The Government's Role in Raising Awareness Towards e-Commerce Adoption: The Case of Jordan

Husam Yaseen, Kate Dingley and Carl Adams
School of computing, University of Portsmouth, UK
Husam.yaseen@port.ac.uk
Kate.dingley@port.ac.uk
Carl.adams@port.ac.uk

Abstract: Government initiatives play a major role in e-commerce adoption having the potential to make a positive contribution to e-commerce development or, more negatively, to place barriers in the way. Researchers have already tried to address certain barriers to e-commerce in Jordan; however, some of the challenges cannot be addressed without the government's support. This study develops and applies a novel research method to examine e-commerce activities and awareness by analysing relevant articles from a national newspaper (1281 articles). The articles were categorised and analysed into themes and reportage of e-commerce in Jordan. The newspaper provides a window on e-commerce activities and the perceived importance of the facilitators of e-commerce in Jordan. The study revealed that while businesses are aware of e-commerce, and there appears to be a desire to conduct e-commerce, there are limited initiatives for raising awareness about the use of e-commerce among citizens. Although there is growing use of social media for leisure, citizens have yet to transfer their online time to e-commerce activities. The reasons for this may be that there is currently little consumer protection for online shoppers, and there is the issue of credit in a Middle Eastern culture, where cash on delivery is still a major payment method. Clearly, cash on delivery limits transactions to a local area, while a major advantage of e-commerce is its global reach. Literature shows that trust is one of the key factors in establishing and maintaining customer relationships, but the study found only 7 articles that addressed this aspect. The articles also showed that although a temporary law was drafted in 2001, the pace of e-commerce overtook the legislation and new clauses were necessary. However, the e-transaction law which was to replace the 2001 legislation, has been delayed through both legal processes and setbacks. The government could take advantage of social media, the press, training and education, and advertising campaigns to increase citizen awareness of e-commerce, but a legal framework that gives consumer protection may be a more important first step in setting out an e-commerce framework and transaction space.

Keywords: e-government, Jordan, awareness, e-commerce adoption, trust, citizens

1. Introduction

Many researchers have tried to address certain barriers in Jordanian e-commerce, however, the literature does not show a complete picture of e-commerce adoption. Al-Debei and Shannak (2005) conducted a study to capture the current state of e-commerce in Jordan, however, this study is outdated. Moreover, with the sudden growth of e-commerce in Jordan, there are new challenges, and previous ones that have not been investigated in detail.

Government initiatives play an important role in e-commerce adoption (Papazafeiropoulou and Pouloudi, 2000). The Government has the potential to make a positive contribution to e-commerce development or more negatively to place barriers in the way (Blakeley et al. 2001). Studies show that some of the e-commerce challenges cannot be addressed without the government's support e.g. law (Papazafeiropoulou and Pouloudi, 2000; Simpson and Docherty, 2004; Scholl et al. 2009; Zaied, 2012; Alrawabdeh, 2014; Halaweh, 2011).

There is limited data on the amount of e-commerce activity in Jordan and no consistent database. There is a need for a new metric of e-commerce activities to inform government policies and legislation. Identifying the current state of e-commerce in Jordan, and the knowledge of current challenges and limitations provides the government with a starting point to enhance e-commerce adoption. To address the problem of lack of resources and information available in the research, a new methodology has been proposed.

The methodology undertaken for this research is outlined in section 2. The findings found through the methodology and discussion is presented in section 3. Section 4, highlights the government's role towards e-commerce adoption and the law's status and impact on e-commerce. The conclusions are presented in section 5. Lastly, recommendations and future research is outlined in section 6

2. Methodology

The methodology developed for this research paper is based on secondary data which aims to capture e-commerce items from a national newspaper (The Jordanian Times). The newspaper provides a window on e-commerce activities and the perceived importance of the facilitators of e-commerce in Jordan. This provides a novel method to capture one metric of both e-commerce activities and a state of awareness of e-commerce.

It also considered as a major source in reflecting public issues (Collins et al., 2006). Though, secondary research has several disadvantages, such as it does not include any primary data. The nature of the study is descriptive (Laudon and Traver, 2009). This study has been uniquely conducted by examining 1281 relevant articles to categorise and analyse the themes and reportage of e-commerce in Jordan.

The information was collected systematically. The first step in analysing the newspaper is to detect the keywords in searching for the newspaper articles Figure 1 illustrates the keywords selection process.

| Brainstorming | → | Semi structure interview | → | Ranking Keywords | → | Computer dictionary |
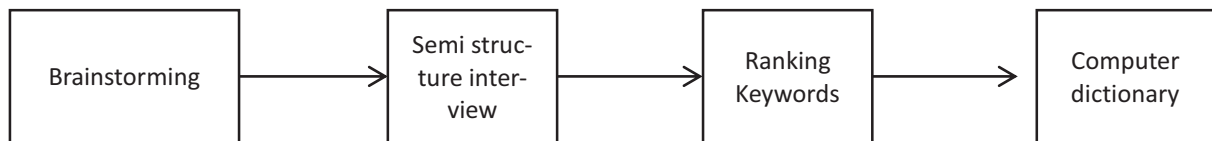
Figure 1: Keywords selection process

The brainstorming activity involved 10 international researchers in the field of computing. The participants were asked to provide 10 keywords that in their opinion might capture the full picture of e-commerce growth using a newspaper website.

In order to be more precise and concrete in the selection, a semi structured interview was conducted with the same 10 international researchers who participated in the brainstorming stage. The purpose of the interview was to get further explanation of the reasons why certain keywords were given in order to guide what should be included in the search criteria.

A list of 100 keywords were gathered and analysed using the words frequency. After determining the most frequent thematic concepts, six keywords (Online, E-commerce, Shopping, Internet, E-payment, and Security) were chosen, as the most important ones.

The possibility was considered of getting the most relevant results so various forms of words were used, such as both E-commerce and Electronic commerce, where the abbreviation might lead to different results as both terms are commonly used in the field. A computer dictionary was used to detect the abbreviations. The total number of newspaper articles found was 1943, from which 662 were found irrelevant and 1281 were subsequently analysed in more depth.

The methodology used has several limitations. Firstly, the newspaper may not be detailed enough and only present portions of the content, due to the lack of space. It can also be selection biased due to the journalist selection of events or description biased due to their selection of contents and text. The newspaper may only receive information the companies are willing to provide, therefore, there may be missing or incorrect information (Öberg, Fors & Dahlin, 2006).

Another limitation is in the method and selected strategies adopted in this study necessitated that all relevant articles were analysed from one source; this must be considered as a limitation as well as being of some benefit. Future work will include other sources such as electronic magazine and social media forums, as well as academic sources.

3. Findings and analysis

After inputting the keywords to search for the articles, we found that certain topics appear most frequent. These topics are all related to e-commerce. The newspaper analysis showed that most of the articles about e-commerce activity were dated post 2009.

Figure 2 illustrates the different topics in 4-6 year scale showing e-commerce growth. Based on Figure 2 findings, an investigation of e-commerce growth for the years post 2009 was done. The articles were divided from years 2009-2011 and 2012-2014. As a result, the majority of the articles found were between years 2012-2014. Hence the majority of the e-commerce growth being in the last two years. The articles distribution is presented in Figure 3.
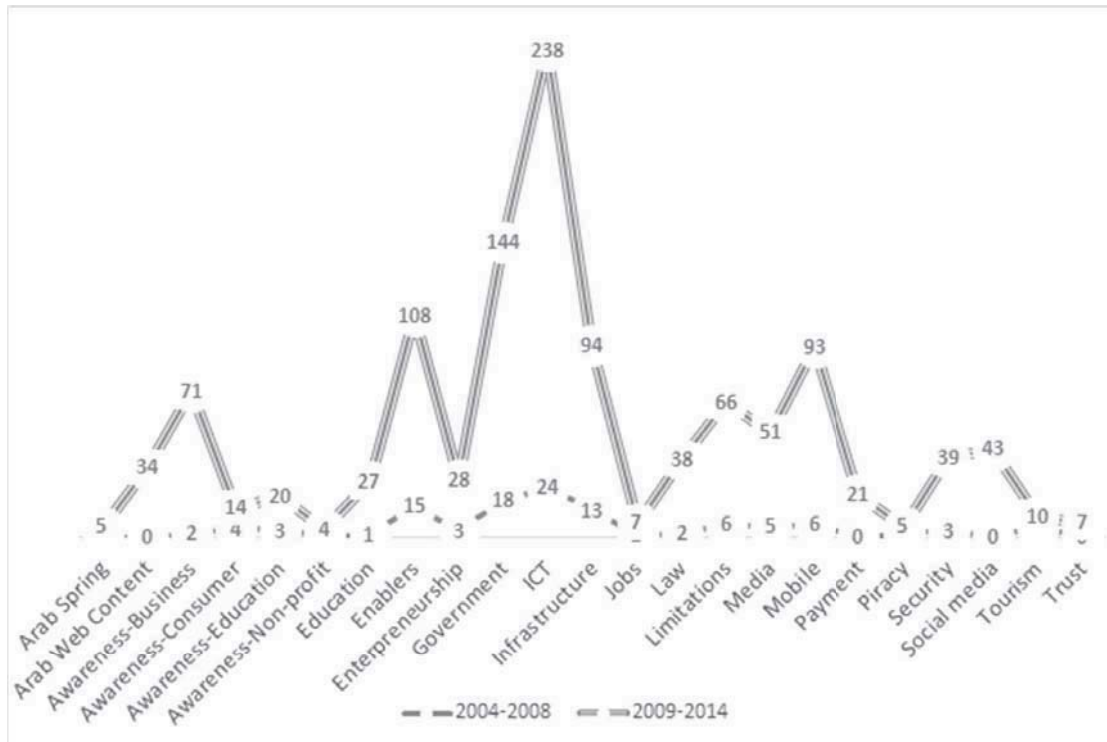
Figure 2: E-commerce growth according to 4-6 year scales
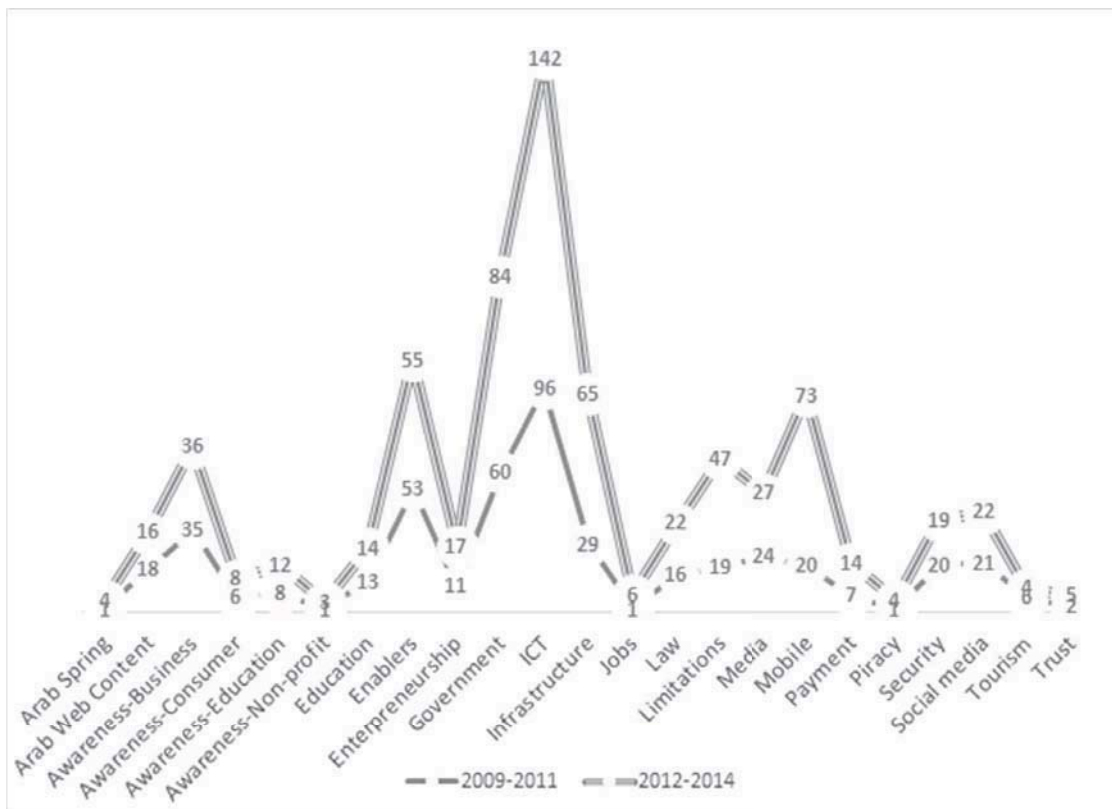
Figure 3: E-commerce growth according to a 3 year scales

Due to the similarity and closeness of topics, some of these topics were classified into two themes: Challenges and Opportunities. For the purpose of this paper only, some of the topic were included, however the rest of the topics will be investigated into more detail in the future. Table 1 illustrates the classified themes.

Table 1: Themes of e-commerce

Challenges	Opportunities
Security	Social media
Trust	Media
Inappropriate training	Education
Awareness	
Law	

There are many challenges in e-commerce, however for this paper we focus on challenges that could be addressed through the government's support. The opportunities are factors that enhance e-commerce adoption. Both these themes depend partially or completely on the government.

The nature of e-commerce topics are interlinked, therefore it is quite challenging to address each aspect separately as topics are influenced by each other. Figure 4 illustrates the relationships between e-commerce topics that are identified based on the authors own interpretation from the analysis of the newspaper and previous research studies.
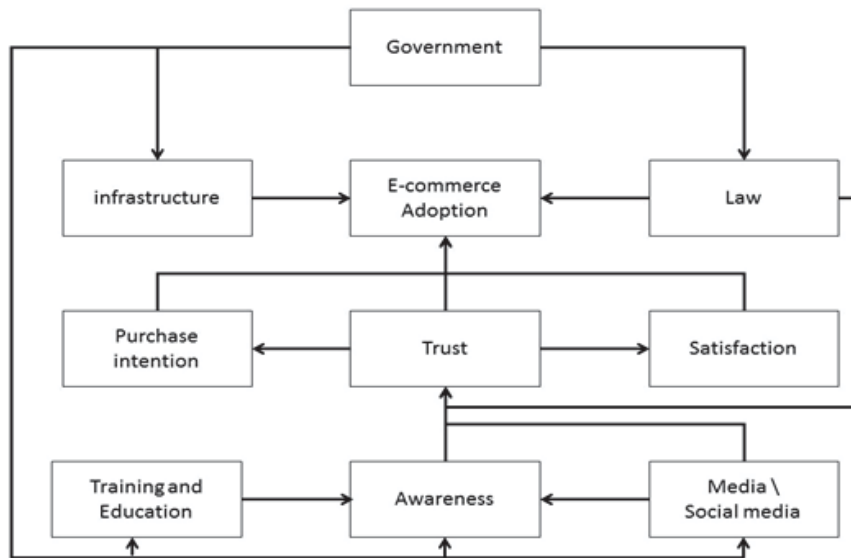
Figure 4: Relationships between e-commerce factors

Trust appears to be a significant factor that effects purchase intention (Zhou, 2012), customer satisfaction (Lu et al., 2012) and loyalty (Valvi and West, 2013). Additionally, the law affects the level of trust as the law provides customer protection which is one the important elements in building trust(Siau and Shen, 2003). Therefore, the role of government is mandatory to set these laws. Furthermore, e-commerce awareness influences trust. Awareness is an important element in Jordanian e-commerce adoption as without the right knowledge e-commerce adoption cannot be achieved. Awareness could be enhanced by social media. Awareness can also increase by adopting proper training and education in schools and universities. It is the government's role to provide training and education of e-commerce. The following section represents the role of government in more detail.

4. Role of government towards e-commerce adoption

4.1 Drafting e-commerce law

The government is responsible for setting the e-commerce laws. Six newspaper articles showed that e-commerce laws have been delayed due to the government's decisions and the process it takes to finalise it. Jordan is a signatory to more than fifty international agreements many of which are trade-related; therefore there must be effective laws that govern e-commerce and electronic transactions.

In 2001, Jordan introduced a temporary law on e-transactions; however, Jordan was not able to provide complete legislation for regulating online commercial activities. The endorsement of electronic transaction law is only the first step that needs further work to enable the online activities in Jordan to flourish. The Jordanian government should utilise a variety of supported instruments to encourage consumers and businesses to use e-commerce without any fear (Al-Ibrahem and Tahat, 2006).

Since 2005 Jordan witnessed a big shift towards e-commerce as more businesses go online and citizens start to use the internet for different purposes. As a result, the Jordanian government realised the importance of renewing the temporary law by addressing its gaps. In 2010 the Jordanian government planned to endorse an amended e-transaction draft law in order to promote and protect e-commerce. However, until this time the drafted law is still in the process of its approval by the government.

Nowadays, many e-commerce activities and projects in Jordan such as "E-Fawateercom", the new e-payment systems that was lunched by Central Bank of Jordan (CBJ), have been delayed due to the late re-draft of the 2010 e-transaction law. The reason behind the delay is because the drafted law has to follow long processes between different sectors within the government before it is signed and approved. Consequently, speeding up the endorsement of the draft electronic transactions law is crucial to encourage a strong adoption to many e-commerce activities in Jordan.

Lack of e-commerce laws affects peoples' trust in e-commerce (Siau and Shen, 2003). Moreover, without the knowledge of laws that protect consumers' rights when purchasing online could lead to lack of e-commerce adoption (Siau and Shen, 2003). As awareness is the first step towards trust; hence the first step towards e-commerce adoption (Najafi, 2012).

4.2 Security and trust

Security and trust are the foundation of e-commerce (Najafi, 2012), and many researchers have identified that the major barriers to the adoption of e-commerce relate to these dimensions (Casaló et al., 2011; Kim et al., 2010; Lai et al., 2011; Lin et al., 2011, Halaweh, 2011; Al rawabdeh et.al., 2012). Security is important to build customers' trust and confidence in the online purchase process.

Trust plays an important role in a customer's willingness to proceed with an online transaction, and the lack of consumer trust in e-commerce can create many barriers to e-commerce i.e. preventing the transaction (or indeed the adoption of e-commerce itself) at the root. A model adopted by Najafi (2012) explains that e-commerce trust consists of four phases: unawareness; building trust; confirming trust; and maintaining trust. E-commerce awareness is the first stage towards trust. The government role presented here is crucial to provide a secure infrastructure to facilitate the adoption of e-commerce.

4.3 E-commerce awareness

Raising awareness is an important factor in e-commerce adoption. Awareness will help positively to enhance e-commerce prevalence and increase the number of internet users (Al-Khaffaf, 2013). The study about e-commerce awareness is important, because it can reduce customers' uncertainty and concern and consequently increase consumer trust. Consumer awareness is one factor that has a major impact in e-commerce adoption. According to Hajli et al. (2012), there is a positive relationship between awareness and adoption of e-commerce. Mehrtens et al. (2001) showed that awareness of the benefits of e-commerce can increase the level of e-commerce adoption. However, the newspaper analysis shows that there is lack of awareness in Jordan. Bakri (2013) and Shkoukani et al., (2013) both show that this lack of awareness is one of the major barriers in e-commerce adoption in Jordan.

Halaweh and Fidler (2008) argue that e-government increases the awareness and participation in e-commerce. Shkoukani et al. (2013) highlighted that the Jordanian government does not actively promote any awareness of the advantages and disadvantages of e-commerce. However, Shkoukani et al. (2013) pointed out the main reason that the government does not promote such awareness is because of lack of resources such as leaflets, brochures and training programs. Alkhaleefah et al. (2010) suggested building awareness and trust through training programs. Al-dalahmeh et al. (2014) highlighted that the media, newspapers, TV and radio can be used

as a tool to broadcast extra knowledge and awareness regarding e-commerce in the developing countries. Promotion is another method that can be used to create citizens' awareness towards the online services (Ziadat, 2013). Promotions can be done through social media due to its popularity in developing countries (particularly Arab countries), including Jordan (Wang and Li, 2014).

There have been a few studies on e-commerce business awareness (Bakri, 2013; Halaweh and Fidler, 2008, Shkoukani et al. 2013), and it is recognised that a lack of e-business awareness (whether latent within businesses themselves or reflexive to a lack of awareness among consumers) could prevent many companies from doing business online. According to Molla and Licker (2005) organisational readiness for e-commerce includes four elements: awareness; governance; commitment; and resources. Awareness assists organisations' understanding of the advantages and risks of ecommerce (Hajli et al., 2012).

E-commerce awareness for businesses in Jordan has been fulfilled by conducting conferences and training programs (Bakri, 2013; Halaweh and Fidler, 2008). The E-commerce Information Center (EIC) in Jordan is responsible for executing the rolling out of the training programmes. This EIC was initiated in order to provide guidance and support for the private sector with regard to e-commerce system implementation (Halaweh and Fidler, 2008). The Electronic Business Development Activity (EBDA) was another initiative devised to increase e-commerce awareness amongst Jordanian businesses by encouraging them to utilize IT in their business activities (Halaweh and Fidler, 2008). The use of e-commerce systems by international enterprises in Jordan plays a major role in raising overall awareness and the promotion of e-commerce systems, by providing financial and technical support for private and public sectors in e-commerce systems holding the potential to fundamentally change small and medium-sized enterprises.

Currently, there are no studies that have investigated the role of citizens' awareness in e-commerce adoption. However, there are many studies that have looked into the effectiveness of citizens' awareness towards e-government (Al-Jaghoub et al., 2010; Alkhaleefah et al., 2010; Almarabeh and AbuAli, 2010; Al-Shboul and Alsmadi, 2010; Shannak, 2013). Awareness is not only an important factor for e-commerce, but for e-government applications as well.

According to Alkhaleefah et al. (2010), citizens' awareness plays a role in e-readiness, which is one of the problems that face e-government programs in the developing countries such as Jordan. Almarabeh and AbuAli (2010) highlighted that citizens may face difficulties adapting to new e-government projects, and one way to overcome this is through awareness and training programs in the technical field. One example of a training program is the Mother and Child Program (M&C), which aimed to raise awareness among mothers of small children about basic ICT tools and applications to facilitate their access to e-government services.

One study looked at citizens' awareness about e-services in Brunei, they investigated the level of awareness (Jait, 2012). They explored different methods and promotional channels in increasing citizens' awareness. They found that certain channels are more successful with some demographic factors such as age, gender, educational level. They created a framework and a model that the government can use to increase citizens' awareness in e-services.

4.4 Social media

Both social media and mainstream media play a significant role in raising awareness about e-commerce.Social media is the future of e-commerce (Hajli, 2012).Social media has a huge impact on internet users, particularly on the way they communicate and exchange information through common used sites such as Facebook, MySpace and YouTube (Swamynathan, et al., 2008).Social media is believed to be a solution for e-commerce trust and adoption (Hajli, 2012; Hajli et.al, 2012).

In Jordan, although there is growing use of social media for leisure, citizens have yet to transfer their online time to e-commerce activities. The reasons for this may be that people are still not aware of the real benefits of e-commerce. Also, there is currently little consumer protection for online shoppers. The governments' role is vital in increasing citizens' awareness and setting laws. People can be reached very easily through social media and e-commerce opportunities can be introduced. Consequently, the government should take a step forward to utilising social media to increase the level of awareness among citizens, this will simplify the acceptance of the e-commerce concept in the future.

5. Conclusion

A novel research method was undertaken to examine e-commerce activities and awareness by analysing relevant articles from a national newspaper. The articles were categorised and analysed into themes and reportage of e-commerce in Jordan. Most of the e-commerce growth in Jordan was found post 2009.

It was observed through the analysis that e-commerce factors are dependent on each other and that the government has a major role toward e-commerce adoption in Jordan. The role of government was observed directly to affect e-commerce adoption in Jordan. It has the potential to make a positive contribution to e-commerce development or more negatively to place barriers in the way. In addition, law and trust are important matters for customers' confidence and, therefore, are important for the development of e-commerce in Jordan.

The research reveals the significance of government initiatives in raising awareness associated with the adoption of e-commerce in Jordan. The major finding of this research confirmed that awareness is one of the crucial issues affecting the development of e-commerce in Jordan. Social media has a significant impact on enhancing awareness and acts as an intermediary element for the government to utilise to increase citizens' awareness. However, the absence of a law providing online customers' protection effects e-commerce adoption.

From this research, it should be noted that the current low level of citizens' awareness in e-commerce in Jordan cannot be attributed to any lack of benefits within the country. Rather, it has more to do with the special constraints that Jordan faces in this area, including limited natural resources and the impact of the Arab Spring. The research shows that companies can overcome the issue of awareness by adopting different events such as workshops, conferences, and business meetings.

6. Recommendation and future research

The research has some limitations, i.e. it does not include primary data. The research results have important practical implications for government towards e-commerce in Jordan. Government and stakeholders in Jordan should better understand which factors are the key areas of e-commerce and which they should focus on in order to enhance citizens' awareness. To validate the effectiveness of this study with the government officials, a case study could be done or the results could be confirmed by interviewing a public representativefrom the house of Jordanian parliament rather than getting honest personal opinions from peoples whose jobs could be at risk.

For future research, factors such as the role of social media in awareness and culture of Jordanian people and laws to protect online customers could be additional studies that may be carried out to investigate in-depth offers opportunities to improve e-commerce adoption in general.

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A Proposal for a Case Law e-Repository for ASEAN Economic Community With Particular Reference to Electronic Commerce

Anowar Zahid, Salawatibinti Mat Basir and HasaniMohd Ali
Faculty of Law, *UniversitiKebangsaan Malaysia- UKM* (National University of Malaysia), Malaysia
anowar_zahid@ukm.edu.my
salawati@ukm.edu.my
hmohdali@ukm.edu.my

Abstract: Chaired by Malaysia, the ASEAN Economic Community is taking place by December 2015 to create a single market comprising free movement of goods, services, investment, capital and skilled labour. To realise this, the ASEAN Charter emphasisesharmonised rules aside of the reduction/removal of tariff and technical barriers as this will place all ASEAN international traders on an equal footing apropos the law governing their transactions. To this end, ASEAN has paid particular attention to electronic commerce. However, the legal harmonisation is not all. There should be a coordinated system of dispute resolution to facilitate harmonisation. As there is no ASEAN Court, domestic courts have to settle disputes. In that case, unless they are coordinated or connected, domestic courts may come up with conflicting interpretations of law and legal decisions. To solve this issue, there should be a central e-repository system that will hold all the domestic courts' decisions classified into various categories of law. The legal community including the judges, arbitrators, lawyers, and academics will be able to know how differently legal rules have been interpreted and decisions made by the law courts and arbitration tribunals of different Member States. This will help them research further to develop a unified approach, namely ASEAN approach of interpretation, which will facilitate integration in the real world. By a theoretical and qualitative research, this paper focuses on the ASEAN legal harmonisation agenda, the likely difficulties in achieving uniformity in the judicial interpretation and decision making with examples of a couple of decided cases, and the role of an e-repository system to remove those difficulties. It concludes that the ASEAN should establish a case law e-repository implementing a modality framework suggested herein.

Keywords: legal harmonisation, judicial interpretation, ICT and e-Repository

1. Introduction

With its inception in 1967 merely as a regional association of a number of neighbouring States, today Association of South East Asian Nations (ASEAN) is a legal person founded on three fundamental pillars, namely Political-Security Community, Economic Community, and Socio-Cultural Community (Association of South East Asian Nations, 2008). The combined aim of these three Communities is "to live in a region of lasting peace, security and stability, sustained economic growth, shared prosperity and social progress, and to promote our vital interests, ideals and aspirations" (Association of South East Asian Nations, 2008). The purpose of the Economic Community, in particular, is to "create a single market and production base" consisting of five freedoms- free movement of goods, services, investment, capital and skilled labour (Association of South East Asian Nations, 2008). In other words, the free movement of these FIVE will turn ASEAN into a single market- an integrated economy. This integration will bring benefits to the Community Members in many ways, such as increase in open competition among business enterprises across the border generating Gross National Production (GDP) and also employment for the people (ASEAN, 2008).

In this context, a relevant question may arise- how to bring about the abovementioned integration. There two types barriers to integration- tariff and non-tariff barriers. Through the agreement of ASEAN Free Trade Area (AFTA), a significant progress in the removal of tariffs has been achieved (ASEAN, 2008). Non-tariff barriers, which consist of technical and legal barriers, remain there to be removed. And the means to remove legal barrier are to harmonise the relevant laws of Member States of ASEAN, a rule-based organisation (Danvivathana, 2010).*The Proposal for the ASLOM Working Group on Examining the Modalities for the Harmonization of the Trade Laws of ASEAN Member States* underscores the importance of legal harmonisation as follows:

One way for ASEAN countries to help its businessmen cope with the uncertainty and cost of having to deal with different legal regimes in business transactions between ASEAN countries would be for the states to harmonise their international trade laws. If this is achieved, then businessmen who conduct business across ASEAN would have to consider only one set of rules applicable to their transaction, rather than many different sets of rules.

This would remove uncertainty, reduce cost, generate greater business confidence and, as the final outcome, promote greater intra-ASEAN trade. (cited in Chong, 2013, p. 6)

For harmonisation of law, the Working Group of the ASEAN Senior Law Officials Meeting (ASLOM) is entrusted with the drafting of the framework legislation. The policy decisions are, however, made by the ASEAN Law Ministers. They make decisions by consultation and consensus (Wong, 2013), which makes their work progress slow. As a result, there has not been much harmonisation. The Working Groups are working in different areas, such as trade law, e-commerce law, extradition, criminal laws. However, side by side harmonisation, there is a need of uniform application of the harmonised legal rules in the national jurisdictions of the Member States. This requires, in turn, the legal community, especially lawyers, judges, arbitrators, academics, regulatory authorities, to have regular updates of the judicial application of the harmonised laws in the Member States. Since there is no ASEAN Court of Law to interpret the laws and thereby to bring interpretational uniformity throughout ASEAN, the updating need triggers a an e-repository system of case laws, which will hold the case law reports from national jurisdictions. From there, the legal community will be able to keep themselves abreast of the judicial decisions and develop a uniform line of interpretation throughout region. This paperargues for the establishment of such a repository. Section 2 of this paper briefly states the legal harmonisation development in ASEAN. Section 3 reviews some case laws to underline how national courts have come up with conflicting or differing legal interpretations despite harmonisation, which justifies the introduction of a case law e-repository. Section 4 proposes a possible modality framework of the proposed repository. Then follows the conclusion with final remarks.

2. ASEAN legal harmonization in electronic commerce

ASEAN took a number of initiatives towards economic integration giving priority to information and communication technologies (ICTs) as the major enabler in this respect. Those initiatives include the e-ASEAN initiative (1999), the e-ASEAN Framework (2000), the ASEAN Economic Community (AEC) Blueprint (2007). The latest one is ASEAN ICT Masterplan 2015, which "seeks to work towards an empowering and transformational ICT in order to help create an inclusive, vibrant and integrated ASEAN" (Infocomm Development Authority, 2013, p. 1). It adopted six strategic thrusts to focus on: economic transformation, people empowerment and engagement, innovation, infrastructure development, human capital development, and bridging the digital divide (ASEAN, 2011).In these focused areas, ASEAN had planned certain initiatives, which include harmonisation of ICT regulation throughout the region. As part of this, the Masterplan envisaged "the establishment of harmonized e-commerce laws in each member country to create a conducive ICT environment for businesses and to build trust in particular by promoting secure transactions within ASEAN, developing a common framework for information security and promoting cybersecurity" (UNCTAD, 2013, p. 1). However, as of 2013, ASEAN made progress most in electronic transactions law. Nine out of the ten Member States had electronic transactions laws in place. All Member States had laws, full-fledged or partial, in domain-name area. The weakest progress was made in privacy law. In other areas, namely cybercrime, consumer protection and content regulation, the progress has been encouraging (UNCTAD, 2013).

Since ASEAN has best achieved harmonisation in electronic transactions law area, a brief account of the Member States' legislative initiatives may be given below.

Brunei:

Electronic Transactions Act 2004 (presently being updated) embodies the main principles of the *UNCITRAL Model law on Electronic Commerce 1996 (MLEC).* It aims to facilitate e-commerce by removing barriers created by legal uncertainties over writing and signature requirements. It also intends to bolster the confidence of the public in electronic transactions. It covers, among others, the following matters: electronic contracts, keeping records by electronic means, electronic signatures, liability of network service providers, and Government use of electronic records.

Cambodia:

Initially modelled on the *MLEC,* the latest draft as of 2013 was an omnibus-type law. It covers a wide range of matters, such as validity of electronic communications, communication process, security service providers,

intermediaries and electronic commerce service providers, consumer protection, electronic fund transfer and Government acts and transactions.

Indonesia:

Law of Electronic Information and Transactions (Law No. 11) 2008 is of wide ranging scope. It adopts major provisions of the *MLEC*. With special emphasis on cybercrime and data security, it includes the followings: Electronic Information, Records, and Signatures; Electronic Certification and Electronic Systems; Electronic Transactions; Domain Names, Intellectual Property Rights and Protection of Privacy Rights; Prohibited Acts and Penal Provisions; Dispute Resolution; and Role of the Government and Role of the Public.

The Lao People's Democratic Republic:

The Law on Electronic Transactions passed by the National Assembly in December, 2012 is generally harmonious with the *MLEC*. It broadly provides for on the following matters: Contracts, data Messages and electronic documents; Electronic signatures; Electronic transactions used by the State organisations; Intermediary; Offences and Prohibited Acts; Dispute Resolution; Management and Inspection; and Sanctions.

Malaysia:

Based on *UN Convention on the Use of Electronic Communications in International Contracts 2005,*Malaysian *Electronic Commerce Act 2006* is the main legislation related to electronic commerce regulation in the private sector area while the public sector is governed by the *Electronic Government Activities Act 2007*.The former contains provisions broadly concerning Legal recognition of electronic message, fulfilment of legal requirements by electronic means, and communication of electronic messages. It does not apply to the following transactions or documents: Power of attorney; the creation of wills, codicils and trusts; and negotiable instruments. Earlier, Malaysia passed the *Digital Signature Act 1997.*

Myanmar:

Myanmar has *Electronic Transactions Law (ETL) 2004*in place*,* which recognises the legal validity of electronic records, messages and signatures. It creates Certification Authorities ("CA") to grant licenses and lays down detailed rules for them to follow. It grants the Control Board powers to supervise their activities. The *ETL* enumerates a list of computer crimes punishable up to 15 years of imprisonment.

Philippines:

Enacted in 2000, the *Electronic Commerce Act (ECA)* grants authenticity and reliability of electronic data messages and electronic documents. It also recognises the validity of electronic signature. In the similar way, electronic contracts are legally valid to the same degree as paper contracts. It is presumed that electronic evidence is admissible in the law court. There are special provisions relating to contracts of carriage of goods. The *ECA* provides for punishment of computer crimes. It is based on the *MLEC.*

Singapore:

Closely matched with *the United Nations Convention on the Use of Electronic Communications in International Contracts,* which is an update to *MLEC,* Singapore adopted the *Electronic Transactions Act (ETA) 2010*. It recognises both electronic and digital signatures. It grants validity to electronic information in the following words: "For the avoidance of doubt, it is declared that information shall not be denied legal effect, validity or enforceability solely on the ground that it is in the form of an electronic record" (Section 6).

Thailand:

The *Electronic Transactions Act 2001*mainly follows the *MLEC.* Of course, its provisions concerning electronic signature are based on the *UN Model Law Electronic Signatures.* It covers both civil and commercial transactions electronically made. It declares the validity of both electronic information and electronic documents in that they

cannot be denied only because they electronically made. It recognises all e-signatures, but digital signature is preferred. It prescribes punishment for certain computer crimes.

Vietnam:

Founded on the *MLEC*, the *Law on E-transactions 2005* contains provisions both relating to electronic commerce and electronic signatures. It provides that electronic information and electronic contracts cannot be denied on the ground that they are electronic. An e-signature to be acceptable must be supported with a certificate issued by a Certification Authority.

3. Discrepancy in the application of law

Section 2 gives a broad view of legislative harmonisation initiatives by ASEAN Member States. But mere harmonisation is not all. Its main success lies in enforcement (UNCTAD, 2013). This Section, therefore, looks into two cases, one from Philippines and the other from Singapore, to see if the judicial interpretations converge or diverge with each other.

3.1 Philippines

MCC Industrial Sales Corp. v. *Ssangyong Corporation*(2007), the Seller (a Korean corporation) and the buyer (a Philippines corporation) entered into a sale contract for the sale of hot rolled stainless steel by pro forma invoices. According to the invoices, the payment was required to be made through an irrevocable letter of credit (L/C) and goods were to be delivered after the L/C had been opened. The seller faxed pro forma invoices to the buyer repeatedly, but the buyer failed to open an L/C account. Then, the seller filed a suit against the buyer in a local court, the Regional Trial Court (RTC), and sought damages for the breach of the contract. The buyer alleged that the seller did not present the original pro forma invoices. The RTC held the pro forma invoices admissible. The Court of Appeal affirmed the RTC ruling and declared that the photocopies of the facsimile invoices were original documents under the (Philippines) *Electronic Commerce Act (ECA), 2000*(R.A. No. 8792)

The Supreme Court reversed the ruling of the Court of Appeal on the ground that *ECA* recognises only "electronic data message", which excludes anything that is not generated by computer, such as telex and faxes. This is so because the Philippines Congress introduced the concept of "electronic data message" in the *ECA* by deleting the following words- "but not limited to, electronic data interchange (EDI), electronic mail, telegram, telex or telecopy"- from the definition of "data message" used in its underlying international model law- the *MLEC*. It defines "electronic data message" as the "information generated, sent, received or stored by electronic, optical or similar means" (Section 5). Thus, even though the "electronic data messages" or "electronic documents" are functional equivalents of written documents for evidentiary purposes, they do not apply to fax transmission as they are not electronically made and so are not "written" for the purpose of *ECA.*

3.2 Singapore

In *Integrated TranswarePte Ltd*. v. *Schenker Singapore (Pte) Ltd*. (30 March 2005), the plaintiff and defendant, through e-mail and telecommunication (and without any correspondence in the form of letter), came to an understanding to enter into a lease agreement. The plaintiff drafted the lease agreement and sent itby e-mail attachment to the defendant who agreed to it by an e-mail reply. Later, the defendant declined to carry out the contract. The plaintiff sued the defendant and sought compensation for the breach of the contract. The defendant argued that the agreement was not valid as it was not done according to the *Civil Law Act (Cap. 43) ("CLA"),* which requires land lease agreement to be in the form of some written memorandum or note evidencing the terms of the agreement of the parties and the signatures of the parties against whom the agreement is be enforced. The Court argued that through e-mail communication all three requirements- memorandum, in writing and signature- were fulfilled. The plaintiff sent the draft agreement to the defendant by e-mail attachment and the latter accepted the same by e-mail reply. This amounted to a memorandum. When the attached draft agreement was opened and it appeared on the computer monitor and was printed, it amounted to a written document. The Court took a broad view of "in writing". It relied on the definition given in the *Interpretation Act,* according to which "in writing" included, apart from printing, lithography, typewriting and photography, also any "other modes of representing or reproducing words or figures in *visible* form." The Court accepted the argument of the plaintiff that "although e-mails are files of binary information when transmitted or stored, they are in visible form when displayed on the screen of a computer monitor. The screen

display would then satisfy the requirement of "writing" " within the meaning of the Article 6(1) of MLEC. Third, for the signature requirement, the Court took the common approach, which considers signature in an inclusive sense. A signature, under common law, is not necessarily to be in hand writing. It can be typewritten or printed. The Court held the view that a signature typed into an e-mail satisfied the requirement. It went further even to say that the signature needed not to be typed into the e-mail. If the e-mail showed the name of the sender in the "From" line, that would fulfil the requirement "as long as the sender knew that his name appeared at the head of every message next to his e-mail address so clearly that there could be no doubt that he was intended to be identified as the sender of the message."

3.3 Comment

As noticed above, the electronic commerce laws of both Philippines (*ECA*) and Singapore (*ETA*) are based on *MLEC.ECA* has accorded written document status to electronic data messages and electronic documents while *ETA* grants the same status to electronic records. But what is "written" has been interpreted by the respective judiciary differently. The judiciary of Philippines has taken a strict and literal approach while the judiciary of Singapore a broader approach. According to the former, only electronically created messages or documents can be treated as written for evidentiary purposes. On the other hand, the latter treats not only electronically created documents as "written", rather anything created by any other means and is capable of being displayed on the computer monitor.

4. Relevance of e-Repository

The above two cases represent the fact that ASEAN countries should have a coordination of the interpretation and application of the legal rules so that one single uniform approach is developed throughout ASEAN. Otherwise conflicting interpretation of law may deter the integration of the region. To this end, the establishment of an ASEAN e-repository of case laws is essential. This may be done replicating the case law repository system of the United Nations Commission on Trade Law (UNCITRAL). This is called the Case Law on UNCITRAL Texts (CLOUT), which is described as

> *"a system for collecting and disseminating information on court decisions and arbitral awards relating to the Conventions and Model Laws that have emanated from the work of the Commission . . . to promote international awareness of the legal texts formulated by the Commission and to facilitate uniform interpretation and application of those texts.*

> *(http://www.uncitral.org/uncitral/en/case_law.html)*

In a similar fashion of CLOUT (United Nations, 2010), the following framework is being proposed for the ASEAN e-Repository,

▪ There should be a network of correspondents from all Member States. Each Member should appoint one correspondent for one particular area of law and should forward the details to the ASEAN Secretariat. The correspondent may be an individual lawyer/scholar or a law firm. Member States should renew the appointment of correspondents every five years. The renewed list should be available to the public upon request.

▪ The correspondents should prepare abstract for court decisions and arbitration awards in English highlighting the subject matter along with section numbers of the particular legislation involved. They should make special note in bold letters at the top of the abstract if the particular decision or award has made any remarkable change in the jurisprudence in that particular area of topic.

▪ The correspondent should report only the final decisions or awards after enforcement, as the case may.

▪ After the Secretariat has received the cases, it should allocate a case number to each case within each Member country slot under the particular legislation. In other words, on the top there should be the country name, followed by the legislation under which will be the case name, number, key words and section numbers, date of decision and the name of the court/tribunals.

▪ If the decision/award is an "original" one, the report should mark it so. If it is copied from any source, it should indicate the source.

▪ An abstract should be in the range of 1500 to 3000 words. It should highlight the reasons and principles upon which the interpretation is based. If the basis is a previously decided case, nationally or internationally, the abstract should mention that too.

- The users should be warned that they are subject to the copyright law of the country concerned.

- The repository may be named as ACL e-REP (ASEAN Case Law e-Repository).

- The repository website should provide the visitors a search engine to find there desired data. The following search engine is being proposed following that of the CLOUT case search (http://www.uncitral.org/clout/showSearchDocument.do?lf=898&lng=en):

Search ACL eREP
Welcome to the ACL eREP search engine.

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5. Conclusion

Economic or political integration and legal harmonisation go hand in hand. ASEAN has rightly appreciated this truth and has assigned different Working Groups to harmonise laws in various areas. It has made an important progress in this respect in the area of electronic commercial law. Most of the Member States have adopted laws mainly modelled on the *UNCITRAL Model law on Electronic Commerce (1996*) and the *United Nations Convention on the Use of Electronic Communications in International Contracts (2005).* However, the legal harmonisation has not been able to establish a uniform judicial interpretation of the legal rules. This is evidenced by two case laws from Philippines and Singapore, as seen above. To help the national judiciaries make uniform interpretation, it is essential that there should be a case law e-repository maintained by the ASEAN Secretariat so that the judges, arbitrators, lawyers and academics will remain updated of the judicial decisions/arbitral awards in other jurisdictions. In this respect, the modality suggested above in this paper may be implemented.

As said earlier, ASEAN aims at a single market where goods, services, capital, labour and investment will move across the border. This requires removal of legal barriers, which, in turns, necessitates harmonisation of law. Again, harmonisation alone is not all. The harmonised laws should be interpreted in a consistent and uniform manner so that an ASEAN approach of interpretation emerges. This is what is necessary for ASEAN to succeed as a regional organisation. This is believed that the ASEAN leadership will accept this thesis and the proposal put forward in this paper. Here lies the possible success of this research.

Acknowledgements

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Fraudulent new IT Systems of the Israeli Courts - Unannounced Regime Change?

Joseph Zernik
Human Rights Alert (NGO), Tel-Aviv, Israel
joseph.zernik@hra-ngo.org

Abstract: Validity, integrity, and impacts of the new IT systems of the Israeli courts, implemented in the decade of the 2000s, are examined. The report is based in part on the Human Rights Alert, NGO, (HRA) submission for the Universal Periodic Review (UPR) of human rights in Israel by the Human Rights Council (HRC) of the United Nations (UN) which, following professional HRC staff review, was incorporated into the HRC UPR report (2013) with the note: "Lack of integrity in the electronic record systems of the supreme court, the district courts and the detainees' courts in Israel". The current report is also based on the findings of the State Ombudsman's Report (2010), which noted that system development failed to comply with state law and standards. System analysis reveals development and implementation with no lawful authority, servers of unverified identity, and invalid implementation of electronic signatures, authentication procedures, authorities and permissions. Data mining reveals widespread issuance of invalid, falsified, simulated, and/or forged judicial records. Case studies document the implications of the operation of such conditions. The systems stripped judicial records of any validity and authenticity. Such systems, implemented through a costly, long-term project, overseen by key national judicial figures, are unlikely to be the outcome of oversight, or human error. The systems should be viewed as suspension of the law of the land, or denial of access to the civil courts. As such, they represent a regime change, or a constitutional crisis in a nation with no constitution. Corrective measures are proposed, calling for Publicity of the Law – transparency - and for the Separation of Powers – placing the development and implementation of such systems under accountability to the legislature. IT experts should assume more prominent duties in the safeguard of civil society in our era.

Keywords: e-justice, human rights, courts, prisons, banking regulation, State of Israel

1. Introduction

The courts worldwide have implemented in recent decades IT systems for efficient management of court cases, electronic filing by parties, and public access to court records. United Nations reports on "Strengthening Judicial Integrity Against Corruption" (2000, 2001) encourage the process. No doubt, such systems could have improved the transparency and integrity of the judicial processes. However, The transition to electronic administration of the courts amounts to a sea change in the operations of the offices of the clerks.

The office of the clerk is central the maintenance and safeguard of valid court records, through procedures that have evolved over centuries under paper administration of the courts. On the other hand, historical review finds that corruption of the offices of the clerks is correlated with corruption of the courts themselves (Messinger, 2002).

The current report is based in part on the Human Rights Alert, NGO, (HRA) submission to the United Nations Human Rights Council (HRC), which was incorporated into the Professional Staff Report (2013) of the Council's Periodic Review with the note: "lack of integrity of the electronic records of the Supreme Court, the district courts and the detainees courts in Israel." Instant report provides: a) Online Appendix I - an expanded version of the current report with links to online references and records, and b) Online Appendix II - HRA submission (2013), sections of which are referenced within the text (e.g., HRA C1e).

1.1 Office of the clerk

The authority, duties and responsibilities of the chief clerk of the court in the State of Israel were defined in a series of laws and respective regulations (HRA C.1). However, the laws and regulations leave considerable amount of ambiguity. On such background, absent unambiguous definition of the authority, duties and responsibilities of the chief clerk and the respective procedures, invalid IT systems were to be developed and implemented. It is noteworthy that the Israeli courts themselves ruled that a court, operating with no lawful office of the clerk, is an incompetent court.

2. Methods

2.1 IT system analysis and data mining

The systems are analysed by review of the their implementation and operation in various courts. Data mining is largely conducted using the inherent built-in search engines. System rules are inferred through review of the systems and the records, since hardly any public records are available (e.g. users' manuals), and the office of Administration of Courts denied respective Freedom of Information requests, or wrongfully refused to respond on them (HRA C9e).

2.2 Case studies

Case studies are provided in Online Appendix I to demonstrate the impact of the IT systems on the administration of justice in the Israel today.

2.3 Human rights, national and international legal implications

Legal analysis is largely restricted to technical and procedural matters, which needed to be addressed in the course of implementing any IT system of the courts. Emphasis is given to records, pertaining to the initiation (e.g. summonses) and termination (judgments) of litigation, which are recognized for centuries as critical for integrity of the courts and the judicial process.

"Simulated Litigation", "Simulated Court Record" are used here pursuant to the Texas Penal Code §32.48 (see Online Appendix I) – conduct which involves the dissemination of invalid, ineffectual, unenforceable, and typically abusive court records, and fraudulently inducing or extorting compliance with them.

3. IT system analysis

3.1 The systems

The current report primarily reviews the IT systems of the Israeli Supreme Court (name unknown) and the district and magistrate courts (Net-Hamishpat). Net-Hamishpat, but not the systems of the Supreme Court, provides the full range of case management, public access, and electronic filing capabilities.

3.2 Development and implementation - disregard of standards, dubious lawful authority

The State Ombudsman's Report 60b (2010) notes that the systems were developed and implemented in disregard of the law and effectual standards, pertaining to the development of state IT systems (HRA C3b):

- Contracts for system development were unlawfully awarded to corporations with no legal tender;

- Contracts were signed with no specifications;

- Development was conducted with no state employee core management;

- Systems were accepted with no independent validation by state employees;

- The servers of the courts were removed from the custody of the clerks of the courts to the custody of a corporation, and

- An unknown number of individuals were issued double ID cards.

The current generation of IT systems of the Israeli courts represents a sea-change in court procedures and court administration. These changes in court procedures have not be legislated. Limited authorization is provided in changes, which are promulgated in the Regulations of Civil Court Procedure and in the Regulations of the Courts – Office of the Clerk (2004), §5 – Mechanical Systems (see Online Appendix I). In Article 5, the Minister of Justice delegates to the Director of the Administration of Courts the authority to change the Regulations of the Courts as necessary in conjunction with implementation of the new IT systems. Article 5 patently violates the principle of Separation of Powers. Moreover, the changes to the Regulations were never published, in violation of the principle of Publicity of the Law, and the Administration of Courts refused to respond on a Freedom of a Information request, asking for disclosure of such changes (HRA C9e).

Changes were discovered, nevertheless, through system analysis and data mining:

- In all Israeli courts (including the Supreme Court) - the most significant change was abolishing the responsibility and accountability of the chief clerk relative to integrity of court records, issuance of summonses, authentication, service, and certification of judicial records.

- In the Supreme Court - where the paper records are deemed authoritative, the validity of all electronic records in the public access system was additionally voided by: a) adding to all records the disclaimer "subject to editing and phrasing changes", and b) omitting the standard statement by the Chief Clerk of the Supreme Court, which had appeared on all records prior to 2002, "True Copy of the Original", with an electronic code (probably an early form of password secured file system) (Figure 1). Both the Administration of Courts and current Presiding Justice of the Supreme Court Asher Grunis refused to disclose, under whose authority and under what legal foundation such profound changes were introduced in the electronic records of the Supreme Court in 2002.
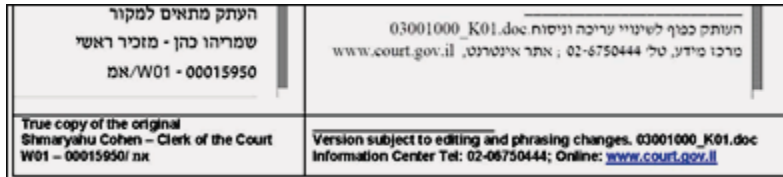
Figure 1: Changes in the IT system of the Supreme Court ~ 2002. Left: Until early 2002, all electronic decisions of the Supreme Court carried certification, "True Copy of the Original", by the late Chief Clerk Shmaryahu Cohen. Right: Since early 2002, the certification statement and any other reference to a chief clerk were omitted. On the contrary, the disclaimer "subject to editing and phrasing changes" was added

- In the district, magistrate, and labor courts - where Net-Hamishpat is implemented, and where electronic records are deemed authoritative, the validity of all electronic records was voided through the implementation of invisible electronic signatures. For example, prior to the implementation of Net-Hamishpat, judges were permitted to inscribe and sign "unformatted decisions" on the face of motion records. With the implementation of Net-Hamishpat, such practice was established as "Post-it Decisions" with no visible signatures at all (Figure 2).
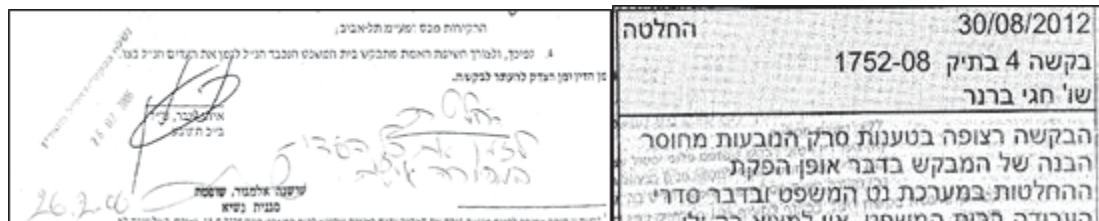
Figure 2: Changes related to implementation ~ 2009 of Net-Hamishat IT system. Left: Under paper administration - Rotem v Baram and State of Israel (73202/04) in the Tel-Aviv Magistrate Court - the February 26, 2006 Decision by Judge Shoshana Almagor is inscribed on the face of Plaintiff's Motion for Subpoena of Witnesses. The Judge's stamp and hand signature appear next to the inscription, as well as the stamp by the office of the clerk of the court "Sent by fax or email on February 26, 2006". Right: In Net-Hamispat IT system - Silman v Social Security (17520-08) in the Tel-Aviv District Court – the August 30, 2012 Decision by Judge Hagai Brenner is a "Post-it Decision" - a semi-transparent frame, superimposed on the face page of the Motion for Disqualification for a Cause with no visible signature and no indication of its service

3.3 Servers of unverified identity and dubious security

Review of the identity of the servers of the various courts, using standard browsers, failed to discover a single server of certified identify (HRA C2b). Furthermore, the Administration of Courts refused to respond on a Freedom of Information request: Who holds the ultimate administrative authority for the servers of the Supreme Court of the State of Israel? (HRA C9e).

3.4 Invalid implementation of electronic signatures

Today, all decision records of the Israeli courts, with the notable exception of the Supreme Court, are maintained as electronic records. Regardless, no visible electronic record can be found on any court records. The notion of

invisible signatures, defies the essence of a signature – a symbol affixed with the intent to accept responsibility (HRA C9d). Such invalid implementation of the Electronic Signature Act (2001) extends beyond the courts (Figure 3). The implementation of invalid electronic signatures was related to the privatization of the electronic signature system of the State of Israel to Comsign, a private corporation.

Figure 3: Implementation of invisible electronic signatures. Unsigned signature box of the 2006-7 Annual Report by Attorney Yoram Hacohen, Magistrate of Databases, as published online by the Ministry of Justice. The signature box says: "Truly, Yoram Hacohen, Adv., Magistrate of Databases, Justice Technology and Information Authority (Originally signed by a secure electronic signature)" [the parenthetical part in red in the original, jz]. The Ministry of Justice denied a Freedom of Information request for a visibly signed copy of the Report, claiming that the electronic signature of a government officer is a "private instrument".

3.5 Invalid implementation of summonses, authentication, certification, service instruments and procedures

In courts, originating in the English common law, the validity and integrity of the summonses are critical for validity and integrity of the subsequent litigation as a whole. However, since implementation of the current IT systems of the Israeli courts:

▪ In the Supreme Court - petitions (matters of original jurisdiction) are heard as "Preliminary Proceedings" with no issuance of the the Conditional Decree, which according to the respective Regulations is the Summons in such procedure.

▪ In the Supreme Court - while all valid court records are maintained in paper court files, the Notices to Appear in Court (for hearings on petitions) are maintained as electronic records, which according to the Supreme Court staff, are automatically eliminated from the IT system after the date of the hearing (Zernik, 2014).

▪ In the district and magistrate courts - summonses are issued by an unnamed person, unsigned, only noted as issued by the "Office of the Clerk" (Figure 4).

Figure 4: Implementation of invalid summonses in Net-Hamishpat. Ben-Yaakov v Rolnick (53747–02-12) in the Tel-Aviv Magistrate Court. The summons is unsigned, bears no seal of the court, and is issued in the name of "Office of the Clerk of the Magistrate Court, Tel-Aviv"

Authentication of judicial records is quintessential in all courts, originating in the English common law, including the Israeli courts, for rendering court decisions valid, effectual, and enforceable. Authentication of judicial records is executed through due service of duly signed records on the parties to the matter before the court with an accompanying letter, signed under the authority of the Chief Clerk.

However, since the implementation of the current IT systems of the Israeli courts:

▪ In the Supreme Court - all decisions are mailed unsigned by the justices, bearing the disclaimer "subject to editing and phrasing changes" and with no accompanying letter (authentication) by the clerk of the court.

▪ In the district, magistrate, and labor courts - all decisions are mailed with an unsigned accompanying letter by an unnamed person (Figure 5).

Figure 5: Implementation of invalid authentication letters in Net-Hamishpat. Silman v Social Security (17520-08) in the Tel-Aviv District Court – the August 30, 2012 Accompanying letter of the decision (Figure 3) by Judge Hagai Brenner says: "Accompanying Letter. Attached is a decision record. Date: August 30, 2012. Signature of a Clerk". The record is unsigned, fails to name its issuer, and bears no seal of the court (Brenner, 2012)

The certification of court records by the clerk of the court is likewise a routine procedure in all courts, originating in the English common law. Duly certified court records are required for enforcement of court orders and judgments. The Regulations of the Courts, Office of the Clerk (2004), §6a vests the Chief Clerk with the authority to certify court records, "True Copy of the Original".

Following the implementation of the current IT systems of the courts, no valid certification of court records could be obtained from any of the courts, where it has been attempted. However, numerous examples of forgeries were discovered:

▪ In the Supreme Court - petitioners, who have asked for signed and certified copies of decisions in their matters, routinely received simulated and/or forged records. Such records typically bear an invalid certification statement, "Duplication is True to the Original", instead of "True Copy of the Original", and are either signed by an unnamed person, using an illegible signature, or by a person, who is not the duly appointed Chief Clerk of the Supreme Court (Figure 6).
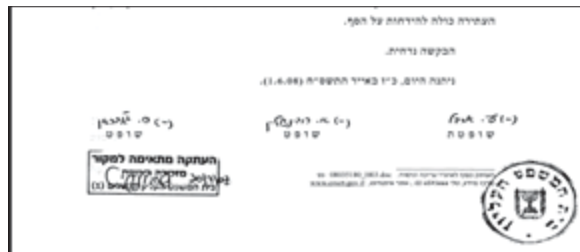
Figure 6: Simulation and/or forgery of certifications of Supreme Court decision record. a. June 1, 2008 Decision in Macmull v Bank of Israel and State of Israel (3518/08). The petition originated in fraud by a bank on Debtor Macmull in the Jerusalem Debtors' Court, and refusal of Bank of Israel to perform its duties as banking regulator. The petition was summarily denied. The signatures of the justices are all in "wet ink", in the form "(-)", and in the same hand-writing as the signature of Sarah Lifschitz "Chief Clerk". The certifying statement is invalid - "Duplication is True to the Original" - instead of "True Copy of the Original". Sarah Lifschitz was not duly appointed "Chief Clerk". The footnote says: "Duplicate subject to editing and phrasing changes."

▪ In the Tel-Aviv Labor Court - certification was issued by a person, falsely in possession of the "Chief Clerk" stamp, while the person, who appears as "Chief Clerk" holds no appointment record as such (Figure 7).

Figure 7: Simulation and/or forgery of certification of the Tel-Aviv Labour Court decision record. Left: The web page of the Tel-Aviv Labour Court lists "Chief Clerk: Ms Orly Hammer". Right: The 29, 2014 Judge Giltzer-Katz Decision, imposing an unusual NIS 4,000 payment in attorneys fees on Plaintiff Genosar, the Israel Electric Company whistle-blower, was certified using a "True Copy of the Original" stamp #49

of an unnamed male "Chief Clerk" . Freedom of Information response shows that Ms Orly Hammer holds no lawful appointment as "Chief Clerk" of the Tel-Aviv Labour Court, and that stamp #49 is unlawfully held by Ms Galit Maglid, a secretary in the Tel-Aviv Labour Court

3.6 Invalid implementation of authorities and permissions - discrimination in access to the courts

Attorneys, who are authorized as Net-Hamishpat users, are permitted access to electronic filing from remote locations at all times. Such attorneys are permitted to enter records into court docket, bypassing the authority of the clerk of the court. Unrepresented parties must file on paper in the office of the clerk during working hours. Service on attorneys is by email, on unrepresented parties - by paper mail. Authorized attorneys are permitted comprehensive access to Net-Hamishpat electronic records from remote locations at all time. In most courts, access to electronic court records is also severely limited or prohibited on unrepresented parties in their own court files, in disregard of the law.

3.7 Universal failure to docket summonses and authentication records

Review of court file records in Net-Hamishpat failed to discover the summonses in a number of cases, and it remains unknown if they are maintained among the electronic records in Net-Hamishpat at all. Similarly, no authentication records have been discovered upon inspection of the electronic records in Net-Hamishpat.

3.8 Adulterated, forged, and missing court records

Following the implementation of the new IT systems of the courts, numerous cases were reported, where judges have adulterated or forged court records.

In the Supreme Court - data mining led to the discovery of numerous decision records, bearing forged certification by the late Chief Clerk, up to 5 years after his death in 2002 (Figure 8).
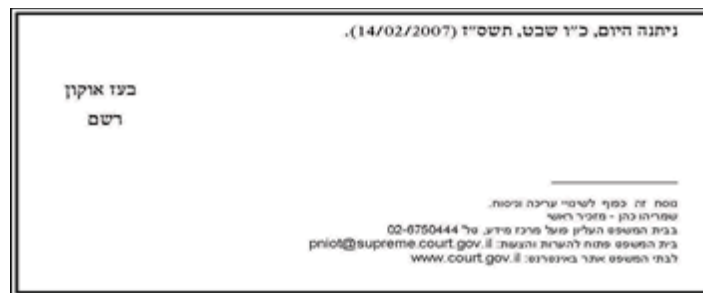
Figure 8: Falsification and/or forgery of Supreme Court decision record. The signature and certification box of Supreme Court Decision in Judith Franco Sidi et al v Authority pursuant to the Persons Disabled by Nazi Persecutions Act (1582/02) in part says: "Issued this date, February 14, 2007. Boaz Okon, Magistrate. This duplicate is subject to editing and phrasing changes. Shmaryahu Cohen – Chief Clerk." By February 2007, Boaz Okon was no longer Registrar of the Supreme Court, and Shmaryahu Cohen was dead for about five years. Numerous other records of the same nature were discovered

The two cases of forgeries of court records, most widely reported by media, involved Judges Varda Alshech and Hila Cohen (Zarchin, 2012, Yoaz, 2005). Neither was held accountable. In the numerous media reports, relative to the falsification of judicial records by judges, the fundamental question has never been raised: How was it technically possible? The most plausible explanation for such conditions in the Israeli courts is related to undermining of the authority of the clerk of the court in the new IT systems of the courts.

3.9 Double books

By law, public access is permitted to all judicial decisions, unless lawfully sealed. In practice, Net-Hamishpat permits judges to selectively permit public access to decision records (Figure 9).

Figure 9: Double-book system in Net-Hamishpat. September 23, 2014 List of Decisions in State of Israel v Rafi Rotem (1074-02-13) in the Tel-Aviv Magistrate Court: a. A remote public access terminal shows no decisions, and the screen says: "No details found". b. The office of the clerk terminal lists a dozen decisions

3.10 Unlawful filing of evidence in criminal prosecutions with no prior inspection by the defendant

The Criminal Court Procedure Act prohibits the filing of evidence in criminal prosecution, unless the defendant and his counsel were first provided the opportunity to inspect the evidence. Inspection of court files shows that in Net-Hamishpat, the Prosecution electronically files the evidence without providing the defendant and his counsel the opportunity to inspect the evidence first (Figure 10).

Figure 10: Unlawful filing of evidence in a criminal prosecution. List of Related Files in State of Israel v Rafi Rotem (1074-02-13) in the Tel-Aviv Magistrate Court shows hyperlinks to seven (7) Israel Police investigation files, although the Defendant had not been provided an opportunity to inspect the evidence, regardless of repeat requests. The hyperlinks are inaccessible to the public and the Defendant

3.11 Failure to register judgments

Honest registration of judgments is critical for honest administration of the courts. Typically, a "Judgment Book", or an "Index of Judgments" is considered one of the fundamental "Books of Courts". Registration of judgments in Net-Hamishpat is arbitrary and capricious (Figure 11).

Figure 11: Invalid registration of judgments. State of Israel v Roman Zadorov (502-07) in the Nazareth District Court – a case of dubious murder conviction. Under the "Judgments" tab in Net-Hamishpat, the September 14, 2010 Judgment, convicting Zadorov of murder and sentencing him to life in prison is not listed. The February 24, 2014 Supplemental Judgment, which again convicted Zadorov of murder, is listed as "Order on Defendant's attorney to file certificate of counsel"

4. Case studies

A series of case studies, further documenting the deficiencies in the new IT systems of the courts, outlined above, is provided in Online Appendix I. The series of cases related to Tax Authority whistle-blower Rafi Rotem is particularly instructive. Israeli media described him as being 'abused by the courts for over a decade' (Online Appendix I):

a) In Rotem v Tax Authority et al in the Tel-Aviv Labour Court, Rotem tried to gain protection against retaliation. The case, commenced in 2005, and was conducted as a paper court file. Inspection of the court file revealed only an unsigned, unauthenticated judgment record, which the Court refused to certify.

b) Rotem v Baram in the Tel-Aviv Magistrate Court commenced in 2004 and was likewise conducted as a paper court file. Inspection failed to discover summonses or authentication records, but uncovered numerous unsigned judicial records, which were never duly served. Request for certification of the purported judgment in the case, yielded a record, which should be deemed forgery/simulated court record.

c) The still ongoing State of Israel v Rotem in the Tel-Aviv Magistrate Court, which commenced in 2013, provides a detailed example of the conduct of abusive, simulated criminal prosecution under Net-Hamishpat.

The hallmarks are:

- Electronic records of vague and ambiguous validity, purportedly bearing invisible electronic signatures;

- A double-books system, where public access is purportedly permitted, but effectively denied to all decision records issued so far so far (Figure 9);

- Electronic filing of evidence by the prosecution without providing Defendant an opportunity to inspect it first, as required by law (Figure 10);

- Appearance of unauthorized outside attorneys as purported "public defenders", who consistently failed to perform their duties, and

- Refusal of the clerk of the court to certify judicial decisions "True Copy of the Original".

d) The petition Rotem v Samet in the Supreme Court, commenced and summarily denied in 2008, provides a detailed example of the denial of access to a national tribunal for protection of rights, and the issuance of simulated Supreme Court decision records, which the Supreme Court refused to have duly certified.

5. Hague Apostille Treaty (1961)

The Hague Apostille Treaty abolished the requirement for legalization of foreign public documents, and established instruments for mutually recognized certification of court records. The State of Israel entered the Treaty in 1978, but the evidence shows that the State of Israel employs a false procedure for apostille certification by private notaries, in violation of both Israeli law and the Treaty. The Administration of Courts refused to answer on a Freedom of Information request: Under whose authority and what legal foundation such procedure was published? (HRA C10a).

6. Discussion

The fundamental deficiencies in the new IT systems of the Israeli courts, systems that hold high significance relative to the administration of justice and were developed through a high cost, long-term project, overseen by senior national judicial officers, cannot be reasonably deemed the result of oversight or human error.

The new systems consistently strip judicial records of any evidence of authenticity, validity, force and effect.

Therefore, the systems should be viewed as suspension of the law of the land, or denial of access to the civil courts. As such, they represent a regime change, or a constitutional crisis in a nation with no constitution. The evidence shows that invalid litigation records were issued also prior to implementation of the systems. However, the older records reflect wrongdoing on a local basis, whereas the new IT systems reflect wrongdoing on a national scale.

Valid IT systems could have provided unprecedented public access and unprecedented transparency of the courts. In contrast, the systems which were implemented effectively created a double books system, which undermines public access and transparency of the courts. Furthermore, in a key decision of the Israeli Supreme Court (Association for Civil Rights v Minister of Justice, 5917/97), subject of which was public access to court records under the new IT systems, then Presiding Justice Dorit Beinisch ruled that public access had to be restricted, based on the 'constitutional' right for privacy.

Valid, visible electronic signatures could have practically eliminated the possibility of forgery, or the issuance of simulated court records. In contrast, the implementation of invisible electronic signatures enhanced the ability to generate forged or invalid, simulated court records. The privatization of certifying authorities of state electronic signatures again defies their own purpose.

The conduct of the Israeli courts, inherent in the new IT systems, stands contrary to the fundamentals of the English common law, in which the Israeli courts originate. Such conduct, likewise, stands contrary to the fundamentals of fair hearing and access to national courts for protection of rights in Human Rights – international law. It also stands contrary to the fundamental of Jewish law, another major source of Israeli law, where valid issuance and execution of summonses, execution of court records through valid signatures and authentication/service procedures, particularly in matters of marriages and divorce, have been well-established for over 2000 years.

The development and implementation of the new IT system of the Israeli courts was launched under the tenure of Supreme Court Presiding Justice Aharon Barak (in office 1995-2006). Under his tenure, the Supreme Court purported to construe various fundamental human and civil rights and Barak advertised himself as leading of a 'Constitutional Revolution' in Israel (Zernik, 2012). Outside observers perceived Barak as an 'enlightened despot' at best, or the world's record holder in 'judicial hubris' (Posner, 2007). The current report proposes that Justice Barak in fact presided over unprecedented corruption of the Israeli courts.

The implementation of the new IT systems in the Israeli courts correlated with a period, which has been marked by unprecedented, rampant government corruption and the emergence of extreme socio-economic gaps. The economy fell under the dominated of a handful of 'tycoons', and Israel has been propelled to the first place among OECD nations in poverty rate without suffering any economic crisis. The socio-economic transformation has also led to the emergence in recent years of a social protest of unprecedented scale.

The State of Israel is not alone. Similar, but older IT systems have been reported in the state and federal courts in the United States (HRA, 2015). In this context, the key role of two US-based international corporations, IBM and EDS, in the unlawful development and implementation of the new IT systems of the Israeli courts should be noted, as well as the conduct of IBM in other nations (Zernik, 2014).

Undermining of the integrity of the Israeli justice system by senior justice officers, documented in the current report, has serious national and international implications. For example, the competence of the Israeli justice system is likely to be questioned in any attempt to bring disputes between Palestine and Israel before the International Criminal Court.

7. Proposed corrective measures

The implementation of the new, fraudulent IT systems in the Israeli courts, implicates the judiciary as a class, as well as the Israeli Bar Association and the Ministry of Justice. Corrective measures may eventually require a Truth and Reconciliation Commission or similar approach.

Under similar circumstances in the US courts a century ago, key corrective measures involved reform of the offices of the clerks (Messinger, 2002). Similar measures may be needed in Israel.

Corrective measures should note the unique relationship between code and law (Lessig, 2000), demonstrated in IT systems of the courts, therefore requiring transparency – pursuant to Publicity of the Law, and accountability to the legislature – pursuant to the Separation of Powers – placing the development and implementation of such systems under accountability to the legislature.

Human rights and internet activists should keep vigilance in monitoring such systems.

IT experts should assume more prominent duties in the safeguard of civil society in our era.

Acknowledgements

Online appendices

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Building and Evaluating Classification Framework of Critical Success Factors for e-Government Adoption

Ewa Ziemba[1], Tomasz Papaj[2], Rafał Żelazny[3], and Maria Jadamus-Hacura[2]
[1]Faculty of Finance and Insurance, University of Economics, Katowice, Poland
[2]Faculty of Management, University of Economics, Katowice, Poland
[3]Faculty of Economics, University of Economics, Katowice, Poland
ewa.ziemba@ue.katowice.pl
tomasz.papaj@ue.katowice.pl
rafal.zelazny@ue.katowice.pl
maria.jadamus-hacura@ue.katowice.pl

Abstract: This research focuses on the critical success factors of e-government. Its purpose is to propose and assess a classification framework of critical success factors for adopting e-government in Poland. This framework should exemplify the "best practices" for the e-government, especially in the countries of the Visegrád Group and also in other transition economies of Central and Eastern Europe. The paper continues as follows. Firstly, the success factors for adopting e-government in Poland are investigated and the framework of critical success factors is identified. This framework embraces four categories of success factors, and they are: economic, socio-cultural, technological and organizational. All the factors are assigned to three stages: ICT access, ICT competences and ICT use. Secondly, the framework is evaluated and the statistical analysis is conducted. The paper concludes with discussing its findings, limitations, implications, and avenues for further research.

Keywords: e-government, critical success factors, e-government adoption, the transition economies, the Visegrád Group, Poland

1. Introduction

Electronic government (e-government) suggests the use of information and communication technology (ICT) to provide efficient and quality government services to employees, government units at the state and local levels, and first of all to citizens and businesses. Generally, e-government embraces (Anttiroiko, 2008; Gil-Garcia and Helbig, 2007; Ziemba, Papaj and Żelazny, 2013):

- improving government processes by using ICT and government process management (e-administration);

- providing government services electronically for citizens, businesses and employees, (e-government services);

- improving transparency and democratic decision making as well as citizens' participation (e-democracy);

- developing cooperation, networking and partnerships between government units, citizens and business (e-governance).

The resulting benefits of e-government successful adoption are numerous. For example, e-government has the potential to bring about higher quality and more cost effective government services, and better relationships between government units at the state and local levels as well as between government units and their clients, like citizens and business. Successful adoption of e-government results in increasing the convenience and accessibility of government services and information to citizens and businesses (Angelopoulos et al., 2010; Carter and Belanger, 2005). It improves efficiency, transparency, and accountability in government units. Moreover, e-government helps build trust between government and citizens and businesses by enabling direct online interaction between government units and their clients. It is possible to achieve significant cost reductions derived from improving government processes, introducing electronic-based document processes and service-oriented procedures, reducing transaction times and removing redundant layers of bureaucracy (Sultan et al., 2012).

Nowadays the e-government adoption has become a priority issue for developing countries (Harindranath 2008; Humes and Reinhard, 2009; Joseph and Jeffers, 2009; Ke and Wei, 2006; Mahmood, 2011; Moatshe and Mahmood, 2012; Nfuka and Rusu, 2013; Sang et al., 2009), among others the transition economies of Central and Eastern Europe, embracing the Visegrád Group. The term "transition economy" refers to an economy that is changing from a centrally planned economy to a market economy (Ifinedo and Singh, 2011). It is assumed that

countries being European Union members have the transition process completed. However, this assessment causes some controversy. The transition process is adopted in a different way and at a different rate in different countries. It depends on various determinants – historical, political, cultural, and economic. Taking into consideration Eastern and Central Europe countries' experiences we can identify the leaders of the transition process and the followers. In the first group there are Poland, the Czech Republic, Hungary, Slovakia, Slovenia, Lithuania, Latvia, Estonia, Croatia, Romania and Bulgaria. It's worth to state that among the above mentioned leaders four of them, i.e. Poland, the Czech Republic, Hungary, Slovakia cooperate as the Visegrád Group. The other group includes Belarus, Russia, Georgia, Moldova, Ukraine, Serbia and Montenegro. All of them face the challenge of adopting political, cultural, technological and organizational changes designed to support and drive a profound transformation in government units at the state and local levels (Ahrens and Zweynert, 2012; Armingeon and Careja, 2008; Cordella and Lannacci, 2010). It involves rethinking government organizations and processes, changing behavior, and using ICTs and information to make government services more efficient and easier to access for citizens, businesses and government units (Andersen et al., 2011; Anttiroiko, 2008; Ziemba and Papaj, 2013; Ziemba et al., 2013).

Studies and empirical activities aimed at e-government have strongly been developing from 2000 (Heeks and Bailur, 2007), but some questions have remained unanswered. A fundamental question asked in practice and scientific studies is: *why is the interest in e-government so high on the one hand, but its usage so low on the other?* (AlAwadhi and Morris, 2009; Ebrahim and Irani, 2005; Kunstelj et al., 2007). The successful adoption of e-government means successful implementation of ICTs in government units and its successful usage by all government stakeholders, e.g. government employees, citizens and enterprises. The adoption of e-government is not straightforward, it requires rather a complex technological, organizational, social, economic and political framework approach (Beynon-Davies, 2007; Choudrie et al., 2005; Nfuka and Rusu, 2013; Pina et al., 2009). It also requires the coordination of many activities of government units and a close cooperation of employees, managers, IT specialists as well as citizens and businesses.

Additionally, there is a lack of proven scientific theories on and experience in the adoption of e-government in the Visegrád Group countries and also other economies of Central and Eastern Europe. The adoption of e-government in transition countries is not considered as successful as in their counterparts in developed countries. The transition countries face challenges in making ICTs work over time and institutionalizing them in daily routines within their government units at the state and local levels (Harindranath, 2008; Ifinedo and Singh, 2011; Nurdin et al., 2012; Yun and Opheim, 2010). Among other things, it is very important to identify determinants, barriers and success factors for a successful e-government adoption. The identification of critical success factors (CSFs) for the e-government adoption in the transition economies remains a challenge for researchers and practitioners alike, there has been relatively little research exploring the CSFs in the transition economies of Central and Eastern Europe (Harindranath, 2008; Ifinedo and Davidrajuh, 2005; Ifinedo and Ifinedo, 2011; Roztocki and Weistroffer, 2008).

To address this gap, this research focuses on key factors influencing successful e-government adoption in Poland. Its purpose was to build and assess a classification framework of critical success factors for adopting e-government in Poland. The transition economies of Central and Eastern Europe, especially the Visegrád Group countries that are recently starting the transition from a traditional government to e-government, will be able to comply with those factors for the successful e-government adoption.

This paper is structured as follows. Firstly, the success factors for adopting e-government in Poland are identified and the classification framework of critical success factors is proposed. Secondly, the framework is evaluated and the statistical analysis is conducted. The paper concludes with discussing its findings, limitations, implications, and avenues for further research.

2. Research methodology

The following research question was posed:

RQ: Which areas and operations of government units should be primarily focused on in order to achieve the most satisfying results of transition from a government to an e-government?

This research took the following steps:

- The first step – a review of literature was conducted to identify CSFs for the e-government adoption presented in the literature. The search for the appropriate literature on e-government adoption research began with four bibliographic databases, that is: ProQuest, Emerald Management Plus, ISI Web of Knowledge, and Scopus. This was achieved by developing a relevant set of keywords and phrases such as "critical success factors," "CSFs," "Visegrád Group," "e-government," "electronic government," "success factors," "Poland," 'Hungary," "Czech Republic," "Slovakia," "adoption," "usage," "implementation," "impact" in all possible permutations and combinations (taking into consideration the logical AND, and OR as appropriate) and conducting a corresponding search. In addition, some dedicated journals of e-government adoption research such as *Government Information Quarterly* (GIQ), *Transforming Government: People, Process, and Policy* (TGPPP), *Electronic Government: an International Journal* (EGIJ), *Journal of Global Information Technology Management* (JGITM), *The Electronic Journal of e-Government* (EJEG) were also explored. Moreover, the open access papers and empirical studies were examined. Our aim was to review only those research papers which were associated directly or indirectly with the CSFs for e-government adoption.

- The second step – CSFs for e-government adoption in the Silesian Voivodeship (Poland) was indicated on the basis of collaboration among the authors in conjunction with the Silesian Centre of Information Society (SCSI) that is responsible for e-government in the Silesian Voivodeship in Poland.

- The third step – basing on literature findings, empirical experiences and brainstorming of the authors, the framework of CSFs for e-government was proposed.

- The fourth step – thanks to the Delphi technique this CSFs framework was verified and developed. 22 experts participated in the Delphi study. The experts were selected to combine knowledge and experience of scholars, researchers and practitioners. The group of experts was composed of: (a) 16 employees of the local and state government, who are responsible for e-government adoption in Poland; and (b) 6 professors of Polish universities, who conduct studies and empirical research on e-government (Table 1). Governments' experts were managers and top managers. The Delphi process was viewed as a series of rounds. In the early rounds four experts participated, in the last round all 22 experts participated in the Delphi research. In each round every expert dealt with and filled out a questionnaire which was delivered to a researcher who gathered, organized, and gave back to every expert an account of the standpoint of the whole group and the expert's own opinion. A summary of opinions expressed by each expert made them aware of the range of positions and the reasons underlying those positions. In the last round the experts evaluated the strength of influence of particular factors on e-government adoption. The experts had to answer the question: *On a scale 1 – 5 state to what extend do you agree that the following factors influence the e-government adoption?* A five-point Likert scale was used in the evaluation. The scale respectively represented: 1 – disagree strongly, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – agree strongly.

- The fifth step – the collected data were statistically analyzed utilizing Statistical Package for Social Science (SPSS) for Windows and STATISTICA in order to receive greater and deeper verification, and evaluate the provided CSFs framework. The following techniques for data analysis were employed: min, max, mean ($\overline{x}$), standard deviation (σ), and coefficient of variation (CV). To conduct reliability analysis, Cronbach's coefficient alpha was used.

3. Research findings

3.1 Framework of critical success factors for e-government adoption

The adoption of e-government is conditioned by many factors, which should be addressed clearly in four dimensions (perspectives):

- economic factors;

- social-cultural factors;

- technological factors; and

- organizational factors.

Firstly, there is a positive relationship between economic factors and e-government adoption. Economic factors are related to the national wealth, economic well-being of nation, the financial situation of government stakeholders, the availability of economic endowments, risks of failing to adopt e-government as well as the economic benefits. Secondly, socio-cultural factors positively influence the adoption of e-government. The study

has also shown the existence of a positive relationship between the mentality and awareness of e-government stakeholders, digital divide, information culture, digital culture and the e-government adoption. Thirdly, technological characteristics positively influence the adoption of e-government. These factors are related to ICTs innovations, innovative e-government services, open source software licenses, integration of front-office and back-office information systems, user-friendly information systems, maturity of e-government, ICT standardization, competitive ICT professionals, and quality of e-government services. Fourthly, the e-government adoption depends on organizational factors, such as rule of law, managerial innovation, and management of ICTs.

Furthermore, e-government adoption requires:

- technical and economic accessibilities of ICTs – ICT access (supply) stage;

- competences and awareness related to the use of ICTs – ICT competences and awareness stage; and

- usage of ICTs by government units, citizens and businesses – ICT use (demand) stage.

The factors of the proposed framework by individual dimensions and stages are seen in Table 1. They are explored by Ziemba, Papaj and Zelazny (2013) in greater detail.

Table 1: Classification framework of CSFs for e-government adoption and statistical description of factors

Dimension	Stage	No.	Critical success factor	N	min	max	x̄	σ	CV
Economic	ICT access	X1	Public subsidies and private outlays on hardware, networks and telecommunications	22	4	5	4.77	0.43	8.99%
		X2	Competition on ICT market	22	2	5	4.00	0.87	21.82%
		X3	Public outlays on back-office and front-office information systems, especially e-government services	22	2	5	4.55	0.86	18.87%
		X4	Financial situation of government units	22	2	5	4.36	1.00	22.97%
	ICT competences	X5	Public and private outlays on ICTs education for government managers	22	4	5	4.41	0.50	11.41%
		X6	Public and private outlays on ICTs education for government employees	22	3	5	4.23	0.53	12.50%
		X7	Outlays on creating ICT competence centers government units	22	2	5	4.00	1.07	26.73%
	ICT use	X8	Potential economic benefits coming from ICTs usage in government units*	22	2	5	3.91	1.11	28.36%
		X9	Economic risk of ICTs implementation in government units	20	1	5	2.95	1.00	33.85%
		X10	Public outlays on ICTs promotion in government units	21	2	5	3.76	1.04	27.76%
Socio-cultural	ICT access	X11	ICTs awareness of managerial workers in government units	21	3	5	4.67	0.58	12.37%
		X12	E-government services absorption by stakeholders of government units	21	3	5	4.48	0.60	13.44%
	ICT competences	X13	Incentive system promoting permanent competence improvement of government employees (especially in ICT)	21	1	5	3.86	1.24	32.05%
		X14	ICT external experts consultancy for government units in the field of ICT	22	1	5	3.64	1.14	31.23%
		X15	New social and cultural competences of government employees	22	2	5	4.00	0.87	21.82%
	ICT use	X16	Information culture in government units conducive to the use of ICT	22	4	5	4.64	0.49	10.62%
		X17	Social exclusion of workers, citizens, entrepreneurs due to age, to education, to place of residence, to disability	22	2	5	3.73	0.98	26.42%
Technological	ICT access	X18	Innovative hardware and networks in government units	22	2	5	4.27	0.99	23.05%
		X19	Innovative e-government services	22	2	5	4.64	0.85	18.28%
		X20	Open source software licenses	22	3	5	3.86	0.83	21.57%
		X21	Standardized ICTs for government units	21	2	5	4.29	0.78	18.29%

Dimension	Stage	No.	Critical success factor	N	min	max	x̄	σ	CV
	ICT	X22	Dedicated (personalized) ICTs for government units	21	2	5	4.29	0.85	19.72%
		X23	ICT leaderships and visionaries in government units	22	3	5	4.50	0.67	14.95%
		X24	ICT competences of government employees	22	2	5	4.55	0.74	16.25%
	ICT use	X25	Integration of front-office and back-office information systems	22	3	5	4.64	0.58	12.53%
		X26	Quality of e-government services	22	2	5	4.82	0.66	13.79%
		X27	Maturity of e-government services	19	4	5	4.79	0.42	8.75%
		X28	E-government services enabling e-voting	21	1	5	3.81	1.17	30.63%
		X29	E-government services enabling public consultation and participating in public decision making	21	2	5	4.14	0.79	19.14%
Organizational	ICT access	X30	Coordination of public ICT investments	21	2	5	4.29	1.06	24.63%
		X31	Public-private partnership in the field of ICTs	22	1	5	3.36	0.85	25.20%
		X32	Rule of law	21	2	5	4.10	1.00	24.30%
		X33	Institutional support for the development of ICT infrastructure	22	2	5	3.95	1.00	25.26%
		X34	Access for employees of government units to their network resources	20	1	5	3.35	1.27	37.85%
		X35	Coopetition on ICT market	20	2	5	3.25	0.97	29.74%
		X36	ICT benchmarking for local and state government	21	1	5	3.48	0.98	28.21%
	ICT competence	X37	Approved e-government strategy	22	2	5	4.00	0.93	23.15%
		X38	The competence of employees of government units in the field of new management models	22	2	5	4.00	0.87	21.82%
	ICT use	X39	Top management support	21	2	5	4.29	1.06	24.63%
		X40	Internal regulations of government units on access to e-government services	21	2	5	4.14	0.85	20.60%
		X41	Adaptation of new management models in government units	21	3	5	4.38	0.59	13.46%
		X42	Participation of employees of government units in organizational changes	21	1	5	3.57	1.21	33.80%
		X43	Electronic communication between government units	22	4	5	4.64	0.49	10.62%
		X44	New ways of providing work by employees of government units	21	2	5	3.62	0.80	22.24%

3.2 Analysis of framework items

The mean, standard deviation and coefficient of variation demonstrated the construct validity of 44 factors (items), four dimensions and three stages.

The calculated mean values for 44 items are in the range from 2.95 to 4.82, using the five point Liker scale. 29 items have values exceeding 4. Items with the highest mean concern technological dimension and ICT use stage (Table 2). Whereas the organizational factors as well as means of ICTs access and ICTs competences factors are the lowest. These findings have shown that all factors, dimensions and stages affect the successful adoption of e-government.

Moreover, there are differences in the variability in items, but they all have enough variability to be useful. The coefficient of variation stays in the range from 8.75% to 37.85 %. Only two items: X1 (Public subsidies and private

outlays on hardware, networks and telecommunications) and X27 (Maturity of e-government services) are smaller than 10%. Descriptive statistics for each item are given in Table 1 and Figure 1.

Table 2: Descriptive statistics for CSFs dimensions and stages

Dimensions and stages of CSFs	x̄	σ	CV
Economic	4.11	0.42	10.16%
Socio-cultural	4.15	0.43	10.48%
Technological	4.39	0.42	9.62%
Organizational	3.93	0.52	13.34%
ICTs access (supply)	4.11	0.40	9.79%
ICTs competences	4.11	0.48	11.74%
ICTs use (demand)	4.13	0.29	6.99%
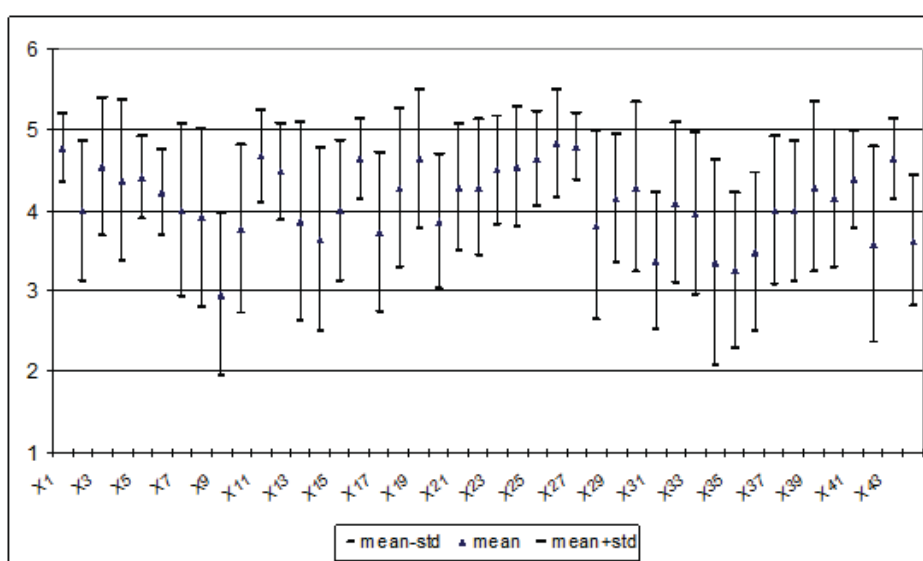
Figure 1: Descriptive statistics of all items

3.3 Reliability analysis

Having decided which items are worth including in the final factors, the overall scale and the subscale of internal consistency were estimated using the test for reliability. Cronbach's coefficient values were chosen to examine the internal consistency among items on a scale. The results of α – values for all the research constructs have values above 0.50 and are presented in Table 3. Cronbach's alpha varied between 0.511 for socio-cultural items and 0.804 for the technological items. Analyzing Cronbach's alpha for CSFs stages, it varied between 0.577 for ICTs use and 0.783 for ICTs access. The reported Cronbach's alpha for all analyzed items is 0.873. Hinton et al. (2004) have suggested four different ranges of reliability, i.e. the excellent range (0.90 and above), the high (0.70- 0.90), the high moderate (0.50-0.70) and the low (0.50 and below). Thus, it can be concluded that the scale has internal consistency and reliability.

Table 3: Reliability analysis

Dimensions and stages of CSFs	Number of items	Cronbach's alpha coefficient
Economic	10	0.589
Socio-cultural	7	0.511
Technological	12	0.804
Organizational	15	0.790
Total (dimensions)	44	0.873

Dimensions and stages of CSFs	Number of items	Cronbach's alpha coefficient
ICTs access (supply)	19	0.783
ICTs competences	9	0.720
ICTs use (demand)	16	0.577
Total (stages)	44	0,873

Next, Cronbach's alpha was examined for each item with the assumption that a given item Xi (i=1, 2, …44) was deleted (Figure 2). We can see that the removal of some items would lead to a very small improvement in Cronbach's alpha, for example Cronbach's alpha would increase from 0.873 to 0.876 if item X4 (Financial situation of government units) was deleted. The results have shown that deleting any item does not seem to make a large difference and Cronbach's alpha still belongs to the high range (0.70-0.90). The original alpha score with all 44 items still shows a strong internal consistency.
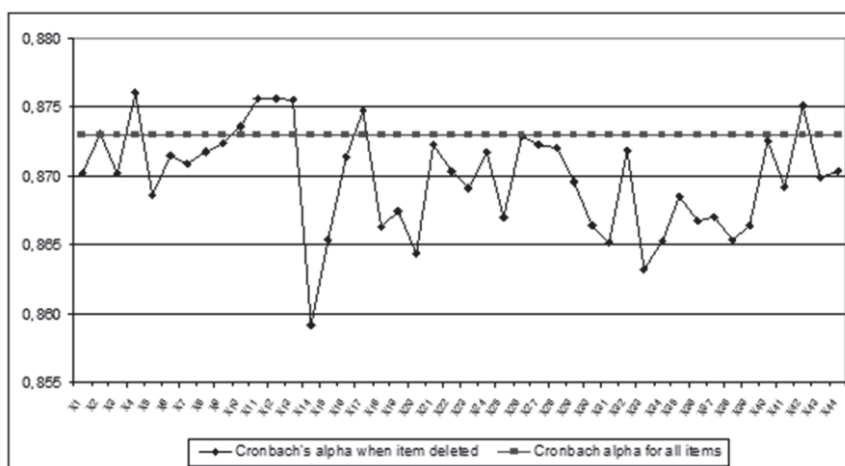
Figure 2: Cronbach's alpha coefficient for all factors

To sum up, Cronbach's alpha coefficient values confirm reliability of scale for the successful adoption e-government in Poland. The high value of Cronbach's alpha coefficient (0.873) proves the internal consistency of items.

4. Discussion

A number of CSFs have been generated around the e-government adoption based on the available literature and the results of empirical study, especially the results of number of in depth e-government experts opinions.

A set of factors has been identified and examined in different dimensions and stages. Descriptive statistics findings confirmed validity of 44 factors, four factors dimensions and three factors stages. Simultaneously Cronbach's alpha coefficient proved the internal consistency among the items on the scale and the subscale. The degree of internal consistency is high.

The research findings shown, that the adoption of e-government requires: (1) technical and economic accessibilities of ICTs – ICTs access (supply), (2) competences and awareness related to the use of ICTs – ICTs competences, and (3) usage of ICTs by government units, citizens and businesses – ICTs usage (demand). It confirmed that there is some gap between the supply of ICTs in government units (e-government) and actual usage of ICTs (e-government). ICTs access means ICT infrastructure investments in government units. This concerns in particular the purchase of hardware, construction of infrastructure networks and the implementation of the standard or creation of the dedicated back-office and front-office information systems. ICTs investments in themselves do not mean success in adopting e-government. They must involve a variety of organizational, social and cultural changes that lead to improvement of efficiency, transparency and accountability in government units by reducing transaction times and removing redundant layers of bureaucracy. The lack of relevant changes, such as re-engineering of government processes and documents workflows or the adaptation of law, usually means that the implementation of ICTs does not bring the expected benefits. Low quality and non-integration of information systems as well as their non-adaptation to the needs of users can be even a cause of failure to use ICTs. In particular, the above characteristics relate to the e-

government services for citizens and businesses. Thus, in addition to ICTs supply, the adopting e-government is also determined by ICTs demand. Competences of government managers and employees are very important for these two stages. Their knowledge and skills are needed to take appropriate investment decisions, implement ICTs and successfully use ICTs.

5. Conclusion

For the last years few academic studies have concentrated on the adoption of e-government and knowledge about the various potential factors impacting on e-government adoption has increased significantly. These studies concern mainly developed countries. Hence the knowledge of CSFs for adopting e-government in the transition economies of Central and Eastern Europe including the Visegrád Group countries, has not advanced very far. This paper contributes to the e-government adoption literature in terms of suggesting a classification framework that takes under consideration important CSFs for adopting e-government. The proposed framework is based on both available literature on CSFs for e-government adoption and empirical research on CSFs for e-government in Poland. It aims at providing a better understanding of critical factors in ensuring the success of e-government adoption.

The replication of this study in emerging and developing countries will be useful to improve their knowledge related to the factors impacting on e-government adoption (or lack thereof) in such contexts. In particular, this proposed framework can be useful for the Visegrád Groups countries. This is because the Visegrád countries are similar and they have to resolve the same problems (Kaderabkova, 2008). They are similar not only through their common neighbourhood and analogous geopolitical situation, but also through their joint history, traditions, culture and values. There is also a similarity in the field of building democratic state structures and a free-market economy as well as participating in the European integration process. The quality of ICT and telecommunication infrastructure in the Visegrád Groups countries is at the same level. Moreover, the maturity levels of e-government are the same and they are lagging behind in comparison with European leader countries, i.e. in terms of cooperation and communication between government units, as well as in the e-government service range supplied to citizens and businesses. These countries have to overcome the same political, economic, social, technological and other barriers in their transition from the centrally planned economy to a free-market economy, also from a government to an e-government. Therefore, the proposed framework of CSFs for the e-government adoption is equally useful for researchers from the Visegrád Group countries, as well as their governments which would like to successfully implement e-government projects. Through the introduction of the framework and the factors, this study addresses the gap in the literature regarding CSFs for e-government adoption in the Visegrád Group countries. This study would give researchers a way forward to further analyze factors influencing the e-government adoption. Moreover, it would work as a rough guide for the governments of the Visegrád Group countries towards taking preventive measures to avoid certain obstacles in the process of adopting successful e-government projects.

This study with depth and insight showed four groups of factors that government leaders should consider in successful adopting of e-government. Firstly, economic factors affect the successful adoption of e-government. A long-term economic plan with a clearly articulated financial strategy of ICTs supply, competences and usage funded by the government, the European Union and businesses (public-private partnership) is vital to the adoption of e-government. Successful e-government adoption requires financing of not only ICTs investments, but also ICTs usage and ICTs competence improvement. Secondly, socio-cultural factors influence the adoption of e-government. This research provides evidence in support of the positive, direct associations between e-government adoption and information culture, government stakeholders' awareness of a given e-government or of its benefits as well as new stakeholders competences focused on information. Thirdly, adoption of e-government is determined by technological factors. Innovative ICTs, e-government services at the highest level of maturity, very good-quality e-government services and integration of front- and back-office information systems enhance the exponential adoption of e-government. Moreover, ICT leaderships and visionaries in government units and their high ICT competences spur on-going efforts to adopt e-government. Fourthly, organizational requirements are necessary for the adoption of e-government. Coordination of public ICT investments and top management support, implementation of new management models and rule of law create favorable conditions for e-government adoption.

Generally, this study helps provide some insights that can lead to improved adopting of e-government in Poland and other Visegrád Group countries. By identifying the relevant factors of e-government adoption, implications

for both research and practice come to the fore. From a research perspective, e-government in the Visegrád Group countries provides very fertile soil. Specifically, researchers conduct in depth quantitative and qualitative studies to identify barriers and determinants of e-government adoption. Owing to this study the research paradigm related to e-government adoption will be worked out. Furthermore, there are implications to the use of the framework for government practitioners while undertaking empirical activities aimed at adopting e-government successfully and effectively, programming and implementing e-government initiatives. Government units and government authorities could find answers to important contemporary questions, in particular: What factors do influence the successful adoption of e-government? How are the requirements of citizens and enterprises changing towards government units? What are the new requirements towards government units? What competencies of government units are important for e-government adoption? Which areas and operations of government units are important to achieve the most satisfying results of transition from a government to an e-government?

One limitation of the framework lies in the fact that it has not been tested yet in a larger number of government units at the state and local levels. While the small sample size did not constrain the data analysis, a larger and more representative sample may yield more useful results. However, eventually, the results of an exploratory study will be summarized in an improved conceptual framework for further research. Aided by the future cross-sectional studies in local and state government units in Poland, the framework will be refined, extensively tested across different government units and developed. Few additional factors will be examined in these studies. They have been indicated in the last round of Delphi study. Hence, finally the number of items on the scale will be increased, but this does not reduce the internal consistency of items on the scale and the reliability of the scale. Moreover, the identified CSFs are not equal. Thus the future study will rank them and prioritize all those factors in different contexts. Thanks to this future research, a limited number of factors influencing and securing the most successful of e-government adoption will be indicated. They will show areas in which satisfactory results ensure successful adoption of e-government. It can be assumed that the CSFs for e-government projects at the local levels of government will be different than at the state level of government. Moreover, the empirical observations show that the CSFs vary depending on the size of government units. All those conjectures will be examined in the future study.

Another limitation of this study is the fact that it only considers the critical success factors leaving apart many other research issues of e-government adoption. There is also a need to conduct more in-depth research on e-government, especially into: (1) improving government processes by using government process management and ERP systems, (2) providing e-government services at the highest level of maturity, (3) exploring "best practices" to be used to adopt e-government successfully, and (4) investigating "demand-side" of e-government from the viewpoint of citizens and businesses view. All these concerns should be carefully considered and assimilated in the future works.

Acknowledgements

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Participation and Data Quality in Open Data use: Open Data Infrastructures Evaluated

Anneke Zuiderwijk and Marijn Janssen
Delft University of Technology, Delft, The Netherlands
a.m.g.zuiderwijk-vaneijk@tudelft.nl
m.f.w.h.a.janssen@tudelft.nl

Abstract: Infrastructures may improve the use of Open Government Data (OGD) by providing insight in how individuals can participate in data reuse and in the quality of open data. Yet, most OGD infrastructures do not support such activities. The objective of this paper is to evaluate the importance and usability of participation mechanisms and data quality indicators for open data infrastructures through quasi-experiments. A quasi-experiment is an experimental evaluation method in which researchers have control over the (non-random) assignment of participants to treatment and control conditions, the selection of control conditions and the organisation of the treatment, and over the measures. Moreover, quasi-experiments usually include a pre-test (i.e. a test before the treatment or control condition) and a post-test (i.e. a test after the treatment or control condition). The results of our quasi-experiments showed that the prototype of our OGD infrastructure improved OGD participation and data quality analysis by providing functionalities including discussion messages, social media sharing, linking items related to a dataset, Wiki descriptions and discussions, and data quality ratings and reviews. Participant observations showed that participants in the treatment group found it easier to conduct tasks with the prototype related to giving feedback on and discussing open data and rating and reviewing data quality than the participants in the control group. Our study suggested that participation mechanisms and quality indicators add value and improve the use of OGD. It recommends the implementation of such mechanisms and indicators in existing OGD infrastructures. To support the creation of transparency, citizen participation and innovation with OGD, our findings suggest that participation mechanisms and data quality indicators are a condition. Yet, these mechanisms and indicators are not sufficient for ensuring the generation of the OGD benefits, since there are still many factors which hinder the generation of these benefits. We discuss a number of these factors including factors related to OGD infrastructures and factors beyond OGD infrastructures.

Keywords: open data, participation, data quality, usability, experiments, infrastructure, social media

1. Introduction

Governmental organisations increasingly open their data to obtain benefits such as transparency (Bertot et al., 2010, Kassen, 2013), citizen participation (Conradie and Choenni, 2014) and innovation (Janssen, 2011). The literature indicates that the use of the Open Government Data (OGD) can be the starting point for democratic dialogues (Davies, 2010), and that data providers can use information about OGD use to make more informed future investment decisions concerning the supply of open data (Davies, 2010). Participation may take place by allowing citizens to contribute to discussions on how to better address their needs (Kassen, 2013). For instance, social media technologies allow for access to and interaction with government operations, programs and data (Bertot et al., 2012). Social media can be used to stimulate participation (Veljković et al., 2014) and to engage people in open data (Garbett et al., 2011). The quality of the data plays an essential role in the use of government portals (Detlor et al., 2013), and a certain level of data quality is critical for OGD use (O'Hara, 2012).

However, at present there is limited support for the use of OGD, while the use and the exploitation of OGD is required to obtain the envisioned benefits (Jurisch et al., 2015). Research on OGD in particular has confirmed that a first wave of OGD infrastructures mainly provides basic functionalities for uploading and downloading data (Alexopoulos et al., 2013, Charalabidis et al., 2014). Existing OGD infrastructures often lack opportunity for data users to participate in improving published data (Alexopoulos et al., 2013). Access on itself is not enough to generate active participation (Alani et al., 2008). The literature shows that participation in OGD use is limited, for example because conversations about released data are lacking (Lee and Kwak, 2012) and because many OGD providers do not know who their external users are (Archer et al., 2013). Users may also be concerned about the quality of open data (Martin, 2014). Kuk and Davies (2011) state that open data often suffer from poor quality, such as inconsistency in terms used in datasets and a lack of granularity. There is a wide variety in the quality of the released datasets (Auer et al., 2013, Kuk and Davies, 2011, Petychakis et al., 2014).

Citizen engagement through user participation and through the provision of high-quality data is considered to be important in open data use to accomplish benefits such as innovation and participation. However, there is hardly any research about the actual engagement effects. The objective of this paper is *to evaluate the usability of participation mechanisms and data quality indicators for OGD infrastructures*. This research uses quasi-

experimentation as the main research instrument to test whether the inclusion of participation and quality mechanisms results in improved OGD use.

2. User engagement functionalities

Participation can be defined as "including citizens in the process of forming the state", and citizens may propose directions for the development of state services and guidelines (Parycek and Sachs, 2010, p. 3). In other contexts it has been argued that a culture of participation through collaborative citizen and government networks may lead to participation in public agenda-setting and decision-making (Maier-Rabler and Huber, 2011). This may also apply to the OGD domain. Open data research generally suggests that participation mechanisms can be beneficial to OGD users. A diversity of participation mechanisms may affect the extent to which users can participate on OGD portals and the extent to which these portals can be used to engage in collaborative innovation (Sayogo et al., 2014). For instance, the analysis of feedback from OGD users can help in improving the procedures for newly publishing or updating datasets (Kucera and Chlapek, 2014), which may lead to continuous improvements to datasets of benefit to all future users of the dataset (Dawes and Helbig, 2010).

Furthermore, open data success strongly depends on the quality of released datasets (Behkamal et al., 2014). Information quality is determined by various indicators, such as accuracy, completeness, consistency and timeliness (Batini et al., 2009). Trust in the quality of datasets is critical for OGD reuse (O'Hara, 2012). However, the quality of data varies widely (Kuk and Davies, 2011, Petychakis et al., 2014). When the quality of OGD is low, open data users may be concerned about the quality of the data (Martin, 2014). Auer et al. (2013) emphasise the importance of generating strategies for assessing the quality of data published on the Web.

We propose that participation mechanisms and data quality indicators can assist in improving OGD use. To be able to evaluate the usability of participation mechanisms and data quality indicators, we developed a prototype of an OGD infrastructure which incorporates these mechanisms and indicators. Based on the literature and discussions with potential OGD users, various prototype functionalities have been implemented (see Table 1).

Table 1: Prototype functionalities investigated in this paper

OGD infra-structure element	Functionality	Functionality description
Participa-tion mecha-nisms	1. Discussion messages	Posting messages to discuss a dataset or to discuss conclusions based on data use (e.g. users can describe how they used a dataset and what they learned from this). For each message it is visible who posted it and there was some basic information about the background of the user
	2. Social media sharing	Sharing a dataset or findings from data use via social media (e.g. Twitter, Facebook, LinkedIn). OGD users and providers can inform each other about what they did with and learned from a dataset
	3. Submission of related items	Submit an item related to the original dataset (e.g. a publication that was written based on the dataset, a report about the data collection method or a visualisation or application of the dataset)
	4. Wiki descriptions and discussions	Using a wiki to describe and discuss OGD use in general. The wiki contains documentation and tutorials about how the prototype can be used to visualise and curate datasets
Data quality indicators	5. Data quality ratings	Viewing how other users assessed the dataset (i.e. viewing ratings of various quality indicators of the dataset) and rating the quality of the dataset
	6. Data quality reviews	Discussing the quality of the dataset by leaving a message or review in the data quality rating system, also visible to other OGD users

3. Evaluation methodology: Quasi-experiments

The evaluation aimed at examining the usability of participation mechanisms and data quality indicators. The following sections describe the quasi-experimental approach of this research, as well as the organisation of the quasi-experiments.

3.1 Quasi-experimental approach

Generally, experiments can be carried out to manipulate variables and to examine their effects on other variables (Campbell and Stanley, 1969). Experiments can be either *true experiments* or *quasi-experiments*. Quasi-experiments incorporate a treatment and a control group, a pre-test and a post-test, and a model that reveals the treatment and the control group effects over time, given no treatment effects (Kenny, 1975). They allow researchers to hold control over the selection and scheduling of measures, the non-random assignment of participants, the type of control group to compare the treatment group with, and how the treatment is organised (Shadish et al., 2002). Our experiments did not allow for randomly assigning participants to treatment and control conditions and thus we cannot refer to them as true experiments (Campbell and Stanley, 1969). We therefore performed quasi-experiments.

Figure 1 provides an overview of the variables involved in our quasi-experiments. The benefits on the very left side of the figure are outside the scope of our evaluations, because they are too high level to evaluate through observations. For example, transparency is a construct that needs to be measured through multiple variables. We decided to focus on more tangible variables, namely on the infrastructure elements. Yet, we will reflect on the high level benefits of transparency, participation and innovation in our discussion (section 5).
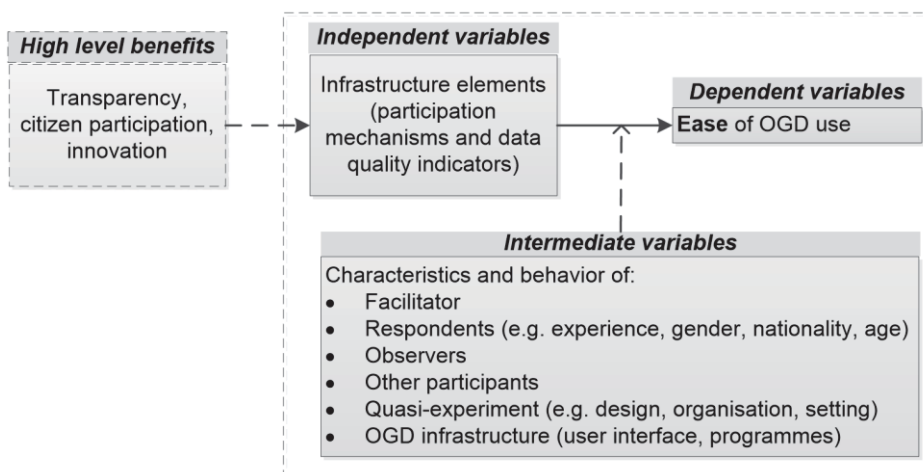
Figure 1: Overview of the variables involved in the quasi-experiments

3.2 Organisation of the quasi-experiments

In 2014 three quasi-experiments were conducted with 19 third year Bachelors students, 72 first year Masters students, and 36 professional open data users. Each quasi-experiment took 95-100 minutes. Participants of the first and second quasi-experiment were randomly divided in a treatment group (i.e. a group that used the designed prototype) and a control group (i.e. a group that used a control OGD infrastructure) (see Figure 2). The participants from the third quasi-experiment were not split into two groups because the size of this group did not allow for this. In the first and second quasi-experiment the participants were provided with two different infrastructures to test the effects of the introduction of participation mechanisms, and data quality indicators. The other conditions for the treatment groups and the control group remained as equal as possible. The control OGD infrastructure did not provide participation mechanisms. The control OGD infrastructure did provide rates about quality aspects of datasets (e.g. about the completeness of the data and the format that is was provided in) for a number of datasets. There was no possibility to write a free-text review about the quality of the data or for which purposes it could be used. In both the control and the treatment condition in all quasi-experiments most participants were male (71,7% males in total). The average age of the 120 participants who provided age information was 27,9 years, ranging from 20-65. Most quasi-experiment participants (62,2%) were Dutch.
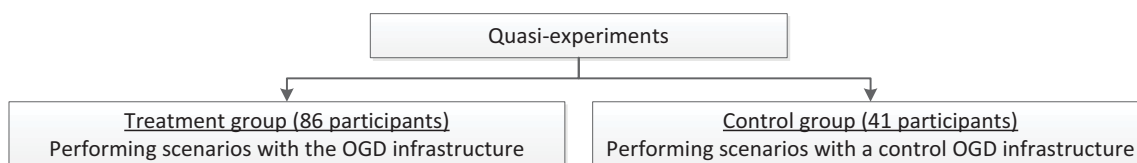
Figure 2: Structure of the quasi-experiments

All three quasi-experiments comprised a practical session in which the participants worked with the OGD infrastructure by conducting the same scenario tasks. The quasi-experiment participants received instructions in advance. A pre-test (a survey) was carried out to measure various background characteristics of the participants, as well as their experience with OGD use. Subsequently, the participants completed scenario tasks to evaluate the infrastructure functionalities, as well as a second survey about the difficulty of these tasks. While the participants completed the scenarios tasks, time measures and observations were used to obtain additional information. An observation protocol was developed, provided to the observers, and explained to them in a training session. To structure the observations and make the observers focus on the infrastructure functionalities, observers were provided with a semi-structured observer survey. Then a post-test (the third survey) was conducted to measure whether the OGD infrastructure had influenced to which extent the scenario tasks could be completed. This paper discusses the results from the observations.

4. Measuring OGD use: Findings from the observations

In this section we describe the results from the participant observations, which were used to investigate to which extent participation mechanisms and data quality indicators influenced the ease of OGD use. Observers were asked to assess the ease of conducting the scenarios by the participants of the quasi-experiments. Table 2 gives an overview of the assessment of the quasi-experiments by the 18 observers. In general it was found that the observers believed that the control group participants found it more difficult to conduct the scenarios than the treatment group participants. We elaborate on the findings from the observations in the following sections.

Table 2: Assessment of the ease/difficulty of the scenarios according to the observers (the numbers represent the number of observers).

		Very difficult or difficult	Not difficult, nor easy	Easy or very easy
Scenario: OGD participation	Control group (students)	4	0	0
	Treatment group (students)	0	3	3
	Treatment group (professionals)	0	0	7
Scenario: OGD quality analysis	Control group (students)	4	1	0
	Treatment group (students)	1	0	5
	Treatment group (professionals)	0	0	6

4.1 Observations of OGD participation scenario

The OGD participation scenario encompassed giving feedback on and discussing data use. Participants of the quasi-experiments could post messages, discuss data use on social media and a Wiki and submit an item related to the original dataset (e.g. an improved or extended dataset). The observers of the control group observed that it was difficult or very difficult for the participants to use the control infrastructure for these purposes. The observers of the control group wrote that "*participants found it quite difficult […] and they gave up too quickly*". The observers of the treatment group of students observed that it was easier for the students to conduct the participation scenario. Most of these participants could find the functionalities that they needed to participate in OGD discussions, although it still took them some time: "*they are trained to form opinions but taking the task seriously they took time to formulate their opinion well*". One observer mentioned the difficulty for the students in the treatment group to find the Wiki: "*the students can easily find the discussion under the selected dataset, but it is difficult for them to find a forum or Wiki related to the dataset*". The observers of the treatment group of professionals all stated that the participants found it easy or very easy to conduct the participation scenario ("*it's really easy for them to look at other people's comments under the specific dataset*"). The professional OGD users may be more trained to participate in OGD use and to formulate their opinion regarding various aspects of the dataset.

4.2 Observations of OGD quality analysis scenario

The subsequent scenario concerned the analysis of OGD quality through ratings and reviews. Participants could view how other users assessed the dataset and they could discuss the quality of the dataset by leaving a message or review in the data quality rating system. The observers indicated that it was relatively difficult for the control group participants to conduct this scenario, as illustrated by one control group observer who said that "*all of them could not finish the tasks*". Another control group observer stated that "*only some of them saw the rating*

indexes. No one has been seen to leave a message". It was observed that it was difficult to use the control OGD infrastructure to rate and review the quality of open datasets. On the other hand, the observations showed that the student and professionals of the treatment groups found this scenario less difficult to complete. The observers of the treatment group wrote that this was an "*easy task for all the participants*" and that "*even the slowest participant did it in a few minutes*". Another observer mentioned that "*students find it easy to rate the dataset*". It was observed by all six observers of the treatment group of professionals that it was easy or very easy to use the developed OGD for data analysis purposes. While five other observers also mentioned that students in the treatment group found it easy or very easy to use the developed OGD for data analysis purposes, one observer indicated that the observed students found this difficult or very difficult. It is not clear why this observer disagreed with the other observers of the student and professional treatment group.

4.3 Observations of intermediate variables

Various intermediate variables were investigated through the observations. Intermediate variables can be defined as variables which might influence the effect of the independent on the dependent variables (Pearl, 2001), yet it is not clear whether this influence actually exists and what its nature is. The observers were asked to which extent they believed that various other intermediate variables besides the elements of the infrastructure may have influenced the difficulty or ease of performing the scenario tasks in the quasi-experiments. We first discuss the intermediate variables observed by the observers of the control group, followed by those observed in the student treatment group. Thereafter, the observation of intermediate variables in the professional treatment group is discussed. Finally, we discuss intermediate variables for all three groups.

First, out of the five observers of the control group, four wrote that the performance of the control group had negatively been influenced by the user interface. It was mentioned that the user interface of the control infrastructure was not user friendly and could be improved. Furthermore, two observers wrote that some of the observed participants might have been influenced slightly by the observers, since it was visible to the participants that they were observed. Four observers wrote that some participants may to some extent have influenced other participants, and one wrote that previous experience had influenced their performance ("*their previous experience was important*"). Moreover, one observer wrote that the setting may have influenced the performance of the participants because it was difficult for some participants to see the screen with instructions, although these participants could still hear the instructions as presented by the facilitator of the quasi-experiments. Finally, one observer wrote that the temporal unavailability of the server of the control group had frustrated some participants. No influence was observed from the facilitator, the nationality of the participants or the organisation of the quasi-experiment.

Second, intermediate variables were investigated for the student treatment group. All six observers of the student treatment group wrote that the difficulty or ease of performing the scenarios had been influenced by the user interface ("*I believe that the ease and the simplicity of the user interface played a major role*"). This finding indicates that the usability of the OGD infrastructure may not only be the result of the infrastructure elements, but that the user interface also plays an important role. Since the observers of the control group also found that the user interface could negatively influence the usability of the infrastructure, it is important for OGD infrastructures to devote sufficient attention to the development of the user interface. Two of these six observers of the student treatment group wrote that some participants might have been influenced slightly by the observers, since the participants could see that they were observed. Two observers stated that some participants may to some extent have influenced other participants, as some asked each other questions. Two observers wrote that the nationality of two participants may have made it slightly more difficult to conduct the tasks for non-Dutch participants, which may have been caused by the fact that the participants had to reuse a dataset (in English) that concerned Dutch elections. One observer stated that some noise of participants who had finished the quasi-experiment may have influenced the performance of other participants who were still working on the scenarios. It was observed that the organisation of the quasi-experiment was clear to almost all participants. One observer said that "*one person didn't understand some instructions*", while other observers stated that there was no influence from the organisation of the quasi-experiment at all ("*everything was well-prepared, participants were not distracted by unclear aspects*"). No influence was observed from the facilitator of the quasi-experiment, or the experience of the participants in the student treatment group ("*their e-skills are so high, they immediately got used to the interface*").

The third group that was observed in the quasi-experiments included the treatment group of professional OGD users. Out of the seven observers of the professionals treatment group, five wrote that the difficulty or ease of performing the scenarios had been influenced by the user interface. This observation confirms the observations of the participants of the control and the student treatment groups, and it shows the importance of paying considerable attention to the user interface to improve OGD use. Moreover, three observers wrote that the participants' experience had influenced their performance ("*more experienced participants performed better and faster*"). This finding suggests that OGD use can be improved by training potential users, so that they obtain experience with the use of OGD infrastructures.

Two observers stated that there had been a slight influence from the facilitator at the end of the quasi-experiment with professionals after the facilitator had announced that time for conducting the scenarios had almost passed. This had resulted in rushing through the final scenario by some participants. Some observers said that older participants worked more slowly than younger participants. There were no significant differences observed between males and females who participated in the quasi-experiments. In addition, no influence was observed from the nationality of the participants or the setting of the experiment. Almost no influence was observed from the organisation of the quasi-experiments ("*Well-structured organization. No guidance questions from the participants*"). No influence was observed from the observers in the treatment group of professionals, and only one participant was found to be influenced by other participants. In all quasi-experiments the computers were separated by partitions, so that all the participants had their own work place and it was difficult for them to see what other participants did on their computers. This stimulated working individually.

Finally, the infrastructure also contained functionalities that were not described in this paper. For instance, it was also possible to visualise datasets in charts and tables, and structured overviews of the metadata of each dataset were available to the infrastructure user. These other functionalities may also have influenced the ease or difficulty of conducting the scenarios.

5. Discussion and conclusions

The objective of this paper was to evaluate the usability of participation mechanisms and data quality indicators for open data infrastructures. Participant observations in three quasi-experiments showed that participants in the treatment group found it easier to conduct tasks with the infrastructure prototype related to giving feedback on and discussing open data and rating and reviewing data quality than the participants in the control group. The study suggested that the participation mechanisms and quality indicators add value and improve the use of OGD. We recommend the implementation of such mechanisms and indicators in existing OGD infrastructures.

This paper started with the statement that OGD are often released for the reason to stimulate benefits including transparency, citizen participation and innovation. The findings of this study suggested that participation mechanisms and data quality indicators are essential to support transparency, citizen participation and innovation with OGD. Without participation mechanisms it is not possible for OGD users and providers to discuss what can be learned from the use of certain datasets, and OGD users cannot give feedback on datasets or data reuse. Without indicators of OGD quality, potential data users do not know for which purposes a dataset can be used, and they may be reluctant to actually use the dataset.

Nevertheless, participation mechanisms and data quality indicators are not sufficient for ensuring the generation of transparency, citizen participation and innovation. Various other factors hinder the generation of these benefits. Some of these hindering factors concern other infrastructure functionalities. For example, OGD infrastructures also need to provide insight in the context in which datasets have been created and sufficient contextual metadata needs to be provided to OGD users. While the literature postulates that it is essential for the correct interpretation and use of open data to offer sufficient metadata simultaneously to data (Braunschweig et al., 2012), metadata provision for open data is often cumbersome (Martin, 2014, Dawes and Helbig, 2010). Another infrastructure barrier concerns the lack of tools to search, analyse, visualise, mine and otherwise obtain understanding of open datasets. OGD users can be supported through integrated adequate and context-relevant knowledge processing tools and resources (Charalabidis et al., 2011). However, most traditional open data infrastructures provide only basic data download and upload functionalities (Alexopoulos et al., 2013, Charalabidis et al., 2014). There is a lack of tools to generate information that can easily be understood by the general public (Novais et al., 2013).

Infrastructures have large potential to support OGD access and public debate (Charalabidis et al., 2011), and they may be improved to remove the above-mentioned barriers. At the same time there are also barriers which do not relate to OGD infrastructures but to other aspects. Such factors, for example, relate to the lack of availability and access to the desired datasets. The release of OGD is challenging, and OGD infrastructures cannot fully support the internal decision-making processes that need to take place within governmental organisations before their data are disclosed. While some researchers have proposed guidelines and decision-support for releasing governmental data (e.g., Zuiderwijk et al., 2014), data publishers still need to handle obstacles related to threats of privacy violations by releasing data, of being legally liable when disclosed data are misused (Kalidien et al., 2010, Kulk and van Loenen, 2012), and of potential misinterpretation and misuse of their datasets (Conradie and Choenni, 2014, Kucera and Chlapek, 2014). Datasets that are desired by potential OGD users may not be available or accessible.

OGD infrastructures can be improved further to enhance their usability and to stimulate the high-level benefits such as transparency, innovation and participation. In addition, other factors which hinder the realisation of OGD benefits need to be addressed. Transparency, participation and innovation require an integrated approach towards removing OGD barriers, and factors including those related to infrastructures (including participation mechanisms, data quality indicators and metadata), decision-making processes, availability and access to data, usability and understand ability need to be addressed.

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PhD Research Papers

E-Procurement: A Tool to Mitigate Public Procurement Fraud in Malaysia?

Khairul Saidah Abas Azmi[1] and Alifah Aida Lope Abdul Rahman[2]
[1]Essex Business School, University of Essex, UK
[2]School of Architecture, Computing and Engineering, University of East London, UK
ksbaba@essex.ac.uk
u1220872@uel.ac.uk

Abstract: The major aim of this paper is to explore and analyse the views of Malaysian public officials on how e-Procurement helps mitigate procurement fraud. Inevitably, government activities have an intertwined relationship with the private sector manifested in the implementation of activities such as acquisition of works, supplies and services. While it is fully legitimate for private enterprises to bid for public works, in many cases there is inappropriate granting of public money to non-qualifying private business in a fraudulent manner. Concerns about public procurement fraud in Malaysia have been of practical significance for massive public spending and great deficiencies among various government departments. The visibilities of fraud losses in the public sector have undermined the delivery of public services. Decrease of fraud can improve the country's growth in terms of infrastructure, by providing facilities to improve healthcare and education, to combat poverty, and to fund security and defence. The prevalence of public procurement fraud has eroded public confidence of political and economic institutions. The implementation of E-Government has transformed the public service into a dynamic and diverse environment for government activities. Electronic Procurement (e-Procurement) can be used as a tool to mitigate fraudulent activities in public organisations. In other words, e-Procurement is one way of mitigating public procurement fraud in Malaysia by ensuring accountability, transparency and the achievement of best value for money contracts. In this study, the oral history technique via in-depth interviews and documentary analysis using a political economy approach are employed. We examine how e-Procurement is infused with power relations of dynamic institutions, various vested interests and public-private interactions. This study shows how e-Procurement helps to alleviate fraudulent activities in the Malaysian public procurement and it has a number of practical implementations and contributions. The experience and views on e-Procurement by Malaysian public officials can facilitate policy makers, enforcement agencies and researchers in understanding how to mitigate public procurement fraud using an automated and online environment. However, this study also concludes that e-Procurement is just a 'tool' to moderate public procurement fraud, not the solution to this problem.

Keywords: e-procurement, public procurement, fraud, public-private organisations, Malaysia

1. Introduction

Concerns about fraud in public procurement have been of practical significance for massive public spending and deficiencies among various public organisations (Caulfield, 2014). In many countries, public procurement has devoted a large share of public funds to procure necessary goods, services and works to deliver public services. According to OECD, public procurement accounts for 15% of GDP in OECD's countries and for a higher percentage for many non-OECD 's countries (OECD, 2007). Rooney (2007) revealed that government contracts have attracted long-term business opportunities which are vulnerable to bribery between state officials and businesses. The World Bank estimated that $200 billion was spent on the bribe fees in order to seal public procurement bids (World Bank, 2004). Comparatively, the World Economic Forum in 2005 provided the frequency rates of bribery in public procurement in various countries: OECD (15%), East Asia (58%), South Asia (70%), Sub-Saharan Africa (60%), former Soviet Union (50%) and Latin America (58%) (OECD, 2008). As fraud in public procurement has affected a big portion of many government contracts, transparent and accountable procurement practices are needed so as to prevent fraud and corruption and promote integrity. The introduction of e-Government through e-Procurement which aims to provide efficient evaluation of bidding in a faceless environment and with less human contact is just a 'tool' to mitigate public procurement fraud.

The emergence of information and communication technology (ICT) has made Electronic government (E-Government) a platform in order to increase efficiency and effectiveness of the public-sector service delivery. The technological push for implementing e-Government is paralleled to transform public organisations through the ICT with increased collaboration between business agents and the government. According to Mansor (2008), reasons for the implementation of e-Procurement in Malaysia are driven from the ICT's evolution in order to: (1) ensure continuous supply of products and services, (2) achieve best value for money, (3) encourage local industries growth, (4) encourage technology of transfer and (5) encourage alternative sources. As a result, e-Procurement is introduced to facilitate the acquisition of works, supplies and services for both government and suppliers in an on-line environment (Vaidya et al., 2006). The adoption of e-Procurement can support and

facilitate more accountability and transparency in all government procurements. E-Procurement is perceived to mitigate fraud and corruption in public procurement by slashing opportunity at every level of procurement system by using ICT (Neupane et al., 2012).

In order to improve public service delivery, the Malaysian government has welcomed the initiatives for e-Government in many of its operations. The launch of e-Government under the Multimedia Super Corridor (MSC) in 1997 aimed to achieve the goals of Vision 2020. The first step taken for the improvement of government purchasing concerns the implementation of electronic procurement (E-Procurement). In the Malaysian context, scholars have addressed the implementation of e-Procurement as an electronic acquisition of goods and services in both in the public and private sector. Some scholars have focused on the innovation of e-Procurement (Mansor, 2008), the adoption of e-Procurement (Kaliannan et al., 2009a; Kaliannan et al., 2009b; Kassim and Hussin, 2013) and others focused on the transparency of public bidding (Alaweti et al., 2013). A considerable number of scholars have quite recently also addressed the expanding role of e-Procurement in Malaysia to combat fraud and corruption (Haron et al., 2013; Othman et al., 2009; Othman et al., 2011). Nevertheless, these scholars have not provided evidence on how e-Procurement in Malaysia can help to mitigate fraud and corruption in the Malaysian public sectors. Therefore, this study aims to explore and analyse the perspectives of Malaysian public official on how implementation of e-Procurement helps to reduce public procurement fraud in Malaysia.

This paper is divided into four sections. In the first section we review the literature on e-Procurement and public procurement fraud in order to find and address the links between them and to provide a framework for this study by using a political economy approach. The second section briefly describes our research methodology and provides justification for it. The third section provides the results and a discussion on our key findings from the implementation of e-Procurement to mitigate fraud. The final section concludes the study and provides suggestions for future research.

2. Literature review

The use of ICT in government departments has transformed many public services (West, 2004). The development of ICT has inspired the implementation of e-Government in the public office. The increasing effort in implementing e-Government in various government departments has a good impact on increasing public service delivery. Scholars have provided evidence on the use of the internet in speeding up public services (Boyer et al., 2002; de Ruyter et al., 2001), in creating opportunities for cost reduction (Davila et al., 2003), and in promoting transparency and accountability (Bertot et al., 2010; Krishnan et al., 2013). Generally, the implementation of ICT in government purchasing using e-Procurement has been widely applied to procure goods and services (Davila et al., 2003).

E-Procurement involves procuring goods or services via electronic means (Moon, 2005). In their seminal work, Malone et al. (1987) list the merits of IT purchasing: reduction of costs, higher market transparency and better coordination and collaboration. Comparatively, Barbieri and Zanoni (2005) illustrated that e-Procurement engages its users to employ ICT at all levels of the procurement cycle including selection of sellers, control over ordering supplies, purchasing, payment, receipts and reviews after procurement process in the electronic marketplace. Thus, the mechanisms of e-Procurement to increase transparency and accountability for many government contracts have to some extent been designed with the aim of curbing fraud and corruption activities.

The complexity of the procurement system in the pre-contract, contract and post-contract phase makes it vulnerable to fraud and corruption (Heggstad et al., 2010). Inevitably, the process in rewarding a contract is influenced by power relations of political and economic institutions whose aim is to sustain the status quo (Demski and Magee, 1992; Rose-Ackerman, 1999). Rose-Ackerman (1999), who examined corruption and government contracts, discussed the influence of the bargaining power of the parties involved to win major contracts and concessions. Another study by Della Porta and Vannucci (2007) in Italy showed that senior politicians, business elites, and bureaucrats constantly interfere with procurement processes. Auriol and Blanc (2009) illustrated that the privatisation of public utilities in Africa is designed to benefit the ruling elite and wealthy people at the expense of the wider public. Parallel to this, fraud in public procurement is entrenched with vested powerful interests groups (Bakre, 2010).

At the same time, public procurement fraud describes a relationship between the state and the private sector. The fact that the interactions between public and private organisation in order to procure goods and services are legitimate seems just a myth since the relationship public and private organisations hold mainly works to secure private interests (Amaral, 2008; Auriol and Blanc, 2009; Bjorvatn and Søreide, 2005). E-Procurement is a mechanism for a transparent evaluation and selection of the winner for a government contract and it is seen as a way to fight against dominant power relations, and the influence of vested interests within public-private interactions (Neupane et al., 2014).

The use of online technology for government procurements (e-Procurement) aims to reduce face-to-face interactions and thus increase market transparency, build trust, and keep away from fraud and corruption (Neupane et al., 2014; Vaidya et al., 2006). Neupane et al. (2014) listed numerous potential benefits of e-Procurement including, "standardising and monitoring procurement, increasing transparency, reducing personal discretion in purchasing decisions, enhancing fair competition amongst bidders, avoiding human interference, and maximizing value for money" (p.23). E-Procurement obviously means fewer human interactions and it also enhances competition which helps to reduce the amount of personal decisions taken in relation to rewarding government contract. Therefore e-Procurement is an important tool to reduce the risk of fraud and corruption in public offices and this study aims to provide insights on how its implementation can be used as a 'tool' to mitigate public procurement fraud in Malaysia by using a political economy approach which is a 'novel' theoretical framework in the field of e-Procurement studies.

3. Methodology

This study employed a political economy approach in order to investigate on how e-Procurement in Malaysia helps to mitigate procurement fraud in the Malaysian public sector. The study used two methodological tools, the oral history method and relevant documentary evidence about the implementation of e-Procurement.

To start with the oral history method, 12 in-depth interviews of regulators who are public procurement officers in various government agencies were conducted (due to sensitivity of the research, the government agencies are not exposed). The oral history method was employed in order to give the 'hidden and unheard voices' of procurement officers a chance to be heard and explain how they handle a procurement process as part of their daily routine jobs. According to Howarth (1999), the oral history technique aims to bring out any untold stories and give recognition to the participants' views and perspectives on a hidden subject. This research documented the participants' experiences (if any) of public procurement fraud through subjective meanings and narratives analysis. This technique is suitable for this research because it allows the interviewees to tell their story about procurement fraud and address issues which are 'sensitive' issues and normally hidden. The oral history technique is also suitable for this study because the participants had worked in the Malaysian public sector for minimum of 5 and a maximum of 30 years and as such it is assumed that they have a lot to say about the matter. Therefore data from the in-depth interviews sheds light on the uniqueness of people's life stories (Abrams, 2010).

This study used the 'purposive snowballing' approach so as to find willing participants to discuss public procurement fraud in Malaysia. As Ritchie et al. (2014) explained, a snowballing technique is useful and it involves asking people who have already been interviewed to recommend other people who are suitable to answer the interview questions. In a classic snowball sampling description by Goodman (1961), it is stated that 'each individual in the sample is asked to name different individuals in the population…each individual may be asked to name his 'best friends' or 'individuals with whom he most frequently associates' (p.148).

Christopoulos (2009) provides evidence that a snowballing technique helps to gather expert professional knowledge that is often considered confidential, sensitive or privileged in a hidden public domain. Christopoulos (2009) shows the case study of expert survey through Peer Esteem Snowballing (PEST) which explores hidden and sensitive issues narrated by authoritative and reliable key informants. The challenging task is to find and approach willing expert participants to discuss the very sensitive topic that is the focus of this study. It is assumed that the experts are more likely to give reliable and valid information about the subjects in which they have 'explicit' expertise (Dorussen et al., 2005). Therefore, the purposive snowballing approach helps reveal and access the next reliable expert through a chain of nominations and re-nominations.

The data was transcribed, translated and analysed using thematic analysis. The thematic analysis was used to analyse the rich data from the in-depth interviews technique. The technique involves capturing the most common themes by coding and creating a template of sub themes and then combine them with other themes that are relevant (Braun and Clarke, 2006; Guest et al., 2012). This is a highly flexible method because one is able to modify, add or withdraw and establishing new themes when needed.

Apart from the oral history method via in-depth interviews, the other method used in this study involved analysing relevant documentary evidence about the implementation of e-Procurement in Malaysia. The document analysis adopted for this research aimed to find public resources that can be used as reliable sources of evidence (Easterby-Smith et al., 1991). Myers (2009) argues that an analysis and interpretation of qualitative data such as documents can be incorporated with the interviews data into forming similar themes. Thus, interconnected meanings of various methods of data analysis can give a thick description about a social phenomenon (Holliday, 2007). Documentary and archival evidence shed light on the initiative by the Malaysian government to curb fraud in public procurement through the employment of e-Procurement. These secondary documents and archival records involved publicly available records. Examples of relevant public documentations and regulations are: the Financial Procedure Act, the Government Contract Act 1949, Treasury Instructions, Treasury Circular Letters, and Federal Contract Circulars. These documentations have been mostly issued by the Ministry of Finance in Malaysia which is the leading agency for e-Procurement. Moreover, the public records also included government reports, newspaper articles, fraud charges and legal injunctions. A thematic analysis is also pursued for the analysis of this kind of data.

This research hopes to have made an important contribution by using the oral history technique, and by taking a political economy approach. The technique aims to obtain a subjective views and meanings about public procurement fraud in Malaysia and use these so as to help diminish public procurement fraud in the Malaysian context.

4. Results and discussions

Based on the in-depth interviews, the thematic analysis shows how e-Procurement mitigates public procurement fraud in Malaysia. The emergent themes highlighted political and economic forces interfering in rewarding contracts and public-private interactions.

4.1 Political and economic forces

The interest of political and economic forces in government procurement takes the form of fraudulent activities and corruption in the public offices (Rose-Ackerman, 1999). A number of previous studies showed the role of considerable political and economic forces and power relations in deviating the principles of transparency and accountability in procurement process (Dastidar and Mukherjee, 2014; Thai, 2009). For example, the protectionist policy which has been implemented in Malaysia to favour domestic companies has to some extent resulted to fraud and corruption activities. E-Procurement helps reduce the risk of abuse, fraud and corruption by giving transparent information from any bidders.

Regulator 4 argued that,

> *'E-Procurement helps by showing that only relevant bidders can bid for selective government contracts. If the bidders have not submitted all the relevant requirements to the system [for example they did not provide the Ministry with the hard and soft copies of procurement documentation], we will automatically withdraw their application. This is clearly stated in all government purchasing instructions and it is addressed to all bidders in e-Procurement.'*

The ability of e-Procurement process to not be biased towards certain groups (from political and economic institutions) helps reduce the level of fraud and corruption in government contracts. Regulator 10 stated that,

> *'E-Procurement does not favour and it is not biased towards certain companies. We evaluate the companies based on the information they give to us - their financial conditions, their previous experience, their products and services and all other relevant matters. We do not have to meet them personally. There are fewer human interactions in this way and this process is thus less vulnerable to fraud and corruption.'*

Lastly, e-Procurement is able to cease political and economic forces by advocating values for money for any government projects. EBidding, as one of the beneficial models which has been developed in the e-Procurement system, provides a different way to procure goods and services with greater efficiency of the purchasing process. Regulator 11 said,

> *'I prefer to use EBidding for any procurement process in my department. The bidders need to give us their best value during the bidding time so as to get the contract. They do not know our budget for that contract. This system encourages open competition among the bidders. So at the end, those offering the lowest price will get the contract. During the bidding process, we clearly do not know whether any company has any links with any 'big cable' [from political and economic institutions] or not. I strongly believe that this helps for more transparent and value for money contracts in the government department.'*

In short, e-Procurement provides an avenue to alleviate any fraud and corruption activities in the government procurement. Public procurement fraud is mitigated through the implementation of the e-Procurement system which allows transparent transactions, value for money contracts and conducting one's work with the highest integrity. Political and economic forces cannot easily dispute with the e-Procurement system since it is an online interactive environment.

4.2   Interference in rewarding government contract

The decisions to reward government projects are subject to valuation by the procurement committee via a technical and finance committee. This committee is responsible for evaluating procurement documentations submitted by contractors based on the key principles of government procurement: (1) public accountability, (2) transparency, (3) best value for money, (4) open competitors, and (5) fair and equitable government procurement. In order to adhere to these principles, the committee members and procurement officers should not be influenced or accept interference from any parties for any decision regarding the award of a government contract. Thus, e-Procurement plays a role by effectively managing demands or interference in rewarding the government procurement.

Regulator 6 demonstrated his/her experience in handling e-Procurement via EBidding by saying,

> *'EBidding has saved me from any interference by others, whether these are my ex-bosses or the higher ranking officer. I can give them proof that the price they offered for an item was too high and that there was a cheaper price offered by another contractor. The system chose the lowest price offered by the bidders. At the end of the bidding process, the system shows us the winner. That's how the eBidding works.'*

However, many procurement officers did not deny having experienced interference in rewarding a government contract. They claimed that interference and exercise of influence mostly came from powerful groups with vested interests, including politicians, top bureaucrats and business leaders. To some extent, the decisions of rewarding a government contract to a non-viable company came from abuse of power in the public office. However, the evidence for abusing power within the state apparatus is not easily proven. Therefore, e-Procurement helps to safeguard the procurement officers from being a 'scapegoat' and alleged for fraud and corruption. This is confidently argued by Regulator 8 below.

> *'E-Procurement helps us not to be a scapegoat for any alleged fraud and corruption within the procurement process. The system is crystal clear in showing who is feasible and qualify to get the contract. The transparency and efficiency of the system can eliminate outside interference'.*

Any meddling in rewarding government project can be minimized by strictly adhered the e-Procurement in any government purchasing. The use of e-Procurement provides a 'barrier' for any broader spectrum of interference from any vested interest. Therefore, the rewarding of government contracts is advocating the key principles of government procurement.

4.3   Interactions between government and business

Inevitably, the nexus between government and business organizations is evidenced in many government purchases. The fact that it is legitimate for private enterprises to bid for public works has to some extent flourished fraud and corruption activities. The intimate relationship between the state and business organizations has opened up opportunities for fraud and corruption practices in relation to bidding government

contracts (McCampbell and Rood, 1997). By abusing their position in the public offices, business leaders with a closely-connected relation with some politicians and top bureaucrats can easily secure the government contract. Therefore, the intertwined relationship of government and business organizations is now affected by the usefulness of e-Procurement in mitigating public procurement fraud in Malaysia.

Regulator 5 discussed the interactions between public and private organizations for any government contracts.

> *'To comply with the needs of e-Procurement, a contractor must provide us their specialty and licence so as to prove that they qualify to do or supply the goods and services. For example, if we want to have a contractor with a specialised expertise to commence the government projects, they must be registered in advance with a special code in the e-Procurement system. We will definitely reject any applications that fail to fulfil any important requirements [for example, relevant and appropriate certificates of qualifications to do specialised work] for a specific contract.'*

The special code used in the e-Procurement process represents one imperative element employed by the contractors so as to satisfy the various government departments. The contractor cannot simply elude the e-Procurement system by having a closely connection with those in power as the system requires them to register the product and services which they are specialized in. As a result, the e-Procurement system is able to restraint public procurement fraud in Malaysia in the interactions between public-private organisations.

The interactive online environment implemented by the e-Procurement provides a platform to improve public service delivery and offer quality of interactions among citizens and business actors. This internet-based practice aims to transform the traditional manual procurement system to procure goods and services from various suppliers and conduct everything electronically. In that sense, various suppliers have the opportunity to offer their products and services to a broader range of buyers in the government agencies. Without commitment from and adoption of the e-Procurement in government purchasing by government agencies and suppliers alike, the e-Procurement cannot reach its fullest potential and provide the benefits of the automation to the entire procurement cycle.

Regulator 7 strongly suggested that,

> *'The implementation of e-Procurement helps the government agencies and businesses interact efficiently and effectively in a faceless environment. I believe that criteria [i.e., the automation of the system and its faceless environment] allow the e-Procurement to minimize the risk and abuse of fraud and corruption in any government procurement'.*

Therefore, the implementation of the e-Procurement system which requires the use of a special code for particular goods and services, and the adoption of electronic procurement between government and businesses is used to mitigate public procurement fraud in Malaysia.

5. Conclusion

Through the lens of the political economy approach this research sheds light on the dynamic of political and economic forces, interference in rewarding government contract and public-private interactions in the e-Procurement. The paper illustrated how e-Procurement can be used to mitigate public procurement fraud in Malaysia through the oral history technique via in-depth interviews with Malaysian public officials. Broad and rich mosaics of views on curbing public procurement fraud through e-Procurement have witnessed practical implementation and contributions for policy maker, enforcement agencies and researchers. As a result, the political economy approach brings fruitful evidence to 'unpack' the praxis of e-Procurement in curbing public procurement fraud in Malaysia.

The paper has taken a qualitative approach in exploring the views and perspectives of Malaysian public officials of the aids of the e-Procurement to alleviate fraud in the public offices. A number of points have to be raised in future research regarding the use of e-Procurement as a tool to mitigate public procurement fraud. Different methods, for example quantitative or mixed-mode methods and different theoretical frameworks could be employed in future studies. It would also be beneficial to study a different set of settings (e.g. the private sector). Finally, more participants could be elicited for more robustness on the themes of the research. However, one need to bear in mind that e-Procurement is only a 'tool' employed to mitigate public procurement fraud in Malaysia. It is not the one and only way of fighting and eliminating fraudulent activities in the Malaysian public sector.

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A Conceptual Model for Examining Mobile Government Adoption in Saudi Arabia

Sultan Alotaibi and Dmitri Roussinov
University of Strathclyde, Department of Computer and Information Science, Glasgow, UK
sultan.alotaibi@strath.ac.uk
dmitri.roussinov@strath.ac.uk

Abstract: Recently, many governments have started to change the ways of providing their services, so they allow their citizens to access services from anywhere, without the need to go to a physical place of the service provider. Mobile government (M-government) is one of the techniques which fulfil that goal and adopted by many governments. M-government can be defined as an implementation of Electronic Government (E-Government), where mobile technology is used, with the aim of improving service delivery to citizens, businesses and all government agencies. Although M-government has emerged several years ago, these services are still in their early stage in developing countries in general, and in Saudi Arabia in particular. As any newly introduced concept into society, M-government is facing many difficulties in developing countries and not always accepted. There are many factors influencing the acceptance of M-government in developing countries, for instance the education level, the cost and complexity of use of technology, etc. Governments in developing countries, in general, and in Saudi Arabia in particular, are paying more attention towards the adoption of M-government services by its nationals. This could be done, for example, by considering criteria that help making mobile services easily accepted by citizens, for example by implementing services that are user friendly and that are adequate to citizen needs. *Our study is focusing on the adoption of M-government in Saudi Arabia.* Our research question is: "What are the factors which influence the adoption of M-government in Saudi Arabia?" Answering this research question will enhance the knowledge in this field, by developing a conceptual model for citizens' adoption of M-government. The developed model integrates constructs from the Technology Acceptance Model (TAM), User's Satisfaction, Perceived Service Quality, Perceived Mobility and Trust. The developed model will provide more knowledge to the field of m-Government, either on the theoretical or practical sides. Theoretically, this study aims to determine the variables that are influencing the user intention to use m-Government services. This is made by exploring the applicability of TAM and other external variables derived from the related literature, such as perceived trust, perceived Service Quality, perceived Mobility and user's satisfaction. Practically, our study will help decision makers in M-government projects, in general, and mobile service providers, in particular, to successfully implement M-government services. This is made by providing a better understanding of the variables of the TAM and other external variables. To answer our research question, mixed research methods will be used (qualitative and quantitative methods). The relationships between these constructs form the basis for the research hypotheses which will be tested using a quantitative research approach. Specifically, a survey will be used for gathering data from a sample of Saudi citizens and statistical methods will be used for analysing the quantitative data generated from the primary research. Also, the qualitative data will be used to analyse and assist in explaining and refining the statistical results obtained from the quantitative results, specifically by investigating the participants' views.

Keywords: e-Government, m-Government, adoption, model

1. Introduction

Various Information Communication Technologies (ICTs) are available and used in our daily life, including the Internet. This involvement of ICT has had many effects on the type and the quality of the services delivered to the citizen in different fields. The ICT helps expanding and fastening communication, so that it improves the collaboration between individuals, organizations and service providers. In public service delivery for example, the involvement of ICT has helped to move from bureaucratic paradigm to e-Government paradigm (Ho, 2002). As example of a paradigm shift from bureaucratic to e-Government is the move from documentary mode of service delivery into electronic exchange and from production cost-efficiency orientation to user-satisfaction and control (Ho, 2002).

M-Government emerged after e-Government, in which more ICT tools and techniques are considered. Several studies were centring on the nature of relationship between m-government and e-Government, asking a question if it is a replacement or a complementarity (Lallana, 2004). However, many researchers consider m-Government as a complementarity to e-Government (Lallana, 2004), especially because m-Government is founded on the same principles as e-Government, to which it adds some particular features that distinguish m-Government. These features can be summarized as follows:

- Mobile phones are always turned on, which will make it easy for the citizens to receive messages from government service providers at anytime (Lallana, 2004).

- Mobile phones became very efficient means of communication between people either in advanced or developing countries, rendering it a crucial part of their daily life (Lallana, 2004). Therefore, citizens might benefit from government services easily via mobiles.

- Mobile phones are used more and more to access the web. This might override the use of PC (Lallana, 2004), which saves time and displacement to home or to the physical place of the service provider.

- The main advantage of m-government for citizens resides in its mobility, which permits accessing to the network at anytime and from anywhere (Lallana, 2004).

- The economic situation of each country may limit its access to the internet. This limitation affects the availability of computers and the penetration of fixed internet, the basic constraints for e-Government, which will affect its deployment (Lallana, 2004).

Therefore, many governments are adopting both categories e-Government and m-Government, due to the characteristics of each of them, and which will benefit both sides the government and the citizen. Saudi Arabia is one of these governments that started exploiting the m-Government services in many of its ministries and institutions; so, this paper aims to develop a model which will integrate constructs from the TAM (Technology Acceptance Model) and other external variables derived from the related literature. It also presents the proposed methodology which will be used in this research

2. Literature review

In this section, various studies are be presented, which highlight the users' intention to use some services in different areas, mainly in m-Government, e-Government, mobile data services and 3G services.

The work made by Al-Hujran and Migdabi (2013) highlights the adoption of m-Government services in Jordan. Their study was based on the UTAUT model (Unified Theory of Acceptance and Use of Technology) that was extended by two components: trust and privacy. This study confirmed that trust, in addition to other factors such as performance expectancy and effort expectancy and social influence, were revealed to be a good predictor of citizens' intention to use m-Government services. However, the results showed that privacy was not a considerable predictor.

Li and Yen (2009) were interested in studying 3G services that they considered as a mobile technology; so, they developed a model to study users' perceptions on adopting 3G services. The developed model was based on (TAM) Technology Acceptance Model and on specific service quality factors that influence users' satisfaction. This model was evaluated on a collection of data that was retrieved from an online survey of 213 users of 3G services. The results of the study confirmed that users' behavioural intention to use 3G services was affected by satisfaction and trust. It was also shown that customization, usefulness and ease of use have a positive impact on user satisfaction.

In another study by Al-Hujran et al. (2013), the focus was made on exploring factors that might affect the citizens' adoption of e-Government services in Jordan. More specifically, a conceptual framework was developed based on the TAM model. This framework aimed to explore the links that exist between specific factors (trustworthiness, service quality and citizen satisfaction) and citizen adoption of e-Government services. As results of the study, it was proved that citizens' intention to adopt e-Government services was influenced by perceived usefulness, perceived ease of use, citizen satisfaction and trustworthiness. From another side, the study showed that citizen satisfaction was positively influenced by service quality.

The study of Faziharudean and Li-Ly (2011) was focusing on factors that affect consumers' behavioural intention towards using mobile data services. A questionnaire survey was made amongst the working population in Klang Valley, Malaysia in 2008. In this survey, there were 404 valid participants who were considered in the results. The findings showed that perceived usefulness, perceived enjoyment, perceived mobility, social influence and perceived ease of use had positively influenced consumers' intention to use mobile data services. Whilst media influence and perceived monetary value didn't have a significant effect.

Upon reviewing the previous studies, we would like to highlight the following points:

- The acceptance of e-Government in Saudi Arabian context was not yet sufficiently covered.

- The acceptance and use of m-Government services in Saudi Arabian was not yet sufficiently investigated.

In order to fill in these gaps, our study aims to conceive a model which explores service quality, satisfaction and mobility dimensions in m-Government context. This model should allow assessing user's satisfaction through perception of usefulness and ease of use, as well as service quality. Also, it will assess the user intention of using m-Government through user's satisfaction, trust and mobility.

2.1 Technology adoption theories and models

There have been many developed models which aim to study and investigate the factors that affect the usage of technology in a specific society. Amongst these models, there is the TAM (Technology Acceptance Model). This model is based on 5 constructs: Perceived usefulness, Perceived ease of use, Attitude towards use, Intention to use and Actual use. Some of these constructs are affecting others, for instance the construct "perceived usefulness" affects the construct "intention to use", and the construct "attitude towards use" has an impact on the construct "intention to use". TAM model was used in several studies (Li and Yen, 2009; Al-Hujran et al, 2013), and later adapted to various settings by introducing new constraints (Gefen et al, 2003), or editing the links between the existing constructs (Al-Hujran et al, 2013).

2.1.1 Technology acceptance model (TAM)

There are many reasons that reinforced our decision to choose TAM for our study rather than any other model. These reasons are mainly related to the characteristics of TAM which distinguish it from other models. TAM model is a widely credible model and used in many research studies (Shumaila et al, 2007). TAM is also regarded as a trustworthy empirically proven tool (Chen et al, 2007).TAM was used in many studies for evaluation of users' adoption for technologies, such as emails (Adams et al, 1992), electronic commerce (Gefen et al., 2003), electronic learning (Martins and Kellermanns, 2004), internet banking (Al- Sukkar and Hasan, 2005) and e-Government (Fu et al., 2006). From another side, it was proven in many studies that 'perceived usefulness' and 'perceived ease of use' constructs together have the ability to explain a big proportion of variance in "intention to use IT" (Shumaila et al, 2007). However, TAM is criticised for ignoring the construct 'social influence of technology adoption' (Fu et al., 2006), possibly due to the difficulty of measuring such construct and diversity of users.

3. Conceptual framework

The model adopted in this study consists in a TAM model that is extended by including four more components: perceived Mobility, perceived service quality, users' satisfaction and trust. The various components are detailed in the following paragraphs and in Figure1.
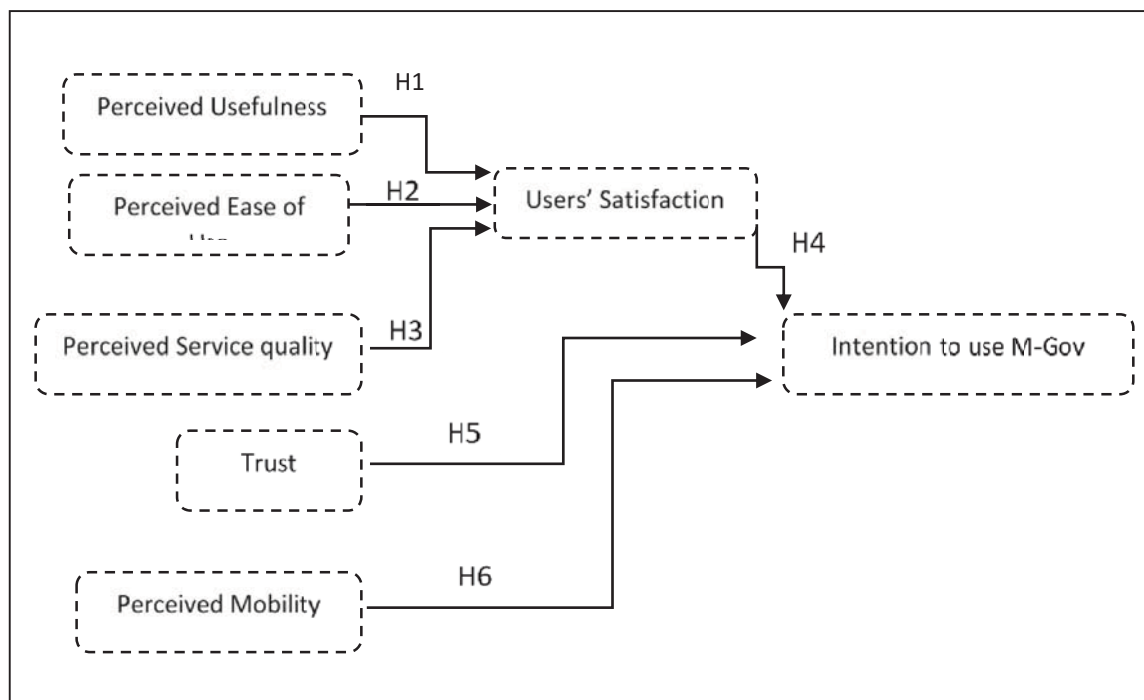

Figure 1: A conceptual model for examming Mobile Government adoption

3.1 Perceived usefulness

Perceived usefulness is one of the most significant constructs in TAM model. PU means that the user perception about potential benefits of using IT technology might generate a positive view about this technology, and thus leads to continuing using it (Davis, 1989). In the context of this study, PU is defined as the extent to which the users deem that they will benefit from the services of m-Government in their everyday life. The ability of user to connect to m-Government services should not mainly rely on time and location, which is known as service ubiquity. The ubiquity of services highlights the advantage of such mobile services. For instance, if citizens are aware that they have continuous access to a given service anytime they need it, then they will probably believe that the service will be beneficial for them (Revels et al, 2010). There will be a satisfaction about the service, which will lead to a continuation of using it. This usefulness of m-Government services will affect the user satisfaction. Therefore, the following hypothesis can be formulated:

> *Hypothesis 1: Perceived usefulness positively affects the user satisfaction.*

3.2 Perceived ease of use

PEU is one of the important components in TAM model and which influences the users' intention to use technology (Davis, 1989). In the context of this study, PEU is defined as the extent to which users believe that m-Government services will be easy to use and effortless (Revels et al, 2010). The complexity of use of technology has an impact on user satisfaction. From another side, when m-Government services are easy to use, then users will be aware of the benefits of using them; so, users time and effort will be saved, which usually affect their satisfaction about the service provided. Also, m-Government services that are user-friendly will influence their usage. Therefore, the following hypothesis can be made:

> *Hypothesis 2: Perceived ease of use positively affects the user satisfaction.*

3.3 Perceived service quality

Service quality is an important issue in electronic services environments (Yaghoubi et al, 2011), and in public sector in general as well. Service quality can be defined as the discrepancy that exists between the perceptions and the expectations of a consumer regarding the services he/she receives from a specific service provider (Parasuraman et al, 1988). Service quality studies help to improve the services delivered to citizens. This is mainly made by understanding citizens' needs and adapting the services to satisfy them (Kumar et al, 2007). Many studies have focused on the evaluation of service quality, e.g. in e-Government field (Horan et al, 2006). However, the SERVQUAL scale is one of the service quality evaluation systems which was developed by (Parasuraman et al, 1988). This evaluation system was extensively used in order to evaluate customer perceptions of service quality. This scale is used to measure the quality of a service in five dimensions: tangibles, assurance, responsiveness, reliability and empathy (Parasuraman et al, 1988). Of the five dimensions, only responsiveness, reliability and empathy are applicable to measure the electronic government service quality (Al-Hujran et al, 2013), so these dimensions will be used to measure the mobile government. Responsiveness concerns the perception of the user regarding the service provider and how responsive and helpful he is. Reliability means how accurately and dependably the offered service is performed. Finally, empathy refers to the interest and concern that a service provider shows to its customers. Services with a high quality will promote their usability by users, which leads to user satisfaction (Lai and Pires, 2010). Therefore, the following hypothesis can be formulated:

> *Hypothesis 3: Service quality factors (responsiveness, reliability and empathy) positively affect the citizen satisfaction.*

3.4 User satisfaction

If the user of a specific service is satisfied, then he/she will continue to use it in the future (Oliver, 1999). User satisfaction factor has an impact on long-term organizational success and system usage (Anderson and Mittal 2000; Oliver, 1999). User satisfaction can be defined as the perception of a pleasant fulfilment of a service (Oliver, 1999), or the extent to which users believe that the information systems available to them meets their information requirements (Ives et al, 1983). In the field of m-Government, user satisfaction is an important factor that affects the quality of delivered services, and thus will affect the intention of using m-Government services. In order to achieve this satisfaction, user's needs and perceptions should be taken into account (Lai and Pires, 2010). The study made by Wixon and Todd (2005) highlights the importance of integrating user

satisfaction literature with technology acceptance literature. Therefore, the following hypothesis can be assumed:

> *Hypothesis 4: User satisfaction positively affects the behavioural intention to use m-Government services.*

3.5 Trust

User trust is defined as a factor that determines the behavioural intention of users in uncertain environments such as in e-Commerce (Gefen et al, 2003). User trust is a very important and significant factor and thus should be taken into account in environments that have a high risk of insecurity, like ubiquitous environments (Min et al, 2008; Zarmpou et al, 2012). The trust factor was recently studied in the context of E-Government (Al-Hujran, 2012). The adoption of E-Government services by users is related to their belief of trustworthiness of the services and their delivery channel. This means that trust can be considered as an important factor that helps to predict the adoption of m-Government by users. This makes the following hypothesis:

> *Hypothesis 5: Trust positively affects the user behavioural intention to use m-Government services.*

3.6 Perceived mobility

Device mobility can be defined as its characteristic to handle information while in state of mobility (Hung et al, 2013). This corresponds to the use of m-Government services without relying on time or location, and without the need for a wired network (Hung et al, 2013). Either at home or in the office, the computer is likely to be the most relevant means to access to internet. However, the need for mobility emerges when the user needs to access to internet quickly, whilst he is travelling or being distant from home or office, which renders the perception of mobile service as useful. Perceived mobility refers to the extent to which mobile technologies can offer potential benefits. These benefits include communication, access to information and services and their availability anytime and anywhere. Mobility was considered in many studies as a crucial factor that influences the user's intention to adopt and use mobile services. However, the m-technology acceptance research did not allocate enough attention to the effects of mobility on IS adoption. Mobility characteristic of m-Government will increase the intention of the user to use m-Government services (Hung et al, 2013), which makes the following hypothesis:

> *Hypothesis 6: Mobility positively affects the user behavioural intention to use m-Government services.*

4. Proposed methodology

Quantitative and qualitative research methods were considered to be very efficient when they are jointly used in the same study (Hayati et al, 2006), especially because each of these two research methods will be answering a different kind of questions. Combining the two research methods within the same study is also known as "methodological triangulation" (Amaratunga et al, 2002). Mixing two different approaches, either in a single study or across studies, will help overcoming their weaknesses from one side and reinforcing their strengths from the other side (Johnson and Onwuegbuzie, 2004), so this kind of research methodology will be used in our research.

This research study will use two data collection techniques, i.e. quantitative research and qualitative research. The collection of data in the quantitative research will be based on survey questionnaires. These questionnaires will be written in Arabic and English languages to obtain maximum responses. The quantitative research will intend to answer quantitative questions (e.g. how many, how often, how much?, etc). The used survey technique will help in collecting participants' responses within a short period. It will also clarify any uncertainty in the answers (Cavana et al, 2001). In addition, there are other advantages of adopting surveys: their easy management, easy checking of values, relations and constructs of variables, help in comparing objectively responses of different groups of participants, exploring large number of opinions, etc (Stroh, 2000).

On the other hand, the data collection in qualitative research, will be based on semi-structured face-to-face interviews. These interviews will be conducted with a number of decision-makers that are engaged in m-Government services projects in Saudi Arabia. The qualitative research will aim to answer qualitative questions (e.g. why, in what way, what are the implications?, etc.). From another side, qualitative research will intend to collect rich information from few people only (Creswell, 2009).

This study will focus on adult Saudi citizens, living in Riyadh Region (representing 25% of Saudi population). According to Saudi statistic 2013, Saudi population is young and the proportion of people under 38 is 75% (Communication and Information Technology Commission, 2013). In this study, the university environments will be chosen as target audience for data collection. The reasons for this choice are:

- It is currently the largest social group.

- This group includes the most future users. Therefore, knowing their attitudes and perceptions towards m-government services will help decision makers to serve the largest number of people.

- University students are amongst the adult population for whom the internet and mobile have become part of their daily routine. This means that the majority of university students know about the Internet and mobile features which are required for the user of m-government services.

- To ensure access to a large number of students in normal classroom sessions and a higher completion rate at both reasonable cost and within a reasonable time frame.

- The academic and the administrative staff will be considered in this study as citizens, not as employees, and they will be asked to express their views as citizens not as government employees.

- The researcher has experience of working in Saudi universities for few years, this will help to ease access to data and increase the response rate of individuals likely to participate in this phase of the research.

Form these points, the survey questionnaires will be distributed to in all the universities which have female and male and owned by government in Riyadh: 1) King Saud University; 2) Imam Muhammad Bin Saud University; 3) King Saud Bin Abdul-Aziz University.

5. Conclusion

This study focuses on the model that we will develop, which will integrate constructs from TAM (Technology Acceptance Model) and other external variables derived from the related literature, possibly user's satisfaction, perceived service quality, perceived mobility and trust. The study also aims to determine the variables that are influencing the user intention to use m-Government (Mobile Government) services. This developed model will further knowledge in the field of Digital Government and will help the involved decision makers in general, and mobile service providers in particular, to successfully implement their services. This will be made by exploring the applicability of TAM, perceived trust, perceived Service Quality, perceived Mobility and user's satisfaction. To test this model, mixed research methods (qualitative and quantitative methods) will be used. About expected finding, from literature review, it will be proved that citizens' intention to adopt m-Government services will be influenced by citizen satisfaction, trust and mobility. The study will also test if citizen satisfaction is positively influenced by perceived usefulness, perceived ease of use and service quality.

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E-Service Adoption in Developing Countries With Instability Status: The Case of e-Government in Syria

Abraheem Alsaeed and Carl Adams
School of Computing, University of Portsmouth, UK
abraheem.alsaeed@port.ac.uk
carl.adams@port.ac.uk

Abstract: Governments consistently strive to improve their online services for citizens & businesses. Enhancing digital capabilities at different levels to provide benefits to all stakeholders. Despite the potential benefits that eGov brings to stakeholders, the level of adoption is still low in developing countries. In countries that face instability, eService is still necessary and governments face extra challenges in their provision, however, academic literature that covers transformational eGov activity in times of geopolitical instability is uncommon. Our aim is to address this gap in the literature by identifying factors that might affect the success of such implementation. We use the example of Syria and other developing countries facing similar challenges to tackle this problem. Our work stems from a literature review that focused on factors affecting the development of eService. The ten principles of reinventing government by Osborne and Gaebler were used to identify eGov enablers, also desk research method was used to identify challenges and barriers: from these we derived a novel conceptual framework in which we suggest technology-related strategies that may assist in the effective implementation of eGov for countries with instability status where the Syrian case was used.

Keywords: eGovernment, Syria, eService, barriers, enablers, framework

1. Introduction

According to United Nations (2010) eGov is "the use of ICT, and its application, by the government for the provision of information and public services to the people" . The ultimate benefit of implementing eService is to reduce the paper based public service and replace it with a digital one. (Alsaeed, Adams, & Boakes, 2014) defines eGovernment as a transformative agent upon political and civic activity, where eService involves the provision and use of information by all stakeholders; and thus has the potential to increase civic efficiency and transparency to promote public service delivery. Understanding to what degree e-Service meets the user's expectation under the citizen-centric approach is a fundamental base for efficient and effective implementation and development of e-government services (Hjouj Btoush, 2009). eGov has been recognized as a change agent for public sector reform. (Ebrahim, Irani, & Al Shawi, 2004) argues that through this change, eGov increasingly tries to build information-sharing and improve communication with other organization as well with the public. In this context several studies have discussed on how eGov can transform public sector organisations from traditional paper-based systems to electronic delivery. On the other hand Heeks (2001) states that increased efficiency, decentralization, increased accountability, improve resource management and marketization in the information age require more roles for information, information system and information technology in the process of changes . Where IT is considered to be reinvention and reinvigoration of public administration. As some governments are trying to lead this innovation some other countries seen it as an inevitable solution for public reform in better service delivery especially, countries have instability and going through changes, Syria as such country. The rest of this paper is organized as follows. Section 2 we discuss Research methodology; in Section 3 Literature Review; Section 4 finding and discussion; Section 5 we discuss our proposed contribution: the conceptual framework. Finally in Section 6 our conclusion.

2. Research methodology

Desk research has been adopted for this study where a critical review of wide collection of existing literature for the past fifteen years (2000 to 2015) on e-Government was established. We conducted a systematic review following guidelines suggested by Watson (2002). The need for a robust search method is driven by the number of published eGov articles for example a search made on Google Scholar for "eGov" keyword gives over 5,000 results. The process starts by searching different databases and academic papers, then selected relevant results. This process formed a loop as relevance feedback offered us an opportunity to improve our search strategy. Any suitable papers found were added to a database for later analysis. Initially a search services such as Google Scholar and Web of Science was used to gather articles related to keywords including: e.g. "E-Government, Syria, developing countries, barriers, enablers, eService " and filtered articles to include those relevant to years 2000 to 2015. At this stage the resources were insufficient to build research themes, however, key Journals and Conferences were identified e.g. European Conference on E-Government (ECEG) & the International Conference

on E-Government (ICEG) .Than a snowball method was employed to group articles by comparing their reference lists and examining particular paper's bibliographies: the relevance the result groups afforded the emergence of thematic classifications. Articles and themes identified in the Select phase were more formally organised in the Collect phase. To identify the most suitable papers for our criteria we used quality appraisal categories devised by(Scott, Ross, & Prytherch, 2012) with some enhancement: Credibility; the extent to which the data supports the conclusions, Transferability; the degree of reliable generalisation to other settings, Transparency; the explicitness of the study evaluation criteria and process and Suitability; the degree of suitable paper content to our criteria. The above search strategy includes the ten principles that have been suggested by Osborne and Gaebler (1992) to be used as a checklist and as an analytical tool to be applied to the most challenges problems facing the Syrian eGovernment implementation.

3. Literature review

3.1 Status of instability of the context

Syria become unstable country after the Civil War Started March 2011. According to the UNHCR (2012)more than two and a half million Syrian people have fled Syria to neighbouring countries to seek refuge and about 4 million Syrians were internally displaced because of the Syrian Civil War, more than 30,000 children in Lebanon borne without registered citizenship (UNHCR, 2014) , where the Lebanese government does not have the mechanism to issue any paper proof such as birth certificate to the born Syrian Refugee children.Unicef (2014) states the concerns for the Syria's children to become a lost generation and called for an immediate actions to prevent this disaster.Syrian people facing extra challenges of proving their entities in the housing countries, online Service provided by the Syrian eGovernment could make a different to those people this is just an example of the importance of implementing eService. However, and despite the benefits that e-Gov may offer, the implementation of eGov initiatives in most developing countries resulted in failure as reported by (Heeks, 2002) where it shows that 35% of eGov projects in developing countries are total failures, 50% are partial failures, while the remaining 15% are successes. Therefore a crucial steps to investigate about all factors lead to successful implementation of the Syrian eGov initiative is needed.

3.2 eGov of the context

Syrian's eGov initiative is still at a primitive stage by offering only static information about public services. The Syrian eGov strategy: "Enhancing Institutional Capacity for eGov Implementation" has been adopted as a five-year plan (2011-2015) and agreed with the United Nations Development Program (UNDP). (Syria Arab Republic, 2008) stats the goal of this project as "*to initiate the implementation phase of strategy through enhancing the operational capacity and the institutional framework for overall coordination of e-Gov initiative*. A step taken to initiate the implementation phase of the strategy as an executive team has been created comprising a *consulting* unit, a *monitoring and evaluation* unit, a *development and standardization* unit, and a *national eGov portal* unit and all units work under the provision of (and report directly to) the Syrian Prime Minister: their tasks are (a) to support and develop IT strategies, (b) to provide technical support, (c) to enable and nurture eGov best practice, (d) to provide a monitoring service and (e) to implement a communication plan (Syria Arab Republic, 2008). The main components of the eServices provided are online payment of electricity, water, and phone bills, civic, education and properties registration.

According to United Nations (2012) Syrian eGov has reaches its highest world eGov development ranking in 2012. Therefore, an improvement have been made since the adoption of the eGov strategy mentioned earlier. (Table 1) below illustrates the Syrian eGov ranking amongst Middle East Arab Countries between 2010 and 2012.

Table 1: United Nation eGovernment development survey 2012.

Country	eGovernment 2012	Rank 2012	Rank 2010	Rank Change
United Arab emirates	0.7344	28	49	+21
Bahrain	0.6946	36	13	-23
Saudi Arabia	0.6658	41	58	+17
Qatar	0.6405	48	62	+14
Kuwait	0.5960	63	50	-13
Oman	0.5944	64	82	+18
Lebanon	0.5139	87	93	+6
Jordan	0.4884	98	51	-47
Syrian Arab Republic	0.3705	128	133	+5

Country	eGovernment 2012	Rank 2012	Rank 2010	Rank Change
Iraq	0.3409	137	136	-1
Yamen	0.2472	167	164	-3

3.3 Review of enablers

The enablers review has been motivated by the ten principles suggested by (Osbome & Gaebler, 1992)that become later on as a guidelines for politicians to help for offering better service delivery and a way for society transformation. The following are the ten principles suggested by Osborne and Gaebler (1992)

1. Catalytic Government (steering rather than rowing): Catalytic Government is to bringing effective non-profits to be bigger, deeper, franchising successful models and offering broader services, its rules will not be to provide direct services but to create networks and leverage resources. Osborne and Gaebler (1992) explore the best kind of government that solves most of society's problems. They argue that different sectors of the economy (public, private, and non-profit) should provide the goods and services that each system produces best separately or as a collective effort. Government is best at providing policy, social equity, direction to the economy, and preventing discrimination. Private sector is best at providing quality goods and services and choices to consumer. The non-profit, "voluntary," or "third" sector is best at providing human services.

2. Community Owned Government (Empowering rather than Serving): Osborne and Gaebler (1992) include communities to be the main rule players in service delivery to improve government performance they argue that to push service control out of bureaucracy and place it in the hand of the community. For example, community-oriented policing, through which police collaborate with neighbourhoods has a positive effective in many ways. Osborne and Gaebler discuss how community members can add special knowledge and experience that professionals and bureaucrats do not have. Osborne and Gaebler (1992) strongly believe that, putting the service delivery out of the community into centralized bureaucracy weakening the communities as they aware of their affaires and problems more than other. However the rule of the government is making sour of the service exists and reaches the people who needs it and fitting the corruption if found and also to remove all barriers facing the community and encouraging them to take control of the service delivery.

3. Competitive Government (Injecting Competition into Service Delivery): Osborne and Gaebler (1992) believe in competition rather than regulation to improve the quality and the effectiveness of the government services and ending the government's monopolies. In the competition world the providers frequently try to keep their costs down, respond quickly to changing demands, and strive to satisfy customers. Osborne and Gaebler (1992) argue that Competition can actually boost morale among public sector workers, because they receive public recognition when they are successful. The governments has the responsibilities to create the market rules that ensure equity and monitor service providers so that they remain accountable for their performance.

4. Mission-Driven Government (Transforming Rule-Driven Organizations): Mission driven government means that each agency is responsible to implement a clear vision on its mission, than managers should be free to find the best way to accomplish that mission Osborne and Gaebler (1992) argue that public organizations should be driven by their mission, not by their rules and their budgets. In the mission driven government, organizations free their employees to pursue the organization's mission, resulting in systems that are more efficient, effective, innovative, and flexible. By simplifying the budget process, governments give employees the chance to focus on the important issues and give managers the autonomy they need to respond to changing circumstances and to create a predictable environment.

5. Results-Oriented Government (Funding Outcomes, Not Inputs): Osborne and Gaebler (1992) argue that governments have focused on inputs but ignored outcomes, and recommend results-oriented government, which call for new ways of measuring and rewarding outcomes. Managers in government that focuses on performance measure the quantity, quality, and cost of every service they deliver in terms of four categories; goals, community condition indicators, objectives, and performance indicators. This new system lead to eliminate many rules and to bring high productivity and lower costs. The authors suggest organizations that measure the results of their activities find that this information transforms them.

6. Customer-Driven Government (Meeting the Needs of Customer, Not the Bureaucracy) :usually government service derived by bureaucracy and often fail to meet customers need because the funding does not come from customers. The authors argue that government must make a greater effort to perceive the needs of customers and give them a choice of producers also government should give them a voice through methods such as surveys, customer contact, customer interviews. In putting in customer's hands vouchers and cash grants for example, government give them the choice of providers and the possibility for customers to choose the service that they

want. Therefore bureaucracy should be transformed from the old systems to new systems that are both user-friendly and transparent.

7. Enterprising Government (Earning rather Than Spending): Osborne and Gaebler (1992) describe how governments have used innovative methods to earn money that would otherwise need to be raised from taxes. Sale of land for development or of public services that only benefit some individuals, such as golf courses or marinas, are examples of ways government can raise money, charging user fees, making investments based on expected returns, turning managers into entrepreneurs, for example by reforming traditional budget systems to allow departments to keep the funds they save or earn or by giving managers access to capital that they could use for innovation purposes

8. Anticipatory Government (Prevention rather Than Cure): Anticipatory governments seek to prevent problems rather than delivering services to correct them. Osborne and Gaebler (1992) suggest that the anticipatory government require redesign budget systems, accounting systems, and reward systems to create the appropriate incentives. They have provided many examples where governments have incorporated mechanisms into their decision-making processes to plan for the future. Anticipating upcoming obligations and recognizing the impact of short-term decisions in the future builds yet another mechanism into the governmental decision-making process that will enable public institutions to be successful in pursuing their goals.

9. Decentralized Government (From Hierarchy to Participation and Teamwork): Decentralized governments means that transfer decision-making authority to those individuals who are in the best position to develop effective and innovative solutions to problems these individuals are usually at the bottom of the organizational hierarchy. Hence in a centralized system, knowledge accumulates at the top of an organization where decision makers are far from the reality. In the decentralized system Organizations become more flexible more effective and enables innovation where employees have some degree of decision making authority that improve commitment and morale which also leads to increased productivity.

10.Market-Oriented Government (Leveraging Change through the Market): Osborne and Gaebler argue that government can make a huge differences and have impact on the market, the Market-Oriented governments utilize a market mechanism instead of an administrative program to provide goods and services to the public, According to the authors that the government does not have the resources to fulfil all of the public's needs through central control but by steering the decisions and activities through restructuring the marketplace instead of attempting to directly control them through administrative programs by many methods such as : providing information to consumers, catalysing private sector suppliers, creating market institutions to fill gaps in the market, sharing risk, changing investment policy.

3.4 Review of barriers

Table 2: References reviewed from where barriers found between 2000 and 2013.

Year	Reference Found
2000	(Carroll & Swatman, 2000)
2001	(Blakeley & Matsuura, 2001)
2002	(Policy, 2002)
2003	None
2004	(Ndou, 2004)
2005	(Abanumy, Al-badi, & Mayhew, 2005) (Ciborra & Navarra, 2005) (Pons, 2005)
2006	(Alomari & Alomari, 2006) (Hassna & Ahmad, 2006)
2007	(Sallard & Alyousuf, 2007) (Awan, 2007)
2008	(Strachan, Wanous, & Mofleh, 2008) (Syria Arab Republic, 2008) (Gant, 2008) (Sethi & Sethi, 2008)
2009	(Almarabeh, Mohammad, & Abu Ali, 2009) (Azab, Kamel, & Dafoulas, 2009) (Chatfield & Alhujran, 2009)
2010	(Abu-shanab, Abu Al-rub, & Md Nor, 2010) (Almarabeh & Abu Ali, 2010) (Khan, Moon, Rhee, & Rho, 2010) (El-qawasmeh & Owais, 2010)

Year	Reference Found
	(Al-Shboul & Alsmadi, 2010)
	(AMER ALI. O. SWEISI, 2010)
2011	(Alsmadi, 2011)
2012	(Alanezi, Mahmood, & Basri, 2012)
	(Yesser, 2012),(Jait, 2012)
	(Farzali, Kanaan, Kanaan, & Atieh, 2012)
	(Hadi & Nawafleh, 2012)
2013	(Abdul Rahim & Al Athmay, 2013)
	(Al-khouri, 2012)
	(Altaany & Al-zoubi, 2013) ,(Kafaji, 2013)

The second component that have been reviewed is the challenges and barriers facing the implementation of the eGov in Syria, which have been done on carefully selected several papers, The table2 list all reviewed papers related to barriers in developing countries with the focus on Syrian context.

4. Finding and discussions

4.1 Enablers

Table 3 below shows the ten principles how would tackle common eGov problems in general and which one is supported in Syria.

Table 3: Applying transformation methods on the Syrian eGov problems

Transformation Method Osborne & Gaebler	Example of eGov problem	How the entrepreneurial government would tackle eGov problems.	Supported in Syria
Catalytic Government	availability of documentation (eGovernance) (eDemocracy)	The entrepreneurial government would encourage cooperation between departments and with the private sector in collecting, storing and utilizing data. Steering rules (Almarabeh & Abu Ali, 2010)	No
Community Owned Government	Public engagement (ePartispation) (eRulemaking)	By interviews, surveys or questioners to consult with stakeholders to assess the existing laws and the impacts results required (Almarabeh & Abu Ali, 2010)	No
Competitive Government	Infrastructure development projects. (eProcurement)	Introduce telecom, public access kiosks and mobile centres competition and lift regulations on wireless and other digital technologies to accelerate their deployment.(Almarabeh & Abu Ali, 2010)	yes
Mission-Driven Government	Mission development Framework	The entrepreneurial government would establish an action framework at the beginning of the process for a better view of the investment. (Almarabeh & Abu Ali, 2010)	Partially
Results-Oriented Government	(eProcurement)	Creation and standardization of meta-data is critical for conducting successful data searches across institutions and networks. (Almarabeh & Abu Ali, 2010)	Partially
Customer-Driven	(eVoting) (ePartispation) (Cyberocracy)	Provide aides at access points who can train citizens in basic computer skills. Special attention should be given to groups difficult to integrate (women, elderly) (Almarabeh & Abu Ali, 2010).	Yes
Enterprising Government	(eProcurement)	Avoid advertising-based or fee-based services. They have generally not been sustainable. Articulate functionalities, and try not to add details that will push budgets into deficit. Develop projects that are achievable with resources available. (Almarabeh & Abu Ali, 2010).	Partially
Anticipatory Government	(eProcurement)	Backup information regularly and store backups in a separate location. (Almarabeh & Abu Ali, 2010).	No
Decentralized Government	(eDemocracy)	Seek assistance and involvement from organizations that already have experience in providing services and information using the same or similar technologies(Almarabeh & Abu Ali, 2010).	Partially
Market Oriented	(eProcurement) (eRulemaking)	Develop publicity and training campaigns that will engage the public about E- government initiatives.	Partially

Transformation Method Osborne & Gaebler	Example of eGov problem	How the entrepreneurial government would tackle eGov problems.	Supported in Syria
		Conduct research to ensure that online services respond to actual needs and that the implementation suits the target audience(Almarabeh & Abu Ali, 2010).	

Table 4 illustrate the eServices provided by the Syrian Governments tested against the ten government principles, the table shows that all eServices are Catalytic, Customer-Driven but does not support competitive system, mission driven, anticipatory and market oriented. Decentralized Government found for the online service, education registration and civic registration but not for the travel document or property registration. Enterprising Government supports the online payment, education registration and property registration and does not support the civic registration nor the travel document.

Table 4: Metrix of applying methods of Gov on services provided by Syria

eServices / Type of government	Online payment	Education registration	Civic registration	Property registration	Travel document
Catalytic Government (steering rather than rowing)	✓	✓	✓	✓	✓
Competitive Government: Injecting Competition into Service Delivery	✗	✗	✗	✗	✗
Community Owned Government (Empowering rather than Serving)	✗	✗	✗	✗	✗
Mission Driven Government: Transforming Rule-Driven Organizations	✗	✗	✗	✗	✗
Results-Oriented Government: Funding Outcomes, Not Inputs	✗	✗	✗	✗	✗
Customer-Driven Government: Meeting the Needs of Customer	✓	✓	✓	✓	✓
Enterprising Government: Earning Rather Than Spending	✓	✓	✗	✓	✗
Anticipatory Government: Prevention Rather Than Cure	✗	✗	✗	✗	✗
Decentralized Government	✓	✓	✓	✗	✗
Market Oriented Government	✗	✗	✗	✗	✗

4.2 Barriers

Our results have been categorized into seven main factors: Infrastructure, human, organisational, political, financial, socio-economic and Instability. Listed in table 5 below.

1. Syrian Civil war and Instability challenges: The Syrian Civil War has impact on all aspects of Syrian life, which could be added as a new challenge placed on top of each existing one. Table 5 shows the Challenges found between 2000 and 2013 and the Impact of Syrian Civil war and instability challenges scaled L Low, H High and M on the rest of the barriers. As the civil war started in March 2011 all life aspects of the Syrian people as well as the country's infrastructure has been affected(Nations, 2012). The impact of the instability resulted in new challenges, by July 2013, the Syrian government was in control of approximately 30–40% of the country's territory and 60% of the Syrian population (Hubbard, 2013). At the end of August 2014, 35,000 refugees were awaiting registration, while estimates of several hundred thousand more were not included in official figures as they were unregistered(Nations, 2013). People of Syria start to find it difficult and dangerous to reach to the government sites anywhere in the country, this is where eGov could fit and serve the purpose.

2. Political Challenges: during the civil war political barriers is the most dominant where political situation, freedom of press, leadership and the political will have been affected severely. As an example of political barriers in Syria as (Blakeley & Matsuura, 2001) highlighted that "Internet access is available only through a government-owned provider, thus furnishing the opportunity for government-imposed limitations on the sites that may be accessed". Ebrahim & Irani(2005) asserts that some government officials specially in developing countries such Middle East Countries considered e-Gov as a threat to their power.

3. Infrastructure Challenges: The ICT infrastructure is recognised to be one of the main challenges for eGov Internetworking which is required to enable appropriate sharing of information and open up new channels for communication and delivery of new services. Security is another important challenge, (Alsmadi, 2011) give a great attention to e-security where security has been widely recognized as one of the main obstacles to the

adoption of Internet services and it is *"considered an important aspect in the debate over challenges facing Internet banking"*. He also status the importance of the personal data that e-Gov portal could contain and the need for security implementation in order to protect such information.

4. Human Challenges : In his study (Khan et al., 2010) found that the level of *ICT literacy and skills of eGov users* in developing countries is very low. Khan *et al.,* (2010) suggested that citizens should be aware and must accept the eGov initiatives and e-service in particular to overcome this barrier. These researchers also argue that improving the awareness by using the government e-services in a Knowledge Management perspective. *"Education and marketing of eGov services has become one of the ten most pertinent challenges for developing a successful eGov"* Khan et al., (2010).

5. Organizational Challenges: Sallard and Alyousuf (2007) argues that the widespread evaluation culture and experience in countries administrations is very important where in developing countries eGov initiatives are designed and implemented by individual units where still with very a loose institutional links with other agencies. *"This could prevent development of a common culture and experience of implementation and evaluation across governmen*t" (Sallard and Alyousuf 2007). Dubai is an example where eGov faced several challenges from government departments regarding the quality of eservices (Sethi and Sethi, 2008). For example, some institutional departments exaggerated of claiming of offering eservices but their services were of little value to customers and some other focus on quantity rather than quality.

6. Socio-economic challenges: digital culture, corruption and poverty are the main socio-economic challenges added the unemployment rate gone up duo to the civil war.

7. Financial challenges: the cost of the eGov service is the highest under this financial factors, especially the war have drained the economic resources which affected on supporting the eGov service.

Table 5: Challenges found between 2000 and 2013 and the impact of instability scaled L ,M and H

Type		Challenges 2000-2013FoundImpact of instability (L) Low, (H) High, (M) Medium			
Civil war and instability challenge	Human challenges	E-Readiness(M)	Human Resources(H)	Awareness (M)	Attitude(M)
		Accessibility(L)	E-Services In Knowledge Management. (L)	Public Support	Capacity Building(M)
		Harmonization Of ICT Systems(L)	Digital Literacy Skills(L)	Training	Human Capacity(H)
		Learning Content/Resources(L)	Knowledgeable Personnel(L)	Low Citizen Participation	Lifelong Learning(L)
		Gender Inequality(L)	Human Capital Development(L)	Trust(H)	
	Political challenges	Political situation(H)	data standards (M)	freedom of press(H)	leadership(H)
		Fiscal policy resources(H)	national policy on the use of ICT(H)	data privacy legislation(M)	ICT roadmap(M)
		e-government strategy(H)	political administrative system(H)	political will(H)	
		e-government policy execution(H)	public administration reforms(H)	regulatory issues(M)	
	Organizational challenges	E-Government Vision(M)	Change Management(L)	Deficiency(L)	Transparency(M)
		Recruitment Of ICT Personnel(L)	Partnership Between Private and Public Sector(L)	Citizen Inclusion(L)	Evaluation Framework(M)
		Implementation Guidelines(M)	Human Capital Development(L)	Organizational Motivation(L)	Information Management(L)
		Management Support(L)	Non- Contextualization Of E-Government Practices(L)	Ability and Commitment(L)	Internal Efficiency
	Infrastructure challenges	Connectivity(M)	internet access (M)	digital divide(H)	cyber security (H)
		ICT infrastructure(M)	information sharing(L)	security and privacy(H)	collaborating systems(M)
		interoperability(H)	data possession(L)	data standards (M)	power supply (M)

Type	Challenges 2000-2013FoundImpact of instability (L) Low, (H) High, (M) Medium			
	explicit reference to ICT access(L)	maintenance of government websites (H)	scarcity of computers(L)	tele-density(L)
Socio-economic challenges	Illiteracy(L)	economic development(M)	culture(M)	demography()
	digital culture(M)	competition environment	corruption(M)	Poverty(M)
	appreciation of IT value(L)	permanent availability (M)	language barriers(L)	benchmarking(M)
	communication	unemployment rate(H)	E-literacy	
Financial challenges	Financial constraints(M)	Cost of eGovernment services. (M)	cost structure Internet cost(M)	

5. Proposed contribution

From the above finding our proposed conceptual framework can be extracted and build. Figure 1 presents the proposed Syrian eService conceptual framework, the framework captures main factors that contribute toward successful implementation of the eService in countries with stress, such as Syria. The framework consist of the following components: Enablers, Barriers, Vision, Strategy, Delivery Methods, Final Framework, Legal, Technical, Organisational and Implementation Frameworks, Guidelines (interoperability, Legislation, Taxation, Authentication) Standards. We May see the layout of the figure 1 reflects the components (barriers and enablers, instability challenges) of the conceptual frameworks reviewed.

The remaining parts of the framework are vision, Strategy, Delivery methods and Final Framework which is the final stage of implementing the eGov initiative and could be define as the collection and successfully incorporating and cooperating the rest of the components with each other. Rabaiah & Vandijck, (2009) state that vision comes at the start of any government strategy as with the political will are indispensable to launch the e-government project. Heeks, (2006) also argues that Vision is necessary, which is normally responsible for planning and spearheading implementation. The Strategy as Heeks, (2006) sees it, is the plan for eGov System supported by government infrastructure to achieve organisational objectives through maximizing the ability of management. Therefore a robust strategy is a major factor in reaching a successful e-Government adoption, where goals and objectives are included. Figure 1 is our proposed Syrian eService conceptual framework.
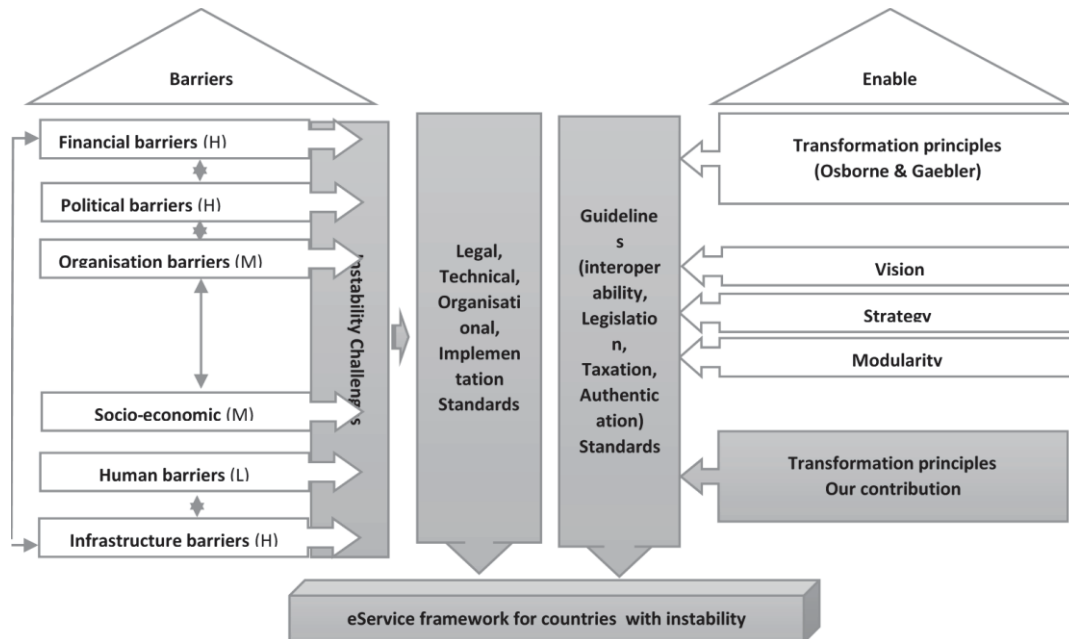

Figure 1: Syrian eService conceptual framework

6. Conclusion

From conducting desk research literature review we were able to identify factors likely to impact the success of eGov projects in countries under stress such as Syria as we have explored the specific geopolitical context of Syria and introduced the scaling effect this may have on generic barriers and issues. Based on our study we can conclude that the most common factors that will affect the success of eGov initiatives are:

1. Enablers: The ten principles suggested by Osborne and Gaebler, (1992) based on the study of the American society and government, the principles work as a guidelines for every politician who intended to reinventing a government and transform a society. Those principles are: Catalytic, Community Owned, Competitive, Mission-Driven, Results-Oriented, Customer-Driven, Enterprising, Anticipatory, Decentralized, Market Oriented.
2. Barriers: Lack of political will for adopting change, Political situation, and leadership, freedom of press, political administrative system, and e-government policy execution , Poor ICT infrastructure (e.g. poor internet facilities),Inexperience of implementers at all levels, Inflexible strategic frameworks that do not allow flexible tactics, Absence of clear vision, Personal attitude among employees, especially fear of change, Poor / limited implementations that harm perception, Absence of e-banking and legal frameworks to enforce them, Overwhelming bureaucracy. Each of the above factors has impact on the others. In attempting to overcome any of the above challenges it is necessary to consider the others in parallel. As a contribution to this research, we have built a conceptual framework (Syrian eService Conceptual Framework, figure 1)in which to evolve our analysis of eGov in Syria and highlighted the extra challenges & opportunities of achieving eGov transformation in the context of geopolitical instability. Our future work will populate and extend our conceptual framework with the aim of providing a reference point for future Syrian government strategy.

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Implementation of e-Government in Kurdistan Regional Government (KRG): Political, Social and Economic Constraints

Sabir Doski
Leeds Beckett University, UK
s.doski@leedsbeckett.ac.uk

Abstract: The trend of implementing E-government is on the rise all over world, from developed to developing countries, all are in pursuit of gaining benefits from this modern technique of management.In order to add a unique angle to an investigation considering the implementation of e-government, an area of Iraq- Kurdistan Region is being targeted. This area suffers from high levels of economic and political instability, for which, improved patterns of governing can play proactive role, but before suggesting anything, it is necessary to predict the degree and nature of its benefits. The main aim of the research is to conduct acriticalexamination of the governing system, the political and economic issues specific to this region and to decide on the basis of these contextual factors whether the idea of implementing e-government in Kurdistan region might be seen as a tool for solving the issues Kurdistan region government might face. In this regard, the study at first attempts to examine the current status of the e-government implementation process in Kurdistan region followed by its analysisof government policies of Kurdistan region on e-government program, besides, it also seeks to understand the feasibility and propose a model for a successful implementation of e-government in Kurdistan while taking all possible issues and challenges into account. Grounded theory approach has been used as a main method in order to closely examine the process of e-government implementation in KRG, the factors associated with it and the problems that KRG might face in implementing e-government system. In the present study, multi-method research has been selected. E-government implementation in KRG was not studied with depth before this research and, therefore, exploration was required. For this exploration, qualitative method is appropriate; however, the outcome needs to be generalizable so to guide the government in improving the e-government implementation process. For this, quantitative research was needed. To fulfil both these requirements, I began with qualitative research method and once I had fully explored the phenomenon and was aware of the main factors that can influence the process, I conducted quantitative research with much larger sample.This enabled me not only to confirm the findings of qualitative research but also in quantifying the obtained findings. This quantification of the importance of factors was important to create a priority list for KRG listing all factors in descending order of their importance. Academics, to whom this research will be of most interest, the results and findings of this research, will contribute a lot on the subject of e-government and economics in KRG-Iraq.

Keywords: Kurdistan Region Government-Iraq, e-government, e-government requirements, e-challenges, policies

1. Introduction

E-government has emerged as a popular mode of governance throughout the world (Dawood 2012, Howard 2001). Different countries, both developed and developing, have utilized this idea of using the Information and Communication Technology (ICT) to improve the governance in public firms, after their successful use in many private companies. Countries, both developed and developing, like US, UK, South Korea, Sweden, Denmark, UAE and many others have implemented or are in the process of implementing e-government system (Dawood 2012; Ndou, 2004; Ali &Sunitha, 2007). Recently, the Kurdistan Regional Government (KRG) has also announced the implementation of e-government in KRG in order to improve the speed and effectiveness of service delivery in public firms as well as to reduce the cost of governance in these firms. The challenges that will be faced by the KRG in making this plan a success story is the main focus of this study with specific consideration to the political, social and economic constraints.

KRG presents a unique case study for e-government implementation for two reasons. First, it's not been long since KRG gained this status of autonomous government, yet it appears in the words of Benard and Schnapper-Casteras (2010), "*sui generis*, a world apart from the rest of Iraq" (p. 83). There is high economic activity going on in the region and many multinational companies have open their offices there (Mustafa 2011). In terms of politics, the region had swiftly adopted the democratic system, in comparison to Iraq where the process is still hampered by many non-democratic forces (Benard&Schnapper-Casteras 2010). Likewise, the technological development is also well-paced with ICT system in almost all public firms (Shareef*et al.*2010). With this high pace of development and improvement, the idea of e-government implementation does not seem far-fetched but, instead, a true response to the needs of the day.

Second, despite this fast-paced development, the region is still suffering from many political and social problems. Political instability in the region is manifested through The poor relationship between Iraqi federal government

and Kurdistan regional government, the monopoly of only two political parties in KRG region, the lack of democratic and civil institutions, and flawed constitutions that violates the basic human rights of Sunni minority living in the region (Ciezadlo 2005; Logan 2009). In particular, due to mistrust between federal government of Iraq and KRG, no consensus has been built on the status of autonomy which the region enjoy and it is expected that this will continue in the future with the withdrawal of US forces, the KRG would fight for changing autonomy to sovereignty while the government of Iraq would attempt to take away the autonomy from KRG (Benard and Schnapper-Casteras 2010; Logan 2009). The emergence of ISIS has not only threatened the security of the region but has also furthered the pressure on the autonomous government to prove its potential (Krajeski and Meyer, 2014). It is, therefore, not just a matter of security for KRG but also of survival. Implementing e-government in such a political unstable society posed a serious challenge.

In addition to that, there is lack of ICT infrastructure required to implement e-government. In particular, the Internet is not accessible in rural areas of Kurdistan Region of Iraq (KRI). The ICT acceptance in the society is also low, except for the urban youth (Shareef*et al.* 2010). Also, female population in the region lags behind their male counterpart in the use of Internet and ICT because of the belief that it might produce negative impact on their personality (Shareef*et al.* 2010). With these findings in hand, it is very much expected that the implementation of e-government in KRG would be very challenging.

The present study looks into the extent of this challenge. It is aimed to critically examine the political, social and economic issues specific to this region and to decide on the basis of these contextual factors whether the idea of implementing e-government in Kurdistan region is feasible or not. The three questions this research specifically tries to answer are:

What major challenges can be encountered while implementing the models of E-government with particular reference to politically unstable region?

Among lower rate of literacy, poor infrastructure of ICT, and corruption, which factor can be the leading impediment in the proper implementation of e-government in a region with political instability like Kurdistan?

What measures needs to be taken in order to deal with all possible obstacles while implementing the models of E-government considering the implementation of e-government in Kurdistan Region?

2. Literature review

2.1 Conceptual understanding of e-government

One major problem, a researcher working on the subject of e-government encounter is the absence of any clear conceptual definition of e-government. Scholars have given varied definitions of e-government with emphasis on one or two element. Some like Heeks (2004) and Holdan, Norris and Flether (2003) view is simply the use of ICT in public firms for operational purposes. Other goes a little beyond that and also includes the purpose of implementing e-government. For instance, InfoDev (2002) defined e-government as the use of ICT in the public firms for the purpose of improving accountability, efficiency and accessibility.Dawood (2012) gives a similar definition with defined purposes of e-government to be "developing and improving the delivery and administration of activities and services of the official government" (p. 1359). Shareef*et al.* (2012), on the other hand, give specific emphasis on public satisfaction by defining e-government in terms of an improved form of public governance with the use of ICT that aims to improve quality of service delivered to public. Norris *et al.* (2001) on the other hand emphasized on the incessant service delivery provided thorough e-government. The key objective of e-government is very much linked with how the scholars treat that term or on how the government of a specific country applies it in their system.

A relatively comprehensive and very clear definition of e-government is provided by the World Bank, according to which e-government is "the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: Better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or simply more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost

reductions" (World BankGroup, 2009). This definition clarify that there can be variation in the objectives as well as benefits of implementing ICT in public firms. Sultan *et al.* (2012) have also pointed out that countries differ in their purpose of implementing e-government.

With different national objectives of implementing e-government, and with so many varied views of scholars regarding the purpose of e-government, the researcher closes this discussion on conceptual understanding of e-government with the conclusion that trying to reach a consensus on the objectives for the purpose of conceptual clarification is unnatural and unnecessary. The researcher agrees that the common factor of using ICT in public firms is adequate to reach a universal understanding of this concept. The objectives and benefits can vary according to the context.

2.2 Advantages and disadvantages of e-government

Most of the literature has pointed out the advantages of implementing e-government and only a few looks at the disadvantages associated with it. Yet for this research, it is important to look at both aspects to help the researcher in deciding whether the implementation of e-government is feasible and beneficial for KRG.

Grimsley and Meehan (2008) pointed out several advantages of e-government ranging from the delivery of service with more efficiency and speed to the continuous delivery of information and services to all stakeholders till the improvement in the economic condition of the state by encouraging entrepreneurship. In addition, it can bridge the gap between government and citizens caused by the complex bureaucratic system (Bertot, Jaeger, & McClure, 2008; Tolbert &Mossberger, 2006) . It can also reduce corruption by making the system more transparent and accountable (Bertot, Jaeger, & Grimes, 2010; Kim, Kim & Lee 2009; OECD 2003)Lastly, it is beneficial for the IT educated people of the country by providing them job opportunities (OECD 2003).

The disadvantages associated with e-government are very much subject to the process of implementation. If every citizen of the state does not have access to ICT systems, it can create biased system for delivery of government system, resulting in resentment across people not getting benefits from this modern technology (Kunstelj&Vintar, 2004). Even if access to Internet and computer is provided all across the region, people differ in term of ICT education and some might face problem in using the new technology (Evans & Yen 2005). Besides, the acceptance of ICT is important and should be worked on before implementing e-government because with low ICT acceptance, all the cost spent on implementing e-government would be wasted. Evans and Yen (2005) and Cook (2000) have also looked into the matter of privacy and security of personal data. Online sharing of information to the government can be risky. Also, implementation is long-term and costly process and Dugdale*et al.* (2005) believes that the cost is much higher than the economic benefits produced by this model.

Lastly, Cook (2000) and Kunstelj and Vintar (2004) held that the usual belief that the system provides transparency is not true. This is because the government uses it the way it wants to use it. The public firms decide which information to deliver and which not to share. Ironically, the government even does not keep track of the information posed and removed on their website (Kunstelj&Vintar 2004).

2.3 E-government implementation process

As provided earlier, the objectives of e-government varies across the globe, so is the implementation process including policies, programs and strategies of implementation. Different countries also differ in the types and intensity of challenges with respect to the political, social and economic conditions of that country. Successful implementation is only possible if the government can keep track of the challenges it might face before going for implementation and plan measures to respond effectively to the potential challenges.

OECD (2003) outlined four major areas that a successful e-government implementation model should include, shown in table 1. Each area has certain sub-elements to further specify the key elements of e-government implementation process. The first area of OECD's e-government implementation model is leadership and vision which further include A: is to establish political and administrative leadership with commitment and clear vision for e-government. B: the integration is important which means making e-government an essential part of policy, public management processes and social activities. The second area is common framework which includes collaboration between different institutions and agencies and a central funding program to ensure that the resources for implementation are present and it is Customer focused . The third area, emphasizes on treating

the citizens as customers and focusing on their key needs. It include providing access to online services, presenting online interaction as choice rather than a necessity, engaging citizens in the e-government policy process, and ensuring privacy of the data shared by citizen. Finally the responsibility area which highlight the importance of making system more accountable and monitoring and evaluating the cost and benefits of e-government at different level of implementation (OECD, 2003).

Table 1: Key areas of successful e-government implementation (OECD, 2003 p.5)

Key Areas	Sub-Elements
Vision and political will	Leadership and commitment Integration
Common frameworks and co-operation	Inter-agency collaboration Financing
Customer focus	Access Choice Citizen engagement Privacy
Responsibility	Accountability Monitoring and evaluation

The model explains how the implementation requires a multi-faceted approach that involves integrating the technical, financial, societal and political change processes along a single strategic plan. Though countries might vary in their objectives to implement e-government, this model is generalizable and includes the basic elements that every e-government implementation process should include, although at different priority level.

2.4 E-government implementation in KRG – the possible constraints

KRG received special attention from Western governments for its high sufferings during Saddam period and they have generously fundedlocal and foreign NGOs to improve the well-being of people living in the region. Also due to its relatively better security condition in comparison to other regions of Iraq, many foreign companies are already present in the region and many other investments are expected to come in (Mustafa 2011). These MNCs as well as NGOs support the idea of developing e-government to ease the process of getting services and information from the autonomous government; therefore, funding might not be a big problem for the region. Also, with e-government installed, the economic conditions of the region are expected to improve as well for the well-known impact of e-government on increasing foreign direct investments (OECD 2003).

The problem lies in other sectors like ICT infrastructure, education, legal requirements, data security and others. Despite installation of ICT systems in all public offices, each ministry has its own independently designed system (Shareef*et al* 2010). This lack of coordination among ministries and agencies present an important constraint in the process of implementing e-government strategically (Zhao *et al.* 2012).

The Internet services are available in the public offices and education institutes (Coursery and Norris 2008).In Erbil, as research showed that 92% of the government members own a computer at home, and 84% of them use the internet, out of which 60% of the members access the internet at home (Coursery& Norris 2008).But these agencies do not use these ICT facilities for official communication and other operational purposes. Traditional means are used to interact with each other, with businesses and with citizens (Ciezadlo, 2005; Grimsley and Anthony, 2012; Mustafa 2011).

The research also confirms the high use of Internet among public. Dawood's (2012) reported in their survey study that 92% of the government members own a computer at home, and 84% of them use the internet, out of which 60% of the members access the internet at home.Another research shows that more than half of those studied use internet for more than an hours per day (Shareef*et al.* 2010). These figures show that access to Internet is not a problem in Kurdistan,but the quality of Internet available to general public is not good in the region (Dawood 2012).

In addition to these technical and resource constraints, the political environment of KRG is also not very encouraging for e-government implementation. The relationship between the federal government of Iraq and KRG are not very good, also effecting the distribution of economic resources between Iraq and KRG (Zhao *et al.* 2012;Benard and Schnapper-Casteras 2010; Logan 2009). There are also issues with regard to the coordination

between ministries and government organizations and the intervention of political parties in bureaucratic matters (Zhao *et al.* 2012).

On viewing the societal aspects of e-government implementation, the scholars have put much stress on the role of trust factor (Coursery& Norris 2008; Sultan *et al.* 2012).Heeks (2008) explains that trust of citizen on government is crucial for making them accept the change brought by the e-government model, in encouraging them to conduct transactions online, in motivating them to use e-services, and in ensuring them that the data they share online will remain in the safe hands. No research has so far looked into this societal factor in KRG context, though research has shown the acceptance of ICT is quite low in the country, especially for female population (Shareef*et al.* 2010).

3. Methodology

The foundation for the methodology of the present research are provided by the pragmatic philosophy of research that proposes multiple interpretation of reality treating ideas as tools that different people use differently (Pansiri, 2005, Deway 2008). However, they did not limit the knowledge to the qualitative domain only, the way inter previses do and treat the factual and statistical data to be as important as the views and opinions. The research being pragmatic adopts an action-oriented approach and examines the situation in Kurdistan using both qualitative and quantitative methods. The purpose is to get complete picture of the situation and to comprehensively answer the questions raised for this research.

The qualitative component of the researchused the grounded theory approach for the exploration of a phenomenon in a systematic manner. It is the lengthier and main component of research having three phases of interviews with the ministers and administrators of four selected ministries, each followed by qualitative analysis of the interview transcripts using coding and categorizing techniques. The grounded theory approach is a mix of inductive and deductive approach allowing the researcher to look into the studied phenomenon with depth (Glaser and Strauss 2009). This approach is also consistent with the pragmatic philosophy as it also focus on the practicality and comprehensibility of the collected data (Strübing 2007, Byrant 2009)

Respondents were selected from the four ministries due to their closer involvement in the e-government implementation process in KRG. These include Ministry of Education, Ministry of Finance and Economy, Ministry of Higher Education and Scientific Research, and Ministry of Planning in addition, the IT department of the Council of Ministers of KRG was also included. The interviewee of each phase is provided in the table 2 along with the name of their ministry. It is important to note that in each phase guided in the selection of interviewee for the next phase.

Table 2: Interviewee of 3 phases of interview

Interview Phase	Interviewee Position	Ministry
First	Minister of Higher Education	Higher Education and Scientific Research
	Director of IT Department	Education
	Director of Graduate Studies	Higher Education and Scientific Research
	Former Minister of Higher Education	Higher Education and Scientific Research
Second	General Manager of IT Department	Council of Ministers
	General Manager of Accounts	Finance and Economy
	General Manager of Directorate of Banking Technology	Finance and Economy
	General Manager of Directorate of Budget	Finance and Economy
	Manager of Follow-up and Monitoring Salaries	Finance and Economy
Third	Director General for Development Planning (on behalf of Minister of Planning)	Planning
	Director General of IT Department	Council of Minister
	Chief Engineer of Planning and Industrial Development	Planning
	Directorate General of Strategic Planning	Planning

The quantitative component of the research is an auxiliary one which was designed only to confirm the findings of the qualitative component in order to make them generalizable and to create a priority list of factors influencing e-government implementation in KRG. The list was created based on the survey of 20 randomly

selected heads of department of the four ministries involved, they rate the factors obtained from the findings of grounded theory research according to their degree of influence on the e-government implementation process as perceived by the survey respondents.

The methodology of this research is designed in order to keep the ethical requirement of research satisfied. Participants of both qualitative and quantitative component gave consent before theirparticipation, their positions and ministries were mentioned with their consent but other personal information was not shared. Only those opinions were used in the study that the respondents allowed to use. The design was approved by the ethical committee of the Leeds Beckett University.

4. Findings

4.1 First phase of interview

The first phase of interview was more open and general as there were some 20 questions on the general status of e-government implementation process, the objectives of implementation, the planning process, the benefits of e-government and the political, financial, social, infrastructural, legal and other constraints in the process of e-government implementation.

At this first phase of interview, it was confirmed that e-government implementation in KRG is only at its initial phase, with more focus on infrastructure building, planning and policy designing. The two ministries related to Education have extended the use of their website from information provision to functional purposes like recruitment of new staff and enrollment of students. The major problem that was identified during this phase is that people in the two ministries lack information on e-government implementation and in some cases were even misinformed, Apart from this the respondents also pointed out the issue of lack of ICT infrastructure, the need for ICT educated staff, the poor condition of collaboration between ministries, and the absence of required will and determination of government in implementing e-government. Respondents did not provide clear answer regarding the political, cultural, economic, and data security constraints.

Regarding the impact of e-government on the KRG, majority of respondents considered it to produce positive influence by saving the time, improving the quality of service, reducing the cost, better management of information, controlling the corruption through transparency, and providing a tool for inter- and intra-ministerial collaboration.

4.2 Second phase of interview

In the second phase of interview, the respondents rejected the view that was provided by some respondents in the first phase of interview regarding the lack of commitment and determination from the government's side. With clear and specific question on this subject, the researcher succeeded in finding that ministers and administrators do not doubt the commitment of the government but actually are critical of the flaws in government policy toward implementing it. They confirmed that people in Kurdistan need education and training to use ICT systems and applications. They also confirmed the need for better planning and management.

As respondents who were intentionally selected related to IT department, they provided detailed answer to the question on data security and made good suggestion on securing the private data of citizens in the e-government of KRG. However, the researcher failed to find much information regarding political constraints. Majority of respondents held that there are no political problems associated with e-government. Just a few mentions were made to the poor relationship with the federal government of Iraq.The matter of social constraints particularly gender differences remained unclear as well.

4.3 Third phase of interview

In the third phase of interview, some of the findings produced at the first two levels were confirmed like the length of implementation process, the need for ICT education and training program and infrastructure building. One important new finding was obtained at this last phase of interviews. It was that research on the e-government implementation is not present to provide reliable information regarding the cultural and social constraints. This is an important knowledge gap that requires to be filled before further extending the e-government implementation process. It is because of this gap, the researcher could not reach any conclusion

regarding the gender gap in the use of ICT in Kurdistan. Some claimed that this gap is present while other rejected this view except one who said that there is no data to prove either case. Respondents also talked about legal reforms and public awareness programs and held that in rural areas there are problems in accessing computers and Internet technology.

4.4 Survey results

A list of factors was prepared from the findings of three phase of interviews and was presented before 20 heads of department to rate them according to their importance for the e-government implementation in KRG. The rating survey confirmed the importance of many factors affecting e-government implementation in KRG. The list of these factors in order of their average rating is provided in table 3. As can be seen, ICT infrastructure was rated by the respondents to be the most influencing factor for e-government implementation in KRG, followed by factors like targeted planning, vision and research on e-government implementation. The least influencing factors were found to be foreign funding, change management, improvement in political relationship between federal government of Iraq and KRG, and integration and collaboration among ministries.

Table 3: List of factors in order of their importance for e-government implementation in KRG

Factors	N	Mean
ICT infrastructure	20	4.90
Targeted Planning	20	4.75
Vision	19	4.68
Research on e-government implementation	19	4.47
ICT education and training to staff at ministries	20	4.25
Sincerity and determination	20	4.25
Recruitment of ICT educated staff in ministries	20	4.10
Legal reforms	20	4.10
Communication of e-government policies to ministries	20	4.00
ICT education and training to pubic	20	3.95
Optimization and reengineering of bureaucratic process	20	3.90
Social acceptance of ICT	19	3.84
Integration and collaboration among ministries	20	3.40
Prioritization of tasks	20	3.40
Improvement of political relationship between federal and KRG	20	3.05
Change Management	19	2.84
Foreign funding	20	1.95

5. Discussion

E-government has attracted the attention of many countries for their benefits like improvement in quality and speed of service delivery, cost effectiveness, corruption control and others despite the fact that some have outlined that these benefits are often over-rated and there are certain drawbacks of implementing e-government as well (Kunstelj&Vintar, 2004; Cook 2000. Evans and Young 2005), government officials in KRG mostly hold the view that e-government has many benefits for the KRG, they, however, look more into the benefits it can produce in the management and service delivery but not on the economy and politics of KRG as was outlined in the literature (Bertot*et al.* 2008; Bertot*et al.* 2010; Tobert&Mossberger, 2006).

Political instability which was highlighted in literature to be one major hurdle in e-government implementation (Zhao *et al.* 2012;Benard and Schnapper-Casteras 2010; Logan 2009) seems to be an overlooked factor for minsters and administrators in KRG. Since interviews were conducted before ISIS became a security threat to KRG, it is understandable that they did not pay much attention to the security concerns, however, not acknowledging the problems with the federal governmentand the flaws in their bureaucratic structure raises an important concern. It is likely that they avoided talking much on the matter pertaining to its sensitivity, but if that is not the case it poses a serious problem for implementation process. Stable political condition is the key to successful implementation of e-government (OECD 2003) and without acknowledging its importance; KRG cannot go for designing an effective road map for implementation of e-government.

The leading impediment to e-government implementation in KRG was found to be the lack of ICT infrastructure. Although previous studies have given figures to prove that people working in the public offices in KRG have

access to computers and Internet (Coursery& Norris 2008), the research confirmed that this would not be sufficient to run government which require better ICT infrastructure building.

The researcher, seeing the figures reported in the studies of Dawood(2012) and Shareef*et al.* (2010), was of the opinion that the people of KRG might be well-versed in using ICT applications, however, the study confirmed the findings of Mustafa (2011) that there is need to provide ICT education and training to general public as well as staff members of public firms.   It shows that mere installation of computer and Internet in the public offices is not adequate and the people who can effectively use those systems for a professional purpose are needed in addition the access to computer and Internet highlight in the study of Dawood (2012) is not homogeneous as it was found that in rural areas, there is poor Internet infrastructure, as was pointed out by Shareef*et al.* (2010).

The study does not confirm the findings of Shareef*et al.* (2010) in terms of gender discrimination in the use of ICT as there was lack of consensus among the ministers on this issue, however, it confirmed the findings regarding the data security concerns. One major achievement of this study is that the administrators from the IT department made some really good suggestions on improving the data security like classification of data in accordance with its sensitivity, installation of applications for securing the stored information, giving official email ids to the staff for secured communication, and planning a comprehensive security policy for e-government.

It is not surprising that most of respondents did not talk much about the economic constraints and rated foreign funding to be least important factors. Previous studies have also showed that NGOs and MNCs are supporting e-government project of KRG and the government has the required funding to fulfil the needs of this project (Mustafa 2011). Another positive aspect is the political will and determination of government which was confirmed by majority of respondents, however, there is need to improve policy making by adopting targeted strategic planning and conducting research to collect contextual data for better decision making.

Although e-government implementation is at the initial phase currently and there is lots left to be done, it is noteworthy that the progress is well-paced. Not only KRG government have been working on improving the ICT infrastructure in the region, some e-services programs have also been installed to make people familiar with the new mode of service delivery. It is, therefore, expected that despite the hurdles it can be a success story and will benefit the political, economic and social condition in KRG.

6. Conclusion and recommendations

Based on the findings obtained above, the present study concludes that implementing e-government in politically unstable societies like KRG can be challenging. Apart from the political challenges, the implementation process is also confronted by the lack of ICT infrastructure, poor education and awareness of ICT among masse and staff members of public firms, the need for collaboration between ministries, and absence of clear strategic plan with well-defined objectives of e-government implementation, however, there are not many financial constraints and the government is determined to bring the change, so a successful implementation of e-government is possible.

For successful e-government implementation KRG would have to conduct more research on the subject and the findings obtained from these studies should be given consideration in policy making process. The recommendations made through this research ought to be treated with sincerity as well. The government immediately needs to look over their infrastructural efforts as they are without a clear plan. The objectives and strategies should be outlined and all stakeholders should be made aware of these strategies in order to team up the efforts made toward e-government implementation in KRG. There is also need to initiate general mass education and training program as well as specific ICT education and training program for staff members of public firms. The data security should be given consideration as well and the suggestions made in this research can be used to ensure that the data shared by citizens through online portals would be secured. Most of all, there is serious need for the officials to understand how the political problems in KRG can affect e-government, with this realization; they would be better able to solve the political problems.

As the security threat posed by ISIS is a recent problem, the research did not provide much detail of its influence on the e-government implementation. It is a highly recommended topic for future studies on e-government in KRG. Other important topics that can be studied in future include gender gap in use the ICT application in KRI,

the public acceptance of e-government programs, technological access in rural areas, and the impact of e-government on the politics and economy of the country.

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Challenges Facing e-Government and Smart Sustainable City: An Arab Region Perspective

Maysoun Ibrahim[1], Sukaina Al-Nasrawi[1], Ali El-Zaart[1] and Carl Adams[2]
[1]Faculty of Science, Department of Mathematics and Computer Science, Beirut Arab University, Beirut, Lebanon
[2]School of Computing, University of Portsmouth, Portsmouth, UK
maisonib@hotmail.com
sukaina_nasrawi@hotmail.com
elzaart@bau.edu.lb
carl.adams@port.ac.uk

Abstract: Information and Communication Technologies (ICT) have affected recent public administration and governance. Electronic Government (e-government) services were developed to simplify government procedures and improve interaction with citizens, on one hand, and to create new governance models to empower citizens and involve them in the decision-making process while increasing transparency on another hand. According to the literature, implementing e-government applications and technologies would enable the country to address the fundamental questions of how cities function, how they are organized, and how businesses and processes could be made intelligent for citizens. By answering these questions, the country would be putting the grounds to enable the transformation towards Smart Sustainable Cities (SSC). Recently, the concept of SSCs gained importance as a mean of making ICT enabled services and applications available to increase the citizens' quality of life and improve the efficiency and effectiveness of the services provided by governing entities and businesses. There is still no common agreement on what a SSC means in practice; however a SSC is characterized by Smart Economy, Smart People, Smart Governance, Smart Mobility, Smart environment and Smart Living. Implementing e-government and transforming towards SSCs is faced with various challenges. Some of the challenges are common across the regions of the world and others are specific to one region or even to a country within a region. Despite these challenges, the Arab region has been embarking onto the e-governance wave for the past few years. It showed a notable progress in implementing e-government services; however, variance exists in the implementation of these services even among the countries of the region. Selected Arab countries have exerted considerable efforts in implementing e-government thus paving the way for smart governance, which is a main characteristic to consider for implementing a SSC. However, literature indicates a variance in the pace of the transformation towards SSCs. This variance is noted across countries in the Arab region and across the cities within one country of the region. Studying the challenges facing the implementation of e-government services therefore affecting the transformation towards the SSCs in Arab Countries is needed. This paper aims at exploring, the definitions of e-government and SSCs in addition to the challenges facing the implementation of e-government in the Arab region and the transformation towards SSCs. This paper also presents practices from the Arab region about the realization of e-government and the transformation towards SSCs.

Keywords: Arab region, challenges, smart sustainable city, e-government, ICT

1. Introduction

Computing in government can be traced back to the start of computer history (Traunmüller, 2003). However, the term e-government came to light in late 1990 (Kolachalam, 2003). E-government started as a practitioner field, basically convening practitioners struggling to meet the new challenges of the Internet medium by implementing new systems creatively. Later on, e-government went beyond services to the citizen to include organizational change and the role of government.

E-government, also known as digital government, online government or connected government, brings significant benefits to the government, citizens, businesses, employees and other non-profit organizations and political and social organizations. There are different types of e-government delivery models namely: Government-to-Citizen (G2C); Citizen-to-Government (C2G); Government-to-Business (G2B); Business-to-Government (B2G); Government-to-Employee (G2E); Government-to-Government (G2G); Government-to-Nonprofit (G2N); Nonprofit-to-Government (N2G) (Riad et al, 2010). These delivery models share activities (Shailendra et al, 2007) such as: pushing information over the Internet; Two-way communications between the agency and the citizen, a business, or another government agency; conducting transactions; Fostering transparent governance. E-government indeed enables the citizen transition from passive information access to active citizen participation by involving the citizen in the different governmental processes.

Countries have, in different levels, exerted tremendous efforts to realize e-government services. Different measurement models were put in place to assess these efforts. The latter includes the United Nations e-Government Development Index (EGDI). The United Nations Public Administration Network conducts a bi-annual e-Government survey which includes a section titled e-Government Readiness. It is a comparative ranking of the countries of the world according to two primary indicators namely: the state of e-government readiness; and the extent of e-participation. Constructing a model for the measurement of digitized services, the Survey assesses the member states of the UN according to a quantitative composite index of e-government readiness based on website assessment; telecommunication infrastructure and human resource endowment (UNDESA, 2014). Given that e-government services are considered to be a prerequisite for the development of a SSC (Lee et al, 2013), selected countries have jumped onto the wave of SSCs including countries from the Arab region as will be detailed throughout the coming sections of the paper.

Urban inhabitants are expected to constitute 86% and 64% of the world population in developed and developing regions of the world (UNDESA, 2012). Given this global urbanization trend and combining it with the quest of sustainable development, the concept of Sustainable Cities came to light and attracted the attention of many researchers and practitioners in the field as a desired goal for future urban development (Nam & Pardo, 2011). Their challenge is to ensure that cities offer, for current and future generations, improved living conditions to their citizens. The latter is faced by tremendous obstacles at the economic, technological, social and regulatory levels. Information and Communication Technologies (ICTs) offer high potential for solutions to many of these obstacles faced by cities while ensuring that they are environmentally friendly and viable. In this paper, section 2 defines the concepts of e-government and SSC. Section 3 highlights the challenges facing the Implementation of e-government and SSCs with a focus on the Arab Region. Section 4 sheds the light on the efforts to realize e-government and transformation towards SSC by listing practices from the Arab region. The paper concludes by discussing the research's way forward.

2. Definitions of e-government and smart sustainable city

E-government and SSC are two concepts that have different definitions. One concept leads to the other but to clearly understand the details of each along with the link between them, it is important to explore their various definitions that exist in the literature.

2.1 Definition of e-government

Prior to detailing the definition of e-government, it is important to distinguish between e-government and e-governance (Grönlund & Thomas, 2005). E-Governance refers to the whole system involved in managing a society. The system includes activities not only by government organizations but also companies and voluntary organizations, and citizens. Moreover, it features the processes and flows of governance, dimensions that are critical to understanding the context of information systems deployment and use (Atkinson, 2003). Another way of describing the difference is that while government is about certain specific activities with a short-term perspective, governance is about processes and outcomes in the long run.

There is no single definition for the term "e-government". It is broadly defined as the use of technologies to support government operations and provide government services (Riad, Hazem and Gamal, 2010). Also, it is considered as a new multidisciplinary field that encompasses the mainstream computing science literature, the fields of information systems and information management, as well as public administration and political science. Its benefits include improved efficiency, transparency, accountability, and access as well as coordination of services at lower costs. (Traunmüller, 2003)

Various definitions were crafted by researchers. According to the World Bank, "e-government refers to the use by government agencies of information technologies that have the ability to transform relations with citizens, businesses, and other arms of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be: less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions" (World Bank, 2009). The European Union (EU) states that "e-government is the use of ICTs in public administrations combined with organizational change and new skills in order to improve public services, democratic processes and strengthen support to public policies" (Europa, 2005). As for the United Nations "e-government is defined as utilizing the Internet and the World-Wide-Web for delivering government information and services to citizens" (UNECA, 2011). The latter definition will be followed in this paper.

2.2 Definition of smart sustainable city

The concept of SSC is recent and the work on defining and conceptualizing it is still in progress. It is an aggregate notion composed of three constituents namely: smart, sustainable and city. An entity is qualified as a SSC if all three constituents are present. If not, then the entity is instead a sustainable city, a smart city, a case of sustainable city or something else (Höjer & Wangel, 2014). Table 1 summarizes a set of existing definitions of SSC.

Table 1: Selected SSC definitions

Source Type	Definition
Magazine (Cohen, 2011)	A city that uses ICTs to be more intelligent and efficient in the use of resources, resulting in cost and energy savings, improved service delivery and quality of life, and reduced environmental footprint--all supporting innovation and the low-carbon economy.
Corporation (Lövehagen & Bondessan, 2013)	A smart city meets its challenges through the strategic application of ICT goods network and services to provide services to citizens or to manage its infrastructure. A sustainable city meets the needs of the present without compromising the ability of future generations to meet their own needs.
Academic (Höjer & Wangel, 2014)	A city that meets the needs of its present inhabitants without compromising the ability for other people or future generations to meet their needs, and thus, does not exceed local or planetary environmental limitations, and where this is supported by ICT.
International Organization (ITU-T FG-SSC, 2014)	A city that is innovative and uses ICTs and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects.

The International Telecommunication Union (ITU) to come up with the above mentioned definition studied a total of approximately one hundred existing definitions of smart cities, sustainable cities and SSCs, analyzed them and identified the top keywords and characteristics that make a SSC. Based on the analysis of these characteristics and common words, ITU introduced, in 2014, the above mentioned comprehensive definition for a SSC which we will adopt in this paper.

3. Challenges facing the Implementation of e-government and SSCs in the Arab region

Implementing e-government applications and technologies enables the country to address the fundamental questions of how cities function, how they are organized, and how businesses and processes could be made intelligent for citizens. However this implementation is faced by several obstacles as detailed below. Overcoming these obstacles enables the adequate environment for the transformation towards SSC, which, in turn, is faced by numerous challenges.

3.1 Challenges of e-government in the Arab region

Most of the countries of the Arab region exerted efforts to embark the wave of e-government services. In line with this intention, and according to the Arab Advisors Group report of 2013, 18 Arab countries implemented electronic government portals. These are: Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, UAE and Yemen. The progress and sophistication in implementing these portals and attached services vary from one country to another (AAG, 2013). This variance is related to a set of challenges that are facing the implementation of e-government services in the countries of the region.

E-Government implementations in developed countries of the world are less problematic in comparison to those in the developing ones. An empirical study conducted by Ndou in 2004 explored 15 developing and developed countries throughout the implementation of e-Government initiatives. The study found that e-Government offers opportunities for governments; however, the ability of developing countries to benefit from the potential of e-Government is limited and is largely held back by the existence of numerous political, social and economic obstacles.

By observing the status of implementation of e-government initiatives in the Arab region (a developing region of the world), many challenges become obvious. These include the development of ICT infrastructure; human resources development and employment creation; the Arab position in the world economy; funding and the lack of legal and regulatory frameworks and government strategies. In addition, ICT access aggravated the problem of the digital divide between the Arab region and the remaining parts of the World and between the countries of the region themselves. (Kitaw, 2006) adds literacy levels to the list of challenges, stating that low literacy levels hinder the types of media available for e-Government implementations in the developing parts of the world. Overall, analytical research indicates that the challenges facing e-Government can hence be broadly categorised into Social issues, Economic issues and Technological issues.

3.2 SSCs challenges in the Arab region

The adoption of SSC solutions faces a set of challenges that vary from one region to another and between countries within the same region. These challenges range from social and technological to economic and regulatory. The Arab region suffers in varied degrees from this set of challenges which could be categorized as below (IEC, 2014, European Commission, 2014, EU, 2014 and Ebraham & Irani, 2005):

- Complexity challenges: SSCs require horizontal integration and creation of a sustainable system of systems capable of generating opportunities for the city and its citizens. This integration increases the complexity of how to operate, regulate, finance and plan the SSC. It also includes issues related to integration and convergence; administration; standardization and interoperability; management of open data; data privacy and security; integrity of data and others.

- Economic challenges: the big challenge of any SSC project is the need for a sustainable financial investment to create and/or renovate the technological and physical infrastructure as well as to invest in digital solutions. The latter is highly dependent on the economic status of the country, thereby the city. Therefore, the SSC project's plan should identify how the SSC services will be delivered (i.e. operation model) and how these services will be funded (i.e. business model).

- Social challenges: this category of challenges refers to the lack of skilled people in the field, lack of collaboration between research and development, the need of greater citizens' engagement, misunderstanding of the impact of smart technologies on the city's daily administrative level, insufficient attention to citizens and others.

- Governance challenges: the inherent nature of a SSC as a complex system of systems increases the need for long-term and holistic policies to enable institutional and governance mechanisms for SSCs initiatives. The latter requires coordination and integration between public, private and civil bodies in addition to the collaboration with different stakeholders to make the city function efficiently and effectively as one organism.

- Technological challenges: technological obsolescence is one of the challenges facing the adoption of SSCs. The solutions to be deployed today may be needed to be replaced in the future to make them interoperable with future systems. The implementation of ICTs led to a set of challenges including the operation cost, security and privacy, and out datedness of ICT infrastructure.

In addition to the above challenges, selected Arab countries highly depend on petroleum output and its price; political instability; large expatriate workforce; growing inflation pressures and water scarcity. These additional challenges are considered to be long-term challenges to SSCs development in the Arab region (Doherty, 2014).

4. Realization of e-government and transformation towards SSCs: Practices from the region

Many Arab countries are exerting tremendous efforts to overcome the above listed challenges to implement e-government services and evolve their cities towards SSCs. The following subsections highlight on practices from the region in relation to the advancement of e-government services implementation in addition to efforts in the area of the evolution towards SSCs.

4.1 E-government: Practices from the region

The implementation of e-government services vary from an Arab country to another. Research indicates that, Tunisia initiated the development of e-administration in 1990s in an aim to modernize its administration. Recent efforts have been directed towards the generalization of e-services and creating the framework conditions for

agencies involved in e-government to realise their stated objectives (Mellouli, 2014). Bahrain announced the issuance of a new e-government strategy in December 2006 aimed at making the country the leading e-government actor within the Gulf region. This would be achieved by providing an increased number of services online through different channels including portals, mobiles, call centres, and post offices in addition to many other measures (EGA, 2009). Jordan also is in the process of implementing an e-government strategy focusing on three main axes namely: legislative framework; infrastructures framework; and service framework. Egypt focused on upgrading existing online services and increasing the number of service delivery channels (JeGov, 2006). A number of projects have been initiated, in particular in the area of creating databases. In the case of Oman, the strategy for the use of ICT (eOman) was endorsed in 2003 with the aim of "transforming the Sultanate of Oman into a sustainable knowledge-based society by leveraging ICT to enhance e-government services, enrich businesses and empower individuals" (ITA, 2007). The eOman approach focused on the integration of different layers: e-government strategies, common technical standards, shared central architecture components, regulatory and legislative frameworks governing electronic transactions, and capacity building. The State of Palestine included e-government as a national priority in all its main policy documents and strategies. With varying degrees of relevance and depth, ICT progressively gained importance and is now fully integrated in all Palestinian efforts to develop a modern, efficient and well-functioning government administration (PNA, 2005). Last but not least, Iraq through its e-governance action plan, harnessed ICT tools to improve basic services to all and to promote all-round good governance, including increased public participation, better social equity and justice as well as a general enhancement of the transparency and effectiveness of public institutions in order to build the necessary platform for a competitive, robust and knowledge-based economy (e-Iraq, 2014).

Efforts vary in relation to the implementation of e-government services. The pace of implementation of national e-government strategies and action plans affect the evolution towards SSC given the tight relationship between e-government services and evolution towards SSCs.

4.2 Evolution towards SSCs: Practices from the region

SSCs can be developed according to two models named the Brownfield model, which is applied on existing cities, and the Greenfield model, by which cities are created from scratch (Amitrano, 2014). Different Arab countries, mainly from the Gulf region, adopted the concept of SSC and started building different cities following the Greenfield model. These cities include but are not limited to Masdar City and Dubai Silicon Oasis in the United Arab Emirates, King Abdullah Economic City in Saudi Arabia and Lusail City in Qatar. Each of these cities has its own identity and is being developed according to particular economic, social and environmental needs. To start with, Masdar City is a model of a smart and sustainable urban development. It will be built, by the year 2020, just a few kilometers from the center of Abu Dhabi and only 15 kilometers from Dubai. The city is planned to provide an innovative working environment and high quality of life for its citizens with the least negative impact on the environment (Manghnani & Bajaj, 2014). Dubai Silicon Oasis is a state-of-the-art technology city that is being built to become equivalent to California's Silicon Valley with a vision of incubating leading centers of advanced electronic innovation, design and development. It has been established to provide a sustainable living and working environment for its citizens; with a mission of facilitating and promoting technology-based industries, research and development within a community that is fully integrated (Doherty, 2014). King Abdullah Economic City is envisioned as a world-class, integrated lifestyle SSC. Using state-of-the-art Greenfield solutions and technologies, the city is planning to lower the carbon emissions, improve public health and safety, support innovations and provide a high quality of life for its citizens (IIG, 2007). Last but not least, Lusail City, which is Located about 15 kilometers north of Doha on the Qatari coast, is being built to face the rapid urbanization of Qatar. The city will provide efficient and sustainable services, which will be delivered by integrated ICT infrastructure, to its citizens to enhance their quality of life and empower businesses. Through green technologies, the city will reduce air and water pollutions and carbon emissions and facilitate conservation of soil (Ooredoo, 2014). Despite the fact that the mentioned examples refer to SSC being built from scratch, the relative countries also announced large and medium scale Brownfield SSC initiatives and are currently leading the transformation process by being built on top of existing cities as is the case for Dubai, Abu Dhabi, Doha and Jeddah (Doherty, 2014).

Countries including Kuwait, Oman, Bahrain (MEED, 2015) and Tunisia (ALMONITOR, 2014) are recently accelerating their own understanding and adoption of SSC initiatives while others are still suffering from a knowledge gap in relation to the transformation towards SSCs. Table 2 summarizes the status of e-government and SSC initiatives in the Arab region.

Table 2: E-government and SSCs status in the Arab region

Country	Existence of e-Government Initiatives*	Existence of SSC Initiatives	Type of SSC Initiatives	Greenfield examples
Algeria	Yes	Yes	Greenfield	Cyberpark city of Sidi Abdellah
Bahrain	Yes	Yes	Brownfield	-
Comoros	Yes (few initiatives)	No	-	-
Djibouti	Yes (few initiatives)	No	-	-
Egypt	Yes	Yes	Greenfield	Smart Village
Iraq	Yes	No	-	-
Jordan	Yes	No	-	-
Kuwait	Yes	Yes	Brownfield	-
Lebanon	Yes	No	-	-
Libya	Yes	No	-	-
Mauritania	Yes (few initiatives)	No	-	-
Morocco	Yes	Yes	Brownfield	-
Oman	Yes	Yes	Brownfield	-
Palestine	Yes	No	-	-
Qatar	Yes	Yes	Brownfield/ Greenfield	Lusail City
Tunisia	Yes	Yes	Greenfield	Tunisia Economic City (in planning stage)
Sudan	Yes	No	-	-
Saudi Arabia	Yes	Yes	Brownfield/ Greenfield	King Abdullah Economic City
Syria	Yes	No	-	
United Arab Emirates	Yes	Yes	Brownfield/ Greenfield	Masdar City; and Dubai Silicon Oasis
Yemen	Yes	No	-	-

*Source: (UNDESA, 2014) / Note: '-'means not applicable

5. Conclusion and future research

Various challenges face the implementation of e-government in the Arab region and the aspired evolution of cities within countries of the region towards smartness. This paper overviewed these challenges and explored practices from the region in relation to the realization of e-government services and the transformation towards SSCs. It did not discuss the solutions to these challenges; however future research will address them. Also, the challenges themselves need to be further researched and special focus needs to be attributed to the variance of the challenges with the type of the SSC being built. Another important issue to address is the variance of the challenges facing e-government implementation given the development status of the Arab country, thus affecting its cities transformation towards SSCs.

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Implementing Successful IT Projects in Thailand Public Sectors: A Case Study

Tawa Khampachua and Nawaporn Wisitpongphan
Research Center of Information and Communication Technology, King Mongkut's
University of Technology North Bangkok, Bangkok, Thailand
tawa.k@fte.kmutnb.ac.th
nawaporn.w@it.kmutnb.ac.th

Abstract: Every public sector has to get involved in the IT project implementation for driving and promoting e-government development. However, implementing successful IT project is still a challenging issue as it requires participation from all stakeholders including politicians, chief executive officers in every sector, government officers, as well as citizen. However, most IT projects are being implemented because of the policies set forth by the policy makers or by the IT unit within the sector. According to our lesson learned from being IT consultants for many public sectors, we discovered that while these projects may very-well be aligned with the first two focused areas in the e-Government Roadmap, most of them fail. More specifically, some IT projects took longer than expected to implement and some were launched without users' involvement so they never get adopted by the users unless there is policy enforcement. Recently, we have observed interesting phenomenon within the public sectors. That is, the IT projects that do not get included in the IT strategic plan, which got initiated by the non-IT unit, are often successful. By carefully investigating into the project detail, we found that these projects had such a great impact on the project owners' operation, i.e., they can help reducing workload, use of paper, and time. Such projects normally attract users' engagement right from the very beginning. Hence, in this paper, we'll discuss different approaches in implementing different types of IT projects in the public sectors so that the IT development is strategically aligned with the e-Government roadmap while still meets the users' need.

Keywords: Lean Startup**,** IT projects, case study, public sectors, readiness assessment

1. Introduction

E-government is one of national flagship in the Thailand ICT strategic plan. In achieving the advancement of the e-Government, the focus is on four key development areas: 1) Interoperability for sharing of data/information and services across government organizations, helping to achieve integrated services development; 2) Institutional structures and governance mechanisms for establishing high-level management oversight and supervision in the implementation of e-government programs; 3) Innovation in public services for embedding innovation in the design and delivery of government services including the use of open source, crowd source and community source approaches; and 4) Radical/frugal reengineering with a view to doing more with less for more, combining better services and lower costs while impacting more people.

To enable the government to materialize its policy for the best benefits of the public, the Electronic Government Agency (Public Organization) (EGA) was established according to the Cabinet resolution. This new agency is a government body under the Ministry of Information and Communication Technology. Its main responsibility is to drive the implementation of electronic government activities, encourage the implementation of public online service, and increase opportunities and equal access to the government services. One of EGA's goals is to fulfill and increase security in the government's electronic services. Other responsibilities of EGA include implementing architecture and standards for e-Government system. At the same time, EGA has to provide consultancy to government offices in applying information and communications technologies related to e-Government services to achieve a single standard that is in line with the international standard.

Over the last decade, government drove e-government projects using a top-down approach by establishing the national ICT master plan, a 10-year roadmap (ICT 2020), and Thailand E-Government Interoperability Framework (TH e-GIF). All public sectors have to conform to the national strategies and policies set forth in the aforementioned plans in order to get an approval for their IT budget. As IT consultants specialized in software engineering, working with various public sectors of different sizes and functions, we were surprised to observe that most IT projects in government organizations fail to meet their expected output and goal. The main reason for the IT project failure seems to be from the lack of user requirement and quality data when applying a top-down IT management approach. In particular, the projects are normally initiated by organizational leaders or IT department without the knowledge of the real system users. The unsuccessful projects typically have a very

superficial and ideal goal which may not be technically feasible given the current status of the available resources.

On the other hand, bottom-up planning approach, where the system users initiate a project from their own budget, is quite successful in terms of the system implementation because of the sufficient user requirements. However, programmers can get overwhelmed, at time, by a storm of incremental requirements. Then, the success depends upon the project manager to convince the users that it is "far better to get a system in on time to handle 90 percent of the cases, than to wait forever for one that will do everything" (McLeod and Smith, 2001). At a later stage, such projects may have a very high risk of failure during the deployment and maintenance because of the lack of involvement and technical support from the IT department. Therefore, there are three key factors which lead to successful implementation of IT projects: (1) readiness assessment of the *enterprise architecture* which includes technology, application, data, and business operation (2) a *user-centric* software development process, and (3) Invalidating cumbersome regulation.

In this paper, we present a case study of applying a user-centric software development process in IT project within public sectors. To reach the goal of achieving e-Government faster, the development focuses less on the old business process and outdated government rules and policies, but more on the operational problem solving and users' benefit. We chose Lean Startup approach as a model to implement new business process which minimizes workload on users and can still meet all user requirements. Development progress will be validated by the users every 2-3 weeks to ensure the correctness of the system functionalities. Our lesson learned show that such approach was well accepted by users and well appreciated by higher managers despite a drastic change in the business process and nonconformity of a certain regulations.

2. IT development in Thailand public sector

In order to be successful in IT development in Thailand public sector, ones need to learn the characteristics of the government sector ones are dealing with. These characteristics include organization structure, level of users, existing applications, as well as rules and regulations. There are typically a well-developed software which does not get used because it does not conform to existing culture and regulation within the organization. As we have mentioned above, certain regulations have to be eliminated in order for a system to be useful and become a benefit instead of a burden. To do so, it is very important to get the policy makers and senior managers within the organization involved in the project right from the very beginning to find out which procedure can be omitted or changed.

2.1 Nature of IS development

There are 3 levels of information system in public sector (Laudon, 2011).

- The highest level of information system is the system used by senior management to assist in strategic decision making. It is typically called the executive information system (EIS).

- The middle level of system is used for tactical planning can be divided into two categories: a system that facilitates routine summarizing and reporting, called management information system (MIS) and a system that allow ad hoc queries and analytical reporting, called decision support system (DSS).

- The lowest level is a transaction processing system (TPS). Typically, this type of system includes payroll, order tracking, machine control, employee records, etc.

The development processes for these three types of system depends on one another. Hence, it is crucial to pay attention to the development plan. Software developers have to understand that TPS needs to be developed before designing MIS. However, the existence of TPS alone is not the indication that MIS can be implemented. Input data to the TPS has to be sufficient and users have to adopt TPS into their routine work for a certain period of time in order to ensure that the MIS development project will be successful. Likewise, EIS can be implemented once MIS has a certain level of data.

Hence, strategic plan has to be well adapted to the status of the existing software usage. That is, the ICT master plan has to be annually revised. Organization has to accept that certain software projects have to be delayed for the overall success of the IT management and investment. Failure to adjust the plan may lead to inefficient software that never get used.

2.2 Structure and culture of information system usage in Thai public sector

Management of the public sectors in Thailand is centralized. Policies and missions of each sector is decided by the central office and distributed to provincial offices. Government officers has to conform to the established policies and undergoes internal and external audit. Thailand has multiple level of hierarchies in the structure: ministry, department, division, subdivision, and work unit. Communication within and between different unit level in this hierarchical structure is by means of an official letter.

To prevent corruption, the standard way of public sector management assumes that "*everybody is a bad person*". Hence, every public sector has to keep hard copies of related documents and paper work in every process as evidence in order to be ready for investigation at all time. These documents include contract, bills, copy of identification card, copy of house registration, etc. Despite the adoption of various information systems which can keep electronic copies of such documents, keeping hard copies of certain documents is still mandatory in the public sector. Sadly, information system can only be a burden for government officers in such case. This is also the main reason for unsuccessful IT project implementation.

2.3 Types of end users

Anyone in public sector who uses a computer can be called an end user. There are typically three different types of end user)Wysocki and DeMichiell, 1997(:

- *Clerical workers* use the system frequently so high volume of transactions come from this type of user. Most transactions are routine and repetitive. The value of each transaction is low.

- *Professional and middle managers* use the system not as often as the clerical workers so they generate moderate volume of transactions which are somewhat structured and repetitive. However, there are moderate value per transaction.

- *Senior managers* use the system in a few occasions so they generate low volume of transactions which is unstructured. However, the value per transaction is high.

To successfully develop a software, developers has to identify key users and try to implement a certain feature that benefit the user. If users realize the benefit offered by the system, then it is very likely that the system will be well-accepted and adopted for use. However, there are some exception to this condition. For example, the users that benefit from EIS is the senior managers. However, EIS is the down-stream system of the MIS and TPS. Hence, senior managers can only enjoy the benefit if clerical workers use TPS. Therefore, it is important for developers to understand how to offer the benefit to the end users so that everybody will be willing to use the system.

3. Developing an asset management system for Royal Irrigation Department: Case study

Royal Irrigation Department (RID) is a government agency whose mission is to develop water resources, increase irrigated area, and manage water allocation in order to mitigate water hazards. Within this department, there are a total of 407 offices located throughout the country. In Thailand, every public sector has to keep track of the information of its own asset which comprises of asset ID, technical specification, date of purchase, value at the time of purchase, depreciated value, maintenance history, owner, previous owner, location, etc. Hence, in order to take care of this asset management and tracking the procurement and supply subdivision is first established in 1935 and later became a procurement and supply division (PSD) in 1952.

Early in 2014, the PSD has decided to get rid of the current asset management software and implement a new one which can better serve their routine work. This project is initiated by the division itself so we were somewhat fortunate to get a very good cooperation from the real system users. However, despite the initial requirement requested by the division which seemed to be sufficient, we applied what we have learned from the project failure from other public sectors to develop this asset management system for them.

3.1 Readiness assessment

In the first phase, we have to perform a readiness assessment of every aspect that could possibly have affected the software development. To do so we have resorted to examining the *Enterprise Architecture* (EA), which includes business, data, application, and technology, of RID with the focus on the part that is related to the asset management process only. As of 2014, EA framework has been adopted in many public sectors. This is because

the Ministry of Information and Communication Technology (MICT) has established a new policy which stated that EA of the organization needs to be submitted to the committee along with the proposal of any software project worth more than 100 million Baht.

3.1.1 Business architecture

According to the information obtained from our interview with the system target users from different offices, there are 5 stakeholders that are involved in asset management: (1) Office of Project Management in over 300 locations or asset owner (2) Regional Irrigation Office 1 – 17 (regional asset manager) (3) Procurement and Supply Division (departmental asset manager) (4) Asset Control Office (specification and asset ID control) and (5) Finance and Accounting Division (maintain the account of the present value of assets). The existing business process of asset management consists of 17 routine steps shown in Figure 1. The process starts from obtaining the asset (step 1 - 2), registering the asset into the system (step 3 – 14), survey existing asset (step 16), and summarize list of asset in the annual report (step 17). There are also other transactions which could be performed on the asset: borrowing, transferring, selling, and fixing the asset. Although there seems to be a standard procedure for every step and transaction, actual process performed at different locations seem to vary slightly in detail.
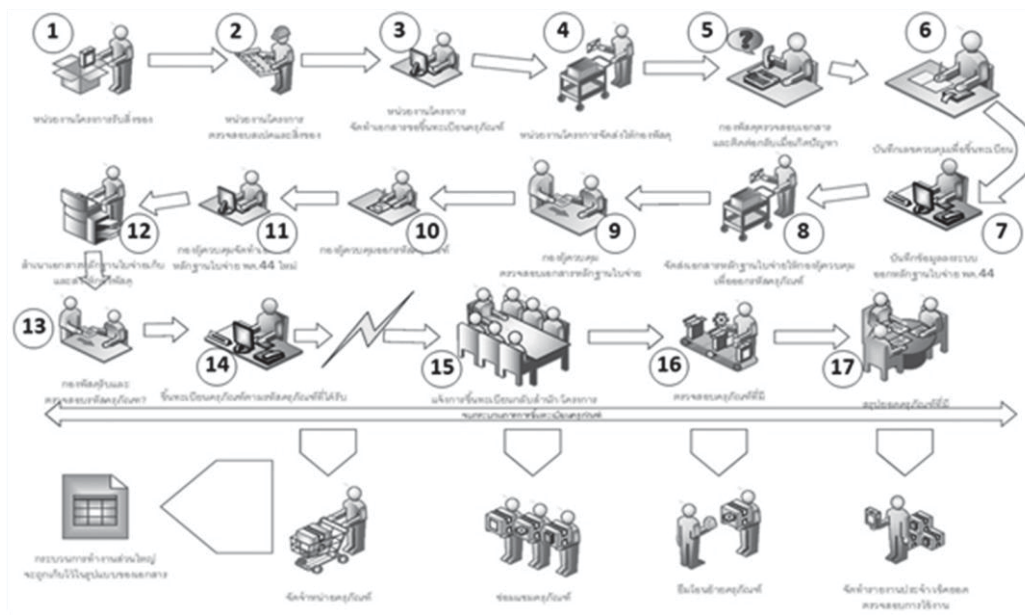

Figure 1: As-Is asset management process

3.1.2 Data architecture

Despite the existing asset management software, history about every asset owned by RID has to be kept in a form of hard-copy at 5 different locations (stakeholders) due to the regulation. So every time there is a change in information, the update has to be propagated to these 5 different locations. However, History of the assets obtained after the year 2012, which is the year that PSD started using the existing system, is also kept in the existing system. In the future, the new business process that we have designed for RID will only require that the owner of the asset keeps the hard copy of the asset's history. Other stakeholders can access this information from the new system.

3.1.3 Application architecture

According to the business process, there are a total of 5 stakeholders including the PSD. The old system is designed for supporting activities in PSD only. Hence, Excel is the choice of software used in keeping track of the assets in 4 other divisions.

3.1.4 Technology architecture

Inefficient infrastructure is an important factor which could lead to project failure. Therefore, one of the first questions we asked the project committee is where the server will be and how fast the network is. Fortunately,

one of the project committee member is from the IT department so we can have access to the data centre. Thanks to the advancement in the virtual system technology, the new asset management system can be deployed on a Virtual Machine (VM) in one of the RID's server. Since the system will be used by many users from various locations, we have pre-evaluated the maximum load and hard disk usage and made a request for a resource on the server to the IT department.

3.2 User-centric software development process

3.2.1 Determining a to-be process and new regulation

Prior to developing a new software, we have several brainstorming session with the stakeholders to discuss and finalize the to-be process and the acceptable change in the regulation. To do so, we have visited several offices in different locations to confirm the correctness of the design of the new software and inform the users about the change in the business process and regulation. Figure 2 shows the final To-Be process which has far fewer steps. In particular, the number of step taken for registering the asset into the system is reduced from 12 steps to only 4 steps (from step 3 to step 6). In this To-Be process, there will be only one copy of the asset management system which is the system that we have implemented. Hence, no more Excel files. A few mundane and tedious tasks such as assigning the ID to the asset and compiling an annual will be done automatically by the new system. Hard-copy document of the official forms are no longer required in this new system.
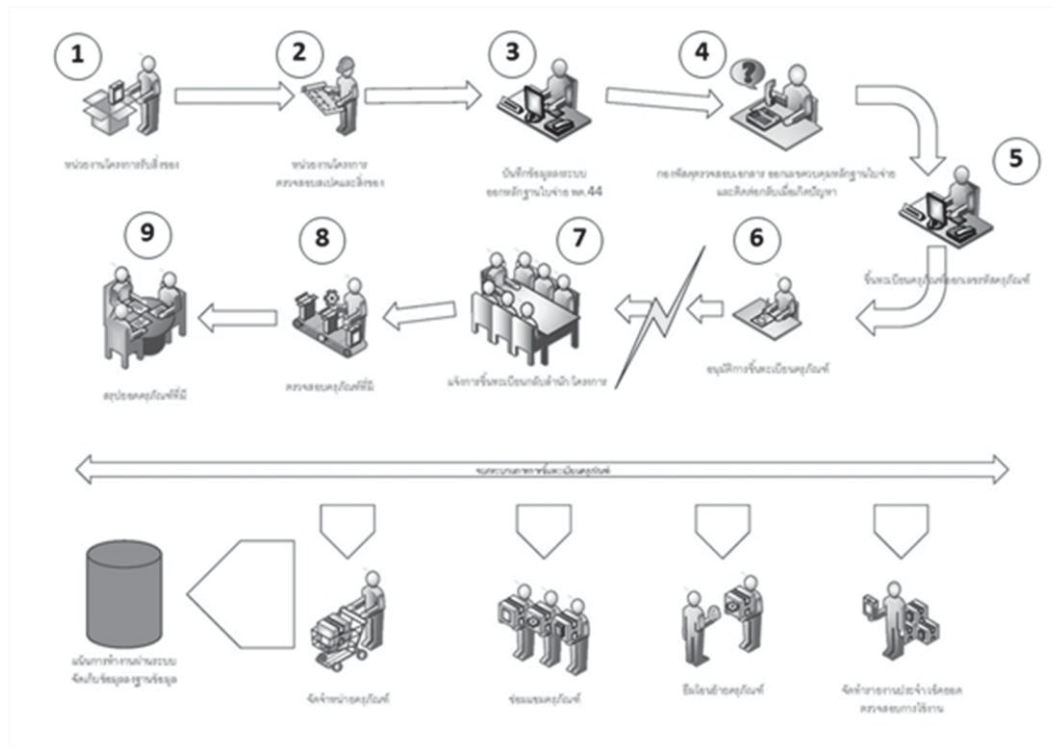
Figure 2: To-Be asset management process

The new system will provide the following benefit to the users:

- Workload is reduced tremendously because of the step reduction.
- It provides easy access to search for the asset, check the existing asset, and generate report.
- It required much less paper and ink.
- RID saves some cost on the postal.
- Senior managers have easy access to monitor the assets owned by RID.

3.2.2 IT development using Lean Startup approach

We applied the Lean startup approach (Ries, 2011) which provides a scientific way of creating and managing IT project in order to deliver the desired system to users' hands faster. Traditional way of developing a system

begins with analyzing the business process and designing the system to support such process (Curtis and Cobham, 2002). Hence, the system will be implemented to support the existing work operation which may or may not be efficient.

The Lean method is a principled approach to new product development. The new system design has to really support the work operation. To do so, the Lean approach call for the new ideas of the new work operation from stakeholders. System is designed according to the requirements and new idea. Users then get involved again in testing the new system. Feedback from users are then incorporate in to the system until the users are satisfied. The Lean development cycle is shown in Figure 3.
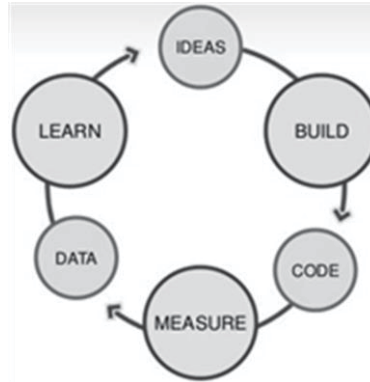

Figure 3: Lean Startup process

In this project, we meet with users every 2-3 weeks to show the progress of our design. By doing so, users have an opportunity to provide us feedback regularly.

4. Lesson learned

- Traditional top-down and up-front project planning approaches fail to adapt to what the users really need as it cannot incorporate learning along the process. Hence, Lean Startup is a learning engine which can uncover what works and what doesn't faster than the traditional software development approach.

- When there is no standard procedure in the business process, there will be a lot of facts from users. Hence, it was a wise decision we took to show the prototype system to the users at the early stage of the project because users spoke out more about what they do and what they want when they saw the walk through of the new business process on the prototype systems. So when the users speak, everybody wins.

5. Discussion and conclusion

In this study, we have applied a Lean Startup approach to designing and implementing a new asset management system for the procurement and supply division at the royal irrigation department of Thailand. We have discovered that much effort has to be devoted to implementing successful IT system: starting from assessing readiness in every aspects, getting user involvement, and most importantly, changing necessary policy. However, the new system we have developed is well accepted by all stakeholders because it provides them with a great deal of benefit. While we think that this approach can very well be used in IT projects in other public sectors, there remains one important problem about how to specify the project detail in the contract. Normally the system requirement is specified in detail in the contract, so that project committee can test the software against the checklist of all the functions listed in the contract. Failure to include a certain function listed in the contract legally mean that the developers fail to meet what is agree upon in the contract. This will cause the developer some penalty fee. However, if the contract does not include detail specification of the desired software, tricky developer can get away delivering inefficient software that still meets the requirement written in the contract. Hence, trust and honesty are the two ultimately keys to success, at this point in Thailand, for both the public sectors and the developers.

Acknowledgements

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Development of an e-Government Ontology to Support Risk Analysis

Onyekachi Onwudike, Russell Lock and Iain Phillips
Department of Computer Science, Loughborough University, UK
o.c.onwudike@lboro.ac.uk
r.lock@lboro.ac.uk
i.w.phillips@lboro.ac.uk

Abstract: The complexity of governments is one of the biggest problems citizens face in engaging with them. This complexity is seen in the growing number of departments and services that a government is made up of and the need for citizens to interact with these departments or services independently. This research shows a lack of efficiency in the E-Government domain due to the vertical alignment of services and the need for complex collaboration across the departments, which all too often does not exist. We propose that an ontology could potentially help to foster interactions between departments and services, and thereby manage this complexity more efficiently. Although ontologies exist for different subject domains, the quality and suitability of these ontologies in the government domain at the present time gives rise for concern. Ontologies have the potential to play an important role in the design and development of government services. The key reason behind the development and design of an ontology for the E-Government domain is to use knowledge that is resident in the domain of governments to reduce risks associated with the delivery, combination and dependencies that exist amongst services so that the resilience of the E-Government domain can be improved throughout government. This paper addresses the issue of identifying and analysing risk in the development and deployment of E-Government services. Relevant information on risks that may occur with respect to services can be collected, compiled and disseminated which can serve as prediction tools for future governments as well as enable service providers make choices that would enable them fulfil service requirements adequately. The aim of this research is to contribute by constructing an ontology that is aimed at gauging the risks associated with using solutions across departments and even governments. Further, we also document how we have made use of queries to validate this ontology.

1. Introduction

As a working approximation the average government is made up of around 50-80 different departments and agencies. For matters that are as simple as registering the birth of a child, different agencies and departments require a bewildering array of information often inputted in different ways, into different systems, and stored/accessed in multiple locations. Rather than these departments communicating amongst themselves, they expect citizens to communicate with them individually. One solution to the problems faced by governments is the use of ontologies. The reasons for building E-Government ontologies are many and varied. They include but are not limited to the following:

- To create and distribute information;

- To maintain information on data and its usage adequately;

- To enforce standards in the way data is exchanged;

- To aggregate data with the use of languages such as OWL;

- To interpret data formally with the use of semantics and to adequately control vocabularies;

- To emphasize trust in data sources because there is provenance of information;

- To compare and correlate data;

- To make government efficiencies and effectiveness transparent; and

- To make sure there is accountability in the process of making policies.

Sowa (Sowa 2000) defined an ontology as a discipline that forms part of the field of knowledge representation. Ontologies are commonly applied to model information from different application domains in order to support analysis. They can be used in the representation of services governments offer to her citizens as well as in supporting the providers of these services in the delivery of these services, and the receivers of these services in accessing the availability of services to them in a structured and logical way. Different E-Government ontologies have been developed for different strata of government in the past; however, these ontologies have

had little or no impact on E-Government as a whole arguably due to the lack of collaboration that has taken place during construction, and due to the inherent lack of collaborative support built into them by the developers. Therefore the ontology this paper presents has been explicitly designed to improve collaboration, and has been formulated using real world data. Although the idea of reuse across ontologies seems to be a welcome idea with respect to the problem of interoperability, the risks and disadvantages associated with reusing existing solutions, as well as making certain functionalities shareable between E-Government services is a concern. We explore the use of ontologies in overcoming risks associated with reusing solutions developed for one department in another department and conclude, with the support of case studies for evaluation, that the use of ontologies could be beneficial in gauging the risks associated with this. This theory is supported by a case study which highlights what can be achieved through reasoning with an OWL ontology extended appropriately by rules. The application aims at modelling the definition of risks that may be identified in the combination of services in the E-Government domain. Simplified examples are provided in the paper to illustrate why OWL needs to be supplemented with rules for reasoning over hybrid knowledge and potential issues with doing so are discussed.

The development of a suitably designed ontology could add value to the E-Government domain in areas of modelling relationships that exist between Departments and services as well as in overcoming the risks associated with reusing solutions across departments in government. Therefore, the role of the research and the artefact created in the form of an ontology is to educate governments and the providers of services so that risks can be reduced as well as the resilience of the system increased.

The rest of the paper is structured as follows: Section two elaborates on existing E-Government ontologies; Section three presents application contexts where a suitably designed ontology can be used to gauge risks in the E-Government domain; Section four makes use of instances of the E-Government ontology to present cases for its relevance and finally Section five presents the conclusions, limitations and potential of this novel approach.

2. E-Government ontologies

In terms of the sharing of knowledge, an ontology is defined as an explicit specification of a conceptualisation (Gruber 1993). In computing, an ontology can be likened to a framework used for the representation of concepts (things, or ideas about things) and the relationships that exist between those concepts (Uschold & Gruninger 1996). Therefore an ontology is aimed at modelling only those entities and relationships deemed relevant within a particular domain. An E-Government ontology can be defined as an explicit description of the E-Government domain containing a common vocabulary to support shared understanding between users. Concepts and relations managed by any scientific community can benefit from formal definitions and the use of ontologies is one of the key ways to achieve this. Several E-Government ontologies have been developed in the past, including SmartGov, EGov, OntoGov, TerreGov etc.

While the OntoGov ontology focussed on making electronic services interoperable and accessible to people all over the globe it lacked the ability to specify roles and actors in the development of the ontology as well as the ability to logically make queries. The SmartGov ontology was designed with the intention of helping public authorities overcome barriers in planning, designing, and delivery of electronic services, but fell short because it was difficult to establish concepts that were related to E-Government in the ontology. Although the TerreGov ontology dealt with interoperability issues of E-Government services for local and regional governments there was an absence of focus for a global community. The EGov ontology encouraged a one-stop government and provided information to citizens but lacked the ability to define complex concepts and relationships; The focus of the QUALEG and QUONTO ontologies was on the problem of integrating services but failed to establish interaction between government and her citizens. Therefore citizens perception of government services were ignored. The question therefore arises, why are the ontologies previously developed not being applied today? Although there was an attempt by these ontologies to address varying problems in the E-Government domain, (Gugliotta A et al. 2005) argue that not one of these ontologies embraces Semantic Web technologies to represent concepts and actions. Many of these ontologies are already obsolete and more crucially lack semantic consistency in their design which has led to loss of critical information. Despite this, ontology development for Electronic Government is an area that has received considerable interest. According to (Fonou-dombeu & Huisman 2011), ontologies are used to describe and specify E-Government services (E-services), primarily because semantic integration and interoperability of E-services are facilitated with their use; there is ease in composition, matching, mapping and merging of various E-Government services. Therefore the purpose of the

E-Government ontology is to facilitate adequate understanding of the E-Government domain by service providers so that issues relating to the integration of services as well as the risks associated with integration in the Government domain can be addressed, as well as used as prediction tools for future governments. It is extremely difficult to develop a single ontology that satisfies all users especially in the areas of precision, coverage, actuality and individualization. This can be attributed to the fact that specific approaches as well as vocabularies are needed by different departments for solving tasks specific to them (Stumme et al. 2000).

The development of E-Government ontologies in isolation, without wider integration in perspective and the lack of reuse of components present serious challenges for the E-Government domain. Ontologies serve as a platform or a means for defining the services offered by governments and attempts have been made at the development of E-Government ontologies. The use of ontologies for knowledge representation can enhance organizational communication and re-usability, and serve as the building blocks for intelligent systems.

To the best of our knowledge, there is no directly related work focussed on the development of an E-Government ontology to gauge risks associated with E-Government services. The focus of other related work have been on the development of semantic driven government (Fonou-dombeu & Huisman 2011). (Gugliotta et al. 2005) focussed on the development of E-Government portals and (Sheng & Lingling 2011) focussed on the application of ontology in E-Government.

2.1 Method of development

To develop the E-Government ontology used in this paper, the steps provided by (Noy & McGuinness 2001) were followed with emphasis on the repetitive process stated in it. This method of ontology development as proposed by (Noy & McGuinness 2001) was used because it is an increasingly popular method for organizing information and has successfully been used in the past by other ontology developers. The process involved determining the scope and domain of the ontology which involved sketching a list of questions the ontology should be able to answer referred to as competency questions; enumerating important terms and relationships; definition of classes and subclasses as well as formulating a class hierarchy; definition of class properties as well as their cardinalities and values and creating instances in the ontology. The competency questions are focussed on what we intend the ontology to do and what questions the ontology should be able to address. With the help of the competency questions we were able to formalise a scope for the ontology which aided the enumeration of important terms and enabled us to define the class structure of the ontology. The key competency questions that were considered during the development of the ontology include but are not limited to the following:

- What services are available to a citizen?

- What service is characteristic of a department?

- What services can be combined?

- What are the criteria for combining services?

- What happens if services that are combined fail?

Based on this list of questions, the ontology will include the information on various services, departments and their characteristics.

The design of the ontology was carried out generically so that it could be used to support reuse across governments globally. A large number of related terms were gathered from existing publicly available documentation with the most general and most important of them forming the classes; some of them were used to form properties and others were not used at all because their relevance in the ontology could not be ascertained. Development of the classes and the corresponding class hierarchy formed the next stage of the process. Considering that different approaches can be used in developing the class hierarchy which are the top-down approach, the bottom-up approach and a combination of the two approaches we made use of a combination of the two approaches. In response to the competency questions, we made use of a combination of both approaches because the top-down approach was best suited which gave a well-defined class hierarchy and then the remaining concepts were incorporated into the ontology with the bottom-up approach. The development of the class hierarchy paved the way for definition of class and objects properties which included defining values, value types and their cardinalities. In order to highlight different scenarios of risks, we made use of the UK Government website as our source of data because it contains semi-structured data and because of the mode of storage of data. The UK Government is one that works with devolved ministries, emergency

responders and other organisations which enables the UK government to prepare for, respond to and recover from risks it is faced with. Therefore, in order to achieve this there has to be a preparation and readiness to deal with risks and emergencies not just from the stakeholders point of view but also in terms of the flexibility of an ontology to support the evolving nature of services and situations. We defined services in terms of other services they were dependent on; departments in terms of departments they were dependent on and were able to model and analyse situations where a given department were critically dependent on another for systems leading to potential shared points of failure. A typical example of departments being dependent on other departments included in our ontology from the UK Gov website is the Attorney General's Office which is a Ministerial department that works with three Non-Ministerial Departments (Crown Prosecution Service, Serious Fraud Office and the Treasury Solicitors Office)and an agency (HM Crown Prosecution Service Inspectorate). Based on the way the UK Government has been structured, it is clear that certain departments cannot function without some other departments or agencies being in place. It also shows that since some departments are overly dependent on other departments, there could be overlooked or incorrectly calculated risks present. This therefore highlights the need to address actively whether reuse is desirable, and whether the details and potential implications of that reuse are clearly defined within government.

In terms of services being dependent on other services but still functioning largely in silos we highlight a scenario based on the UK Benefits Service. Child Benefit is a type of generic Benefit service in terms of our ontology, which itself is represented in this scenario by the creation of a specific instance of that service within the UK government, the Guardians Allowance Service. However, the Guardians Allowance Service is also an instance of the Deaths and Benefits Service which is also a type of Benefit. Other examples include the Carers and Disability Benefit service a type of Benefit service also which shares Carers Credit as an instance with the Job Seekers Allowance service and the Low Income Benefits service. We see the dependencies between these services and conclude that while these dependencies may have been considered in terms of risk, an ontology would make such a process more efficient by structuring the data logically.

In Figure 1 we show a part of the developed ontology hierarchy. The classes of the depicted ontology, i.e. E-Government, Person, Threats etc. and their corresponding subclasses which cover the basic concepts that describe the context of an E-Government application. In terms of the structure of our ontology and to overcome the problems other E-Government ontologies faced which included a surprising lack of semantic consistency and insufficiently defined relationships between the different departments; we developed our structure thus:

The set of government services is primarily considered in terms of those users who have a relationship to the services, represented within our ontology by the class Person who can belong to a department and, offer, support or consume services. The structure of our ontology also helped us define relationships beyond the 'is-a' relationship commonly found in upper level ontologies.

Figure 1: The ontology hierarchy

3. Application scenarios

The purpose of E-Government is to provide services that are focussed on citizens as well as address the demands of citizens and businesses so that they can be accessible, responsive, simple and transparent for the users (Karyda et al. 2006). E-Government services are provided through applications that need to have increased security and privacy features. Although the security and privacy features are key to any government, the possibility of sharing services and reusing solutions across departments and even government cannot be ignored.

3.1 Benefit service

In this section, we revisit the scenario of a Benefits service running in the UK E-Government domain (www.gov.uk). This service includes the different types of benefits accessible to citizens; when and how benefit payments are made; eligibility for benefits and when it is supposed to stop. The receiver of this service would be able to ascertain whether he is eligible for a benefit. The benefit issuing authority would be in a position to verify eligibility, make cross-checks and get additional information from the benefit credit facility. Although this process requires confidentiality, privacy and integrity of the entire benefit process; many of the features required are common to other departments or services such as the Births, Deaths, Marriages and care department. However, this scenario can be made up of the following processes but not limited to:

- Management of personal information by users

- Viewing of previous benefits received by users

- Processing of eligibility criteria

- Notification by system that additional information is needed

- Users update additional information required by system with the needed information.

Although in the scenario analysed, major security requirements need to be met such as authentication and authorization of users, this information needs to still be shared across departments requiring this information.

3.2 Births, deaths and marriages service

In this section we present another scenario in the form of the UK Births, Deaths and Marriages service that offers the child benefit service as a subclass and yet has this same service as a type of service in the Benefits service (www.gov.uk). In the development of a Births, Death and Marriage application, this service includes the registration of a birth, death or marriage; eligibility for benefits and when it should stop; dealing with benefits, taxes and leaving care. This shows us that a solution used for the benefits department with respect to eligibility for benefits and when it should be stopped could be reused for the Births, Deaths and marriages department, however, the purpose of the ontology in this respect would be to highlight the risks related to doing so.

4. Using the e-Government ontology to gauge risks

In this section, we illustrate how the E-Government ontology can be used to gauge the risks associated with combining services or even reusing solutions. We also illustrate how the ontology is validated as development of the ontology progresses. We made use of Protégé4.2 for the development of the ontology and queries were run with the Racer reasoner. Protégé 4 is an ontology editor used for creating OWL ontologies. It cannot work without the OWL API in place. It makes use of a Description Logic Reasoner which checks the consistency of the ontology and automatically computes the ontology class hierarchy. For the purpose of this Research, we made use of OWL-DL which is known to be a more expressive OWL language. It is based on Description Logics which are a component of First Order Logic and are key to automated reasoning. It has the capability of computing the classification hierarchy of an ontology as well as checking for inconsistencies in the ontology (Horridge, 2007). The Racer Reasoner is used for making references and for answering queries over RDF documents (Gmbh 2010). We used it to check for inconsistencies in the ontology and to submit queries so that their validity could be verified. These queries we expressed with the use of the new Racer Query Language (nRQL). The nRQL is a query language that makes use of description logic for retrieving individuals from the A-box which is known as a set of assertions about individuals. This language allows the use of variables which are bound against the individuals in the a-box that satisfy the conditions. Protégé and Racer were able to communicate because of the RQL tab plug-in that was installed. We provide a set of nRQL queries with their answers below illustrating the use of the E-Government ontology to gauge risks associated with reusing solutions.

4.1 Results of nRQL queries

An ontology is said to be useful when it can give answers that are consistent to real-world questions. In this section, we list a number of questions a service provider is likely to come up with when attempting to reuse solutions in the E-Government domain. Although these questions are not exhaustive, they indicate what the ontology can deal with and what level of reasoning it can cope with. We express each question as an nRQL query and present the result of the executed query. The questions presented in this section also guided us in the development of the ontology while the queries presented were used in validating our ontology.

4.1.1 Questions associated with reusing solutions

Having an understanding of the type of risk that may take place when services are combined or solutions are reused gives us an insight into the conflicts that may take place within the back office situation especially with respect to sharing of resources and information property rights. (Homburg et al. 2002) analysed the effects of resource dependence theory and information property rights theory stating the conflicts that could stem from such mixtures in the network. The development of services requires heavy reliance on the use of IT systems. (Woll et al. 2013) outlined a major challenge associated with this as lack of interoperability between different IT systems. Although a lot of research and industrial activities have focused on the feasibility of interoperability in the past, the problem still lingers. (Woll et al. 2013) also outlined how approaches have been mapped out on embracing interoperability but there is a lack of application in the industry. This they attributed to the high cost of linking many different IT systems and the data contained in them.

To successfully build a platform for E-Government to operate requires the collation of information from the different departments and parastatals that make up the government. Hence, there is a lot of replicated data as data collated for one department may be the same data collated across other departments even though the modes of collation or delivery may differ. A typical scenario seen while building this ontology from the UK Government website is in the department of Birth, Deaths, Marriages and Care which has Child Benefit as one of the services it offers and a replication of this same service in the Department Benefits. The question is this, why can't the Department for benefits make use of the already existing framework the Birth, Deaths, Marriages and Care department has? Is there the need for the user of the system to fill this information independently for each department? The following results analyse the data in the ontology to attempt to answer the queries posed, highlighting the perceived threats and risks emergent from the data. The results have been cut down slightly for the purposes of the paper and are therefore illustrative rather than exhaustive and are an indication of how inferencing could potentially help in the analysis of risks in the E-Government domain:

▪ What are the typical objectives of a benefit service?

nRQL Query: (retrieve (?obj) (?obj |Objective|))
nRQL Result: (((?OBJ |Data_Confidentiality|))
               ((?OBJ |Availability|))
               ((?OBJ |Data_Integrity|))
               ((?OBJ |User_Eligibility|))
               ((?OBJ |User_Accountability|))
               ((?OBJ |User_Non_Repudiation|))
               ((?OBJ |Accuracy|)))

In order to answer this question, we first highlight the objectives of the Benefit service. This enabled the modelling of the goals of this service into the ontology.

▪ Which assets are confidential in a benefit system?

nRQL Query: (retrieve (?asset) (and
            (|Confidentiality| ?threat
            |is_threatened_by|) (?asset ?threat
            |damaged_by|)))
nRQL Result: (((?ASSET |Benefit_Data|))
            ((?ASSET |Personal_Data|))
            ((?ASSET |Cryptographic_Keys|)))

In order to address the question of confidentiality in the Benefit service, we had to examine potential threats to the confidentiality of citizens. In doing so we first had to determine the possible threats to the confidentiality of citizens, and model the assets that may be compromised or damaged by them. So, in the case of confidentiality, we modelled that the confidentiality of a citizen may be threatened by, for example user errors, cryptographic keys disclosure or compromise etc.

▪ What are the typical objectives of the Births, Deaths and Marriages service?

nRQL Query: (retrieve (?obj) (?obj |Objective|))
nRQL Result: (((?OBJ |Data_Confidentiality|))
                     ((?OBJ |Availability|))
                     ((?OBJ |Data_Integrity|))
                     ((?OBJ |User_Eligibility|))
                     ((?OBJ |User_Accountability|))
                     ((?OBJ |User_Non_Repudiation|))
                     ((?OBJ |Accuracy|)))

In order to answer this question, we first highlight the objectives of the Births, Deaths and Marriages services. This enabled the modelling of the goals of this service into the ontology.

▪ Which assets are confidential in the Births, Deaths and Marriages service?

nRQL   (retrieve (?asset) (and
Query: (|Confidentiality| ?threat
                     |is_threatened_by|) (?asset ?threat
                     |damaged_by|)))
nRQL   (((?ASSET |Benefit_Data|))
Result   :   ((?ASSET |Personal_Data|))
                     ((?ASSET |Cryptographic_Keys|)))

In order to address the question of confidentiality in the Births, Deaths and Marriages service, we had to examine potential threats to the confidentiality of citizens. In doing so we first had to determine the possible threats to the confidentiality of citizens, and model the assets that may be compromised or damaged by them. So, in the case of confidentiality, we modelled that the confidentiality of a citizen may be threatened by, for example user errors, cryptographic keys disclosure or compromise etc. Questions 1-4 show us that the Benefits service and Births, Deaths and Marriages service have the same objectives. Therefore, there is a potential for reuse between these services.

▪ What happens to departments that are dependent on other departments for shared resources or information?

nRQL   (retrieve (?dependency)
Query: (|Department functionality| ?risk
                     is_threatened_by|))
nRQL   (((RISK |Over_Dependence|))
Result: ((?RISK |System_Failure|))
                     ((?RISK |Shared_Points_Of_Failure|))
                     ((?RISK |Security_Compromise|))
                     ((?RISK |Reduced_System_Reliability|))
                     ((?RISK |End_Of_Service|))
                     ((?RISK| Decommissioning _Of_Department|)))

In order to answer this question, a list of potential risks had to be developed and structured for the ontology some of which are highlighted in the example above including Over Dependence, System Failure, Shared Points of failure, Security of the system being compromised, the reliability of the system being reduced and even abolition of a department which could lead to the termination of the service or services offered by that department.

▪ Which risks might compromise the functionality of a department?

nRQL   (retrieve (?risk)

```
Query:   (|Department functionality| ?risk
                  is_threatened_by|))
nRQL          (((RISK |Over_Dependence|))
Result:  ((?RISK |System_Failure|))
              ((?RISK |Shared_Points_Of_Failure|))
              ((?RISK |Security_Compromise|))
              ((?RISK |Reduced_Funding|))
              ((?RISK |Reputation_Damage|)))
```

In order to model this question into our ontology, we had to determine the risks that may hamper a department meeting its remit to provide functional services to her citizens, with the example above indicating Over Dependence, Security Compromise.

▪ Which threats can compromise the anonymity of the users of the system when services are combined?

```
nRQL          (retrieve (?threat)
Query:        (|User_Anonymity| ?threat
                  is_threatened_by|))
nRQL          (((?THREAT |Impersonation|))
Result:       ((?THREAT |Malicious_Code|))
              ((?THREAT |User_Error|))
              ((?THREAT |OS_Bugs|))
              ((?THREAT |Application_Bugs|))
                     ((?THREAT |Terminal_Highjack|)))
```

As services are combined and solutions reused across governments, the anonymity of users may be compromised, and we have highlighted a subset of the threats that a user may face if this is the case.

▪ Can countermeasures be put in place so that there is no impersonation in the systems that are combined?

```
nRQL          (retrieve (?citizens information)
Query:        (?Citizens Information |No_Impersonation| |address|))
nRQL          (((?Citizens Information |Identification|))
Result:       ((?Citizens Information |Authentication|))
              ((?Citizens Information |Audit_Trails|)))
```

The example above shows that for this example to prevent impersonation in combined systems, audit trails would be beneficial.

▪ Can dependencies among services bring about inter-departmental co-operation?

```
nRQL          (retrieve (?dependency)
Query:   (|Inter-departmental co-operation| ?dependency|))
nRQL          (((? Co-operation |Optimized Results|))
Result:  ((?Co-operation |Increased_Communication|))
              ((?Co-operation |Cognitive_Complexity|))
              ((?Co-operation |Enhanced_Solutions|)))
```

Co-operation between departments foster partnerships and collaboration. This involves having joint goals and a reliance on departments to accomplish the goal. When concepts from an ontology are imported from other ontologies, the dependencies that exist among them are managed using the reproduction of concepts to be imported (Kozaki et al. 2007). In the same vein, when dependencies amongst services exist, they reproduce all definitions related to the concepts produced. Services that are delivered in silos take more time in problem resolution. This could involve sending a client to multiple locations and could lead to information that is incomplete or inaccurate.

5. In conclusion

In this paper, we have discussed the role of ontologies in the delivery of E-Government services, the advantages of reusing the components and solutions that cut across these services as well as the inherent risks and challenges that a government may face with reusing components. The use of ontologies provides an effective

means of capturing, describing and exploiting knowledge in the area of E-Government with its rapidly evolving departments and services. We presented the use of a developed E-Government ontology in multiple areas of application in Electronic Government for gauging risks that may face a government in areas of reuse.

A major challenge faced in modelling the ontology is the fact that the E-Government domain is an expansive one and insufficient tools have been developed to date during the research to enable accurate curation of all relevant terms. Once further developed, and supported by a suitable set of user tools the testing of the ontology in a national setting, currently planned to be that of the Nigerian government will take place.

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How Technology can Help in Reducing Romania's Budget Deficit

Marioara Piroi and Mihai Paunica
Academy of Economic Studies, Bucharest, Romania
m.piroi@groupconsulting.ro
mihai.paunica@medu.edu.ro

Abstract: During the last years, in Romania, the budget is submitted by the Government to the Parliament with delays, the reason being large amount of information coming from all the public institutions and the lack of tools to handle it. The information management is performed manually and, as a consequence, each change needs to be cascaded down manually, adding time pressure. Because of this specific way of handling information, not rare are the cases where, in the end, the numbers simply do not correlate. Offering the civil servants the opportunity to work with the help of a dedicated IT platform will allow for real-time collaborative work, contributing to better management of public money and to the reduction of deficit. This article presents the principles and the ways of functioning of this IT platform. In the coming period, this software could bring value-added for the development and reporting of the budget in accordance with ESA 2010.

Keywords: information, communication, technology, budget, management

1. Introduction

In a recent piece of research, based on an EU-wide survey which we have distributed to all the Courts of Audit in the EU Member States, we have demonstrated the link between the use of technology and the performance level: in the countries where a dedicated IT tool is used, the number of audited entities is larger and the actual duration of the audit mission is lower.

We have applied the same thinking in the current article, to see if technology can be used towards better state budgeting. For our purpose, we translate better budgeting as lower deficit. We can define the state budget as the main financial instrument available to the state. With this instrument, the state ensures stability, takes development decisions, takes on investment loans, handles public deficit. Generically, we can see the state budget as a scale, with revenues on one tray and expenses on the other. The state budget deficit appears due to either the increase of expenditure or to the decrease of revenue.

Given the current economic developments at national and international level, a natural question revolves around which budgeting method to choose, cash-based or accrual-based. Maciuca and Socoliuc (2014) outline the advantages of accrual-based budgeting and showcase the example of other EU Member States, drawing attention to the limitations of the transition from one system to the other, such as resistance to change and increased complexity.

Whichever the method used, there is a need for an analytical balance sheet of revenue and expenses. The balance sheet represents the result of processing a number of documents and, as a financial statement, it offers the ability to see in real time if the financial position is plus or minus. At micro level, for a company, this translates in profit or loss. At macro level, for the state budget, this translates in surplus or deficit.

According to Turlea, Stefanescu and Dumitru (2009), maintaining the delicate balance between the limited public resources and the increasing public demands requires a tight audit and control mechanism, in order to provide the economy with efficiency and effectiveness. According to Loebbecke (2003), there is a clear value added from the use of dedicated IT platforms in the case of an audit. Because auditing the state budget is only one stage, what about the planning and implementation stages? Would there be a way in which the current technological developments, including cloud computing and collaborative working, improve the ways in which the state budget is developed, implemented, monitored and audited? We will aim to answer these questions in the second chapter, following which we will draw the main conclusions of our research on the link between the use of technology in the public sector and the budget deficit.

2. Research design

As part of our case study, the main research question of the article is if the use of up-to-date technology in the Romanian public administration can influence the level of budget deficit. To answer this question, we have developed two hypotheses: the first hypothesis looks at the relation between cash-based and accrual-based

budgeting and states that the two should converge on long-term, in absolute values. The second hypothesis test the correlation between the level of technology and the quality of the budget monitoring.

The methodology we have applied in this article combines quantitative and qualitative data: we have used the compared approach and the statistical analysis for the quantitative part, and the analysis of the law texts for the qualitative part. During our external study we have collected Eurostat data, as well as public data from the Romanian Ministry of Finance and the National Statistics Institute in order to bring together information about cash-based and accrual-based budgeting and to analyse their differences. We have also analysed the reports of the Romanian Court of Audit. Based on the information gathered and on our own set of interpretations, we have derived the need for a dedicated IT platform for budget collection, management, monitoring and auditing. The last part of the paper deals with the principles of developing such a platform.

3. The problem: Difficulty of managing deficit information in real-time

The difficulty of having deficit information in real-time stems from the outdated information exchange mechanisms, generating a low speed of information flow across the administrative chain. Romania is a tax-heavy country, not necessarily in terms of the value but in terms of the number of taxes: more than 800.000 tax contributors were paying, on average, 12 taxes each month. They were declared and paid electronically, but there is no platform linking the information, in order to have reports. The difficulty is also generated by the double budgeting methods employed. Romania reports the state budget deficit in two ways: one is cash-based, one is accrual-based. Why is cash-based budgeting used? Because it is easier to calculate. Why is accrual-based budgeting used? Because it is required by the EU.

But does the EU require this double system of budget accounting? As general background, Eurostat is using the European System of Accounts (ESA) methodology, based on accruals, or commitments, which allows it to be able to have a common base of statistical research across the EU, as well as to be able to compare the statistics of the EU Member States. Up until September 2014, the ESA95 was used, replaced afterwards by the ESA 2010. The European System of Accounts „records flows on an accrual basis when economic value is created, transformed or extinguished, or when claims and obligations arise, are transformed or are cancelled" (Eurostat - Manual of Government Deficit and Debt, 2010). The budget based on the ESA standard is developed starting from the cash-based budget, adjusted with the budget revenue to be collected and the expenses to be performed, i.e. budget expenditure incurred but not yet paid by the end of the financial year.

At the same time, why do we still need cash-based budgeting? Unlike the accrual-based method, which takes into consideration the commitments, the cash-based method of computing the state budget deficit counts the 'money-in-the-pocket'. And this needs to be permanently recorded and kept up-to-date: every government needs to know its financial status. As an example, the state is in the position of being the largest employer in the economy. Monthly, the state needs to pay the salaries to the employees in the public sector. If the value of the cash it holds is lower than the amount which needs to be paid as wages, then the state would need to borrow money, using one of the traditional ways: T-bonds, International Financial Institutions etc. Otherwise, it will be difficult to convince the public servants that they will have to wait to be paid 10 days later because of an accrual which will mature 10 days later than the payday.

Our hypothesis is that different calculation methods lead to different results, but there is always a common base which needs to be underlined. Having two calculation methods is not a bad thing in itself, as long as each is used consistently and for specific purposes: it allows for the cross-check and for the ability to forecast some of the financial movements which, in case of the state budget, need to be carefully balanced, because of the wide impact in the economy. The bad thing is not being able to consistently refer to the same basis for computing values across a larger number of countries.

In the table below we have collected data from the Romanian Ministry of Finance website regarding the state budget revenue, expenditure and deficit. On the same website, two separate sections present two separate sets of data, one referring to the cash-based budget and one referring to the accrual-based budget. The cash-based method generally allows for the understating of revenue and expenditure, when compared to the accrual-based method. The resulting deficit is therefore different, depending on which method is used. And, in the absence of a common methodology, reporting a "deficit" based on cash-based budgeting, when the other Member States are reporting deficit based on accruals, can be misleading.

Table 1: State budget: cash-based vs. accrual-based (ESA), 2008-2013 (in millions of RON)

YEAR	GDP	STATE BUDGET: CASH-BASED				STATE BUDGET: ACCRUAL-BASED (ESA)			
		Reve nue	Expen diture	Defic it	Deficit (% of GDP)	Revenu e	Expenditur e	Deficit	Deficit (% of GDP)
2008	514,7 00	61,1 51.0	80,886 .4	- 19,7 35.4	-3.8	172,95 8.5	202,200.6	- 29,242. 1	-5.7
2009	501,1 39	54,6 78.3	89,851 .7	- 35,1 73.4	-7.0	160,85 3.0	206,161.9	- 45,308. 9	-9.0
2010	523,6 93	68,0 50.3	102,62 7.8	- 34,5 77.5	-6.6	174,44 5.6	209,997.3	- 35,551. 7	-6.8
2011	556,7 08	79,3 79.2	106,08 8.7	- 26,7 09.5	-4.8	188,80 5.4	219,706.6	- 30,901. 2	-5.6
2012	587,4 99	87,1 71.5	104,56 9.8	- 17,3 98.3	-3.0	197,68 9.2	215,112.7	- 17,423. 5	-3.0
2013	628,5 81	90,6 98.3	110,12 8.0	- 19,4 29.7	-3.1	205,50 3.0	219,811.3	- 14,308. 3	-2.3

Source of data*: Romanian Ministry of Finance http://www.mfinante.ro/deficit.html?pagina=domenii

In order to obtain information on the budget expenditure in the ESA 2010 format, with the help of the standardised statement S1001, the public institutions report on a monthly/trimester basis the budget expenditures incurred but not yet paid, therefore with no cash outflow. These expenditures are correlated with the information in the quarterly financial statements and the Ministry of Finance is regularly informed using the information collected in the regular reports of the public institutions.
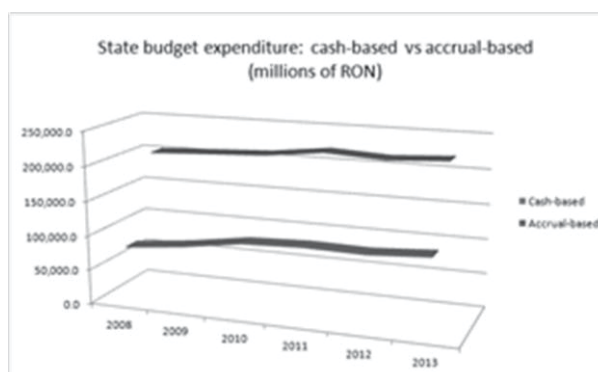

Figure 1: State budget expenditure: cash-based vs accrual based (millions of RON)

Whereas the public expenditure is recorded in a centralised manner, the public revenue does not benefit of an integrated IT platform linking the accounting of the budget income, so there is a permanent mismatch between the synthetic evidence and the analytical evidence at the level of the public institutions.
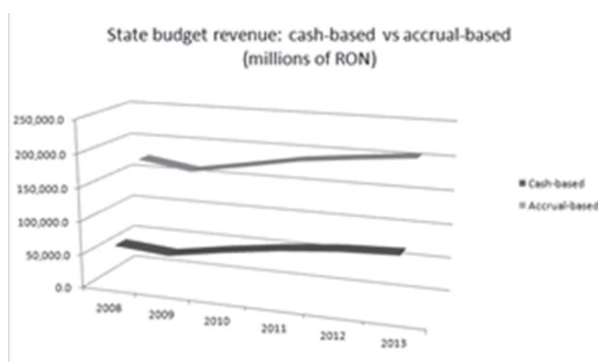

Figure 2: State budget revenue: cash-based vs accrual based (millions of RON)

The state budget deficit trend tends to be aligned, but it is not identical, as we can see below:
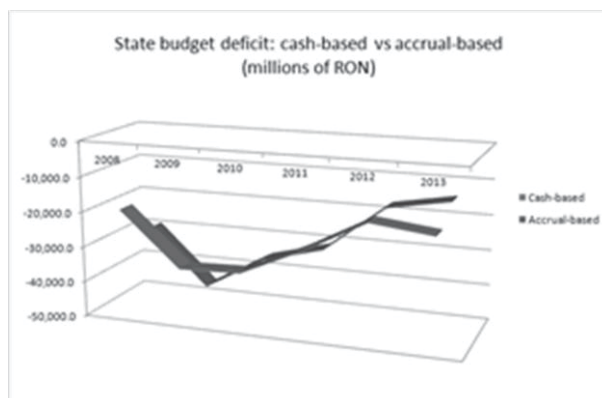

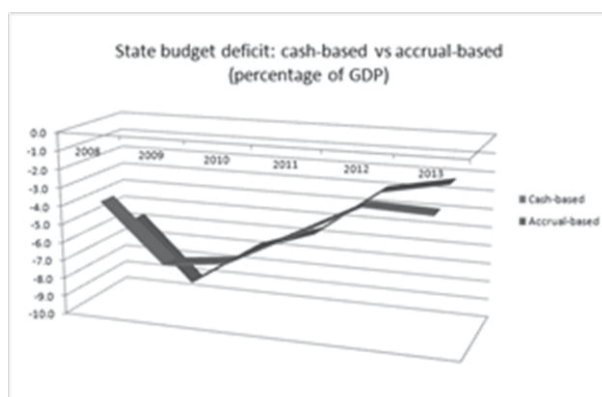**Figure 3:** State budget deficit: cash-based vs accrual based (millions of RON)

Figure 4: State budget deficit: cash-based vs accrual based (percentage of GDP)

Assuming the accrued revenue differences are not carried over from year to year, the calculation of the totals presents the image of an ever-increasing difference between the cash-based and the accrual-based budget figures. Our assumption is also that the differences, highlighted in yellow in the table below, are the result of the lack of technology to properly count for deficit.

Table 2: State budget: cash-based vs. accrual-based (ESA), differences and totals, 2008-2013 (in millions of RON)

YEAR	GDP	STATE BUDGET: CASH-BASED				STATE BUDGET: ACCRUAL-BASED (ESA)				DIFFERENCES		
		Revenue	Expenditure	Deficit	Deficit (% of GDP)	Revenue	Expenditure	Deficit	Deficit (% of GDP)	Revenue	Expenditure	Deficit
2008	514,700	61,151.0	80,886.4	-19,735.4	-3.8	172,958.5	202,200.6	-29,242.1	-5.7	111,807.5	121,314.2	9,506.7
2009	501,139	54,678.3	89,851.7	-35,173.4	-7.0	160,853.0	206,161.9	-45,308.9	-9.0	106,174.7	116,310.2	10,135.5
2010	523,693	68,050.3	102,627.8	-34,577.5	-6.6	174,445.6	209,997.3	-35,551.7	-6.8	106,395.3	107,369.5	974.2
2011	556,708	79,379.2	106,088.7	-26,709.5	-4.8	188,805.4	219,706.6	-30,901.2	-5.6	109,426.2	113,617.9	4,191.7
2012	587,499	87,171.5	104,569.8	-17,398.3	-3.0	197,689.2	215,112.7	-17,423.5	-3.0	110,517.7	110,542.9	25.2

YEAR	GDP	STATE BUDGET: CASH-BASED				STATE BUDGET: ACCRUAL-BASED (ESA)				DIFFERENCES		
2013	628,581	90,698.3	110,128.0	19,429.7	-3.1	205,503.0	219,811.3	14,308.3	-2.3	114,804.7	109,683.3	5,121.4
TOTAL		441,129	594,152	153,024	-	1,100,255	1,272,990	172,736	-	659,126	-678,838	19,712

(*Source of data:* Romanian Ministry of Finance)

Now that we have presented the differences between the two budgeting methods, we understand that, as long as they are used consistently, they bring value-added to the decision-maker, which can take better decisions on how and when to spend the public money.

So why is this double counting still a problem? Because of the way in which information is handled in the Romanian public administration: the pyramid type of organisation is used as well with the information flow, which generates bottlenecks in the points where the IT skills of the information nodes are not so well developed. Currently, the budgetary account is not based on a balance sheet but on information received through various means from the divisions of the Ministry of Finance. There is no software to coordinate this information in real time. The collection of budget resources from taxes is ensured by the Tax Agency with the help of a software which does not generate statistical reports. The Tax Agency has branches in all administrative units, which increases the complexity. At the same time, the cashing in of taxes is performed through the Treasury, which afterwards shares with the Tax Agency the information.

Due to the lack of an integrated IT platform, there is a high risk for data corruption. Pen and paper? Tick. Spreadsheets? Tick. Email attachments? Double tick. Collaborative working, real-time, between multiple public institutions? Not yet.

4. The proposed solution: Integrated IT budgeting platform

There is a stringent need to update the way in which the public institutions share information: this objective can be achieved through the use of an integrated IT platform, linking all the public stakeholders which share responsibilities in budget development, implementation, reporting, control and auditing. The software would need to be structured in 3 module, corresponding to the main 3 categories of users: the Ministry of Finance, the State Treasury, and the Court of Audit.
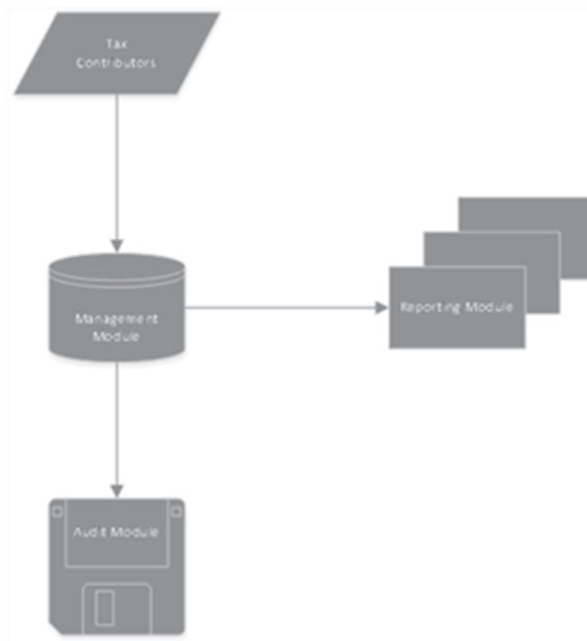

Figure 5: Modules of the IT platform

The Management Module needs to be composed of two sections: an administrative section, with information about the contributors, and a collection section which shows the taxes declared by each contributor. The software thus becomes a control instrument for budget resources and issues alerts each time a contributor does not file the monthly declaration. Also, the module plays an accounting role, offering the possibility to automatically create the accounting records, correlated with the declared taxes, and the import of the accounting evidence into an accounting software. The aim of the module is to ensure that all taxes, which are sources of revenue for the state budget, are correctly declared, and in real time. This software allows for increased transparency and for accurate estimations regarding the budget resources created by the economy, their volume and payback period in case of borrowing.

The Management Module should have a folder for each tax contributor. Each folder should have 2 sections:

▪ An administrative section, where each contributor is uniquely identified with a tax code and with digital signature. The taxes to be paid are defined in this section, based on the activity type of the contributor. When a change in the tax vector is introduced, all subsequent changes should be performed automatically. If the tax contributor does not follow the Tax Procedure Code with regard to the deadline for statements, the software should automatically generate a note through which the fine is communicated to her. Currently, in Romania, there is a 5-year period in which the tax agency can inspect the files and some of the facts may be prescribed if the tax inspectors do not come personally to notice the delay. At the same time, the folder will be closed at their former location for the contributors who move their tax location within the country and automatically reopened at their new tax location. The crosscheck will come from the IT system of the Tax Agency. Additionally, the contributor may select a different activity type, but this will generate additional taxes and fees and this needs to be recorded under the personal folder.

▪ Every month, the contributor will file, through this IT platform, all the statements about the contributions due to the state. The contributor is offered the possibility to see reports on a regular basis, e.g. monthly.

The Reporting Module ensures the interface between the Ministry of Finance and the other institutions involved in budget control, allowing the the monitoring of degree of achievement of the objectives assumed through the budget approved by the Parliament. The National Statistics Institute could also have access to the Reporting Module. With the help of this module, the Ministry of Finance is informed in real time about the manner of using budget resources. The Reporting Module manages the resource collection, issues alerts, anticipating the amount of money needed to cover deficit.

For instance: first, the contributor declares to the Tax Agency what she is due to the state budget in terms of obligations, by means of a tax statement which she submits on a regular basis. Afterwards, when the contributor pays her taxes, the money goes to the Treasury, where it is sorted according to tax codes. The Treasury sends the recordings to the Tax Agency and this closes the circle.

The Reporting Module should include the ability to plot on the country map, developed according to the NUTS classification of the EU (Nomenclature of territorial units for statistics) the figures related to tax payments, up to the last level of the local communities. This could be easily done by using the already-existing tax-codes, which, in Romania, are a sequence of digits, starting with RO if the contributor is a VAT-payer, or without RO if she does not pay VAT.

The map approach would bring a number of advantages:

▪ first of all, the map would allow for the correct allocation of human resources, i.e. civil servants, to the regional/local tax authorities, depending on the number of contributors;

▪ the map could bring in information on the types of business activity in the economy. This would allow for the correct application of taxes where they are most suitable, e.g. an excise tax in a region where vineyards are the most common. This would allow segmenting the national map into areas, so as to show which are the highest sources of tax income;

▪ the map would also allow for the rapid viewing of the areas with the highest local deficit, where the symptoms related to tax payment delays, or even non-payment, are the most frequent;

▪ using the map as an instrument to monitor and to diagnose the country's overall health status would justify the need for additional instruments. For instance, the existence of a body of mobile tax inspectors would

allow for the rapid deployment of a sufficient number of them to the problem areas, in order to identify and treat the problem at source.

The Audit Module can be created based on the data of the two previous modules and can represent a real working instrument for the Court in auditing the state budget. The Court of Audit could most easily use ths module by having direct access to the database, or, indirectly, through importing the database. The auditors could perform at their location part of the audit work, such as the determination of the significance level and the sampling size. The direct access of auditors will allow them to notice the irregularities in time, or to prevent them. An important advantage of this module is the increase in the number of audited entities, and this increase in performance will contrbute to the reduction of deficit.

5. Limitations of the current study and suggestions for further research

The availability of data was considered a minor limitation for the purpose of this research. Due to the origin of the open data, i.e. the Romanian Ministry of Finance, the sets of data are considered to be accurate. There are however two main types of suggestions for further research: the first type is to deepen research in Romania, at national level, by including an impact analysis of the introduction of a dedicated IT instrument for budget development, management, monitoring and auditing; a second type of suggestion involves extending research at horizontal level, to the other EU Member States, in order to benefit for the best practices at EU level. This doube approach would allow the avoidance of some of the common pitfalls of implementing new software, such as resistance to change, viruses, hackers etc., which affect most of the e-governance projects.

6. In conclusion

The main research question of the article, if the use of up-to-date technology in the Romanian public administration can influence the level of budget deficit, has found a positive answer throughout our research. The first research hypothesis, looking at the relation between cash-based and accrual-based budgeting, has proven to be false: even if there appears to be a correlation between the relative values, in absolute values however the differences between the two budgeting methods keep on accumulating. The second hypothesis, testing the correlation between the level of technology and the quality of the budget monitoring, has proven to be correct.

To sum up, in the first part we have demonstrated the increased complexity of the Romanian public administration and the potential leaks of money from the state budget due to the use of outdated technology which makes monitoring hardly an option.

In the second part we have presented the principles of an integrated IT platform which would allow for the coordination of the various stakeholders involved in budget planning, development, implementation, monitoring and audit. The automatic reports based on the information collected by the Treasury can turn into working instruments for the Court of Audit. The tax map shared by the Tax Agency can form the basis of investment programmes in the geographical areas where the deficit is the highest.

The IT platform will ensure the ability to view the two sides of the revenue coin at the same time: on one hand, the tax income, based on the declared tax values recorded by each individual contributor, according to the accrual-based ESA 2010 – and the collection of taxes which represents the cash-based source of revenue. The major merit of the integrated IT platform is that it will bring information on the public money in real time to the decision-makers and to the general public.

Integrating the three modules into a single IT platform, with shared access to a common database of recordings, would bring economies of scale. The format would be similar and the speed of the information flow would be significantly improved. Having instant access to information would also increase peer pressure towards the increase of transparency in revenue collection and in expenditure. With a better streamlining of revenue and expenditure, the deficit would be reduced.

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Information and Communication Technologies for Development (ICT4D): A case study of Jigawa State Government in Nigeria

Kanya Rislana, Alice Good, Carl Adams and Philip Scott
University of Portsmouth, Portsmouth, UK
Rislan.kanya@bazeuniversity.edu.ng
Alice.good@port.ac.uk
Carl.adams@port.ac.uk
Philip.Scott@port.ac.uk

Abstract: Historically, there has only been a limited focus on evaluating the impact of ICT projects vis-a-vis development, and little concrete analysis of these initiatives in terms of their long-term effects. Whilst there is research that documents the scale of disconnect between policy objectives and policy outcome in ICT4D, the findings are not applicable to Jigawa State. This study will develop and test a context-specific model of good practice for ICT4D applicable to decision and policy makers across Nigeria. The research approach used in this research was interpretive within multi-level Case Study context. The results from the research will contribute to an understanding of success factors in a comparable, context-specific case country and significantly influence policy making and implementation in Jigawa State in particular and Nigeria in general. For the first time in the Jigawa state, ICT4D policy will be based on empirical evidence. The outcome of this research will also assist in theorising and deepening the understanding of the application of ICT in development practice with specific reference to Jigawa in particular and Nigeria in general. The unique and novel combination of Sen's Capability Approach and Heek's Design Reality Gap Model in examining ICT4D policy outcome will provide significant new insights on how the gap between policy objectives and outcome might be eliminated.

Keywords: Capability approach, design reality gap, ICT policy, ICT4D, ICT4D project evaluation

1. Introduction

It has been widely accepted in Information and Communication Technologies for Development (ICT4D) literature that Information and Communication Technologies (ICT) can foster socio-economic development, however, the process through which this occurs still remains unclear (Thapa and Sein 2010). Historically, there has only been a limited focus on evaluating the impact of ICT projects vis-a-vis development, and little concrete analysis of these initiatives in terms of their long-term effects (Ibrahim-Dasuki& Abbott, 2011).
Although ICT4D intervention evaluation conducted by Heeks (2003), Thapa (2012) Dasuki (2013), Dasuki Et al (2015); and others have documented the scale of disconnect between policy objectives and policy outcome in ICT4D, findings from none of these studies is applicable to Jigawa State, in Nigeria. This study intends to evaluate factors responsible for promoting and inhibiting ICT4D intervention in the state, examine factors responsible for the disconnect between ICT4D design expectation and policy implementation, develop and test a context-specific model of good practice for ICT4D applicable to decision and policy makers across Nigeria and beyond.

1.1 Statement of the Problem

ICT adoption can make a valuable contribution to development, however, at present, the majority of eGovernment projects fail either totally or partially, according to Heeks (2003). Heeks explains that 35% of eGovernment project in Africa are total failures, 50% are partial failures, while 15% are regarded as successful project, and recently World Bank (2011) indicated that about 70% of ICT4D projects fail to achieve their objectives. The statistics above indicated that majority of eGovernment projects in developing counties fail to achieve their aim, or partially achieve their aim. If the cost associated with project as stated by Heeks (Direct financial, indirect, opportunity, political, beneficiary and future cost) are well known by the project shareholders and properly quantified the rate of the failure will be significantly reduce, however most of the stakeholders are not aware of the associated cost of the project and can't easily quantify the economic loss of many ICT4D projects. The case is not different with that of Jigawa State as no empirical evidence shows to what extent the state owned ICT4D policy and implementation is success or a failure.

The research will be conducted in three phase see appendix 1, phase one conducted holistic review of ICT4D relevant literature and Jigawa state case (Kanya& Good, 2012), and gain deeper understanding of the phenomena. Phase two has examined the factors promoting and inhibiting the effectiveness of ICT4D

intervention policy in Jigawa state and reveals the factors responsible for the disconnect between ICT4D design expectation and policy implementation(Kanya& Good, 2013), Phase 3will be conducted to develop a model of good practice for practitioners and policy makers through combining Sen's Capability approach and Heek's Design Reality gap work.

1.2 Aim of the research

To critically evaluate the effectiveness of Jigawa State Government Information and Communication Technologies for Development (ICT4D) intervention policy and develop a model of good practice for practitioners and policy makers".

1.3 Objectives of the research

- To critically review literature on ICT4D in order to gain a deeper understanding of the phenomena as well as conceptualise ICT as applied to development.

- To study issues associated with Jigawa State ICT4D intervention policies.

- To critically examine the disconnect between ICT4D design expectations and policy implementation using design reality gap model.

- To undertake a comparative study of ICT4D intervention in Jigawa State in Nigeria and Veracruz in Mexico.

- To develop a model of good practice for ICT4D that can be applied widely by policy makers across Nigeria.

1.4 Research Questions

After careful consideration of the research objectives the following research questions emerged:

- What are the factors promoting the effectiveness of ICT4D intervention policy in Jigawa state?

- What are the factors inhibiting the effectiveness of ICT4D intervention policy in Jigawa state?

- What are the factors responsible for the disconnect between ICT4D design expectation and policy implementation?

- What are the extents to which policy implementation approach to ICT4D differs in Veracruz, Mexico to that of Jigawa in Nigeria?

- How can Sen's Capability Approach and Heek's Design Reality Gap model are combined to examine ICT4D policy outcomes?

- How can Sen's Capability Approach and Heek's Design Reality Gap model are combined to improve ICT4D policy outcomes?

1.5 Research contribution and impact

The research seeks to make the following contribution and impact: Although studies by Heeks (2007) and others have documented the scale of disconnect between policy objectives and policy outcome in ICT4D, findings from none of these studies is applicable to Jigawa State. This study will develop and test a context-specific model of good practice for ICT4D applicable to decision and policy makers across Nigeria. The unique combination of Sen's Capability Approach and Heek's Design Reality Gap Model in examining ICT4D policy outcome – never done before – will provide significant new insights on how the gap between policy objectives and outcome might be eliminated.

The results from the research will contribute to an understanding of success factors in a comparable, context-specific case country and significantly influence policy making and implementation in Jigawa State in particular and Nigeria in general. For the first time in the Jigawa state, ICT4D policy will be based on empirical evidence. The outcome of this research will assist in theorising and deepening the understanding of the application of ICT in development practice with specific reference to Jigawa in particular and Nigeria in general.

2. Summary of Literature Review and the proposed framework

Whilst there is ICT4D literature available, the majority of the literature makes no or very little impact, with several epistemological shortcomings (Raiti, 2007). This then provides a demand for rigorous and critical ICT4D research. Harris (2013) stated that "researchers and policy-makers operate with *different values, languages, time-frames, reward systems and professional ties* to such an extent that they live in separate worlds. As a result, *research-based evidence* is often only a minor factor when policies for development are formulated and practices shaped, and too often new public policies are rolled out nationally with little trialling or evaluation. Moreover, university researchers report structural barriers and disincentives to engaging in knowledge translation activities that might advise practice and policy formulation. Secondly, *impact is regarded differently by each community*, with academics fretting over publications, citation counts and journal impact factors, while practitioners look for actionable advice that can be put to use for increasing the effectiveness of public services and policy."

The above theme clearly shows a higher level of disconnection between policy makers, practitioners and academia and has given rise to many inconclusive ICT4D researches over the last decade. There is a fundamental need for better analytical ICT4D research; indeed Heeks (2007) stressed the need for ICT4D research to be drawn from preexisting conceptual frameworks. This research will operationalise the notion of Sen's Capability approach in which the framework will be applied to enquire upon the impact level of the intervention packages, and Richard Heeks' design reality gap will be used as an evaluative lens. A proposed hybrid multi-level framework was proposed in undertaking the research, as seen in Figure 2.1

There has been much ICT4D research that has used multi-level theoretical framework, Appendix 3 summarises the most recent work, however no one has operationalised the use of Sens Capability approach and Design reality Gap framework (See appendix 2), this research intends to make a novel contribution by combining the two frameworks, whilst conducting the enquiry. This research will contribute by building a novel process of building people-centered ICT4D intervention, and will help in promoting and understanding of ICT4D project champion, which is now very well-articulated in the post 2015 development agenda (See Renken and Heeks 2013 and Heeks 2014).

The proposed framework inherited the concept of development from Sen (1999) in which it builds the foundation of theoretical paradigm for human development; Sen proposed that individuals need a 'capability' to expand their freedom of living and in turn expand their welfare economy. Many however who have attempted to operationalise the concept of Sen in their development have failed, Kleine (2010) states that "*in order to properly understand the contribution of ICTs to development efforts, it is necessary to firstly, define which development paradigm we are working with and secondly, to refine our understanding of development processes to recognise their systemic nature*".

The majority of ICT4D intervention failures are not limited to her argument; usually ICT interventions are not adequately defined within a clear development paradigm. To address that, Kleine in fact (2010) proposed a systematic mapping of development process and design and planning of choice.

To do this we proposed that development approach must be well grounded within Sen Capability approach (A dimension), thus   ICTs as described by Kleine (2010) could be seen as useful tools in a processes of empowerment, when proper conversion factors are properly in place (D, E and F dimensions). Taking a view of ICT as a tool for achieving capability for both institution and individual and the frequent number of ICT4D intervention failure, we propose that the design reality gap framework (C dimension) be used as an evaluative lens during pre-implementation, mid-implementation and post implementation of ICT4D project, as proposed by (Heeks 2003). The conversion factors would be used as a catalyst to stimulate ICT project planning, implementation and evaluation, which will address the gap associated with ICT application in development (B1 and B2 dimension).
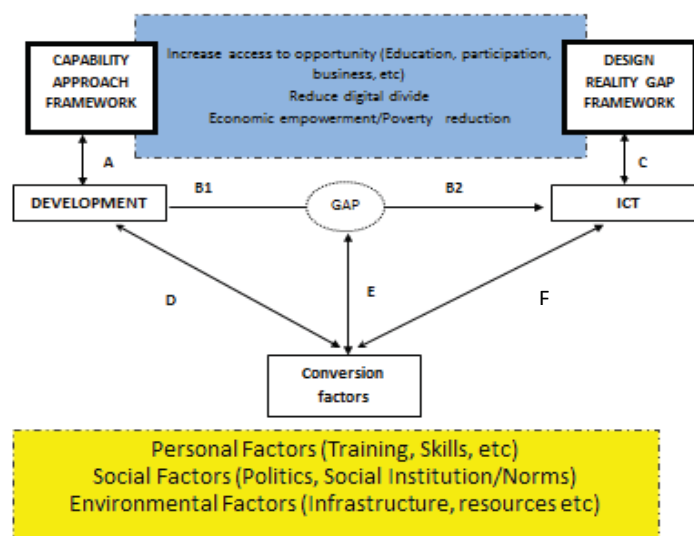
Proposed framework

Figure 1: the proposed research framework

3. Methodology

3.1 Methods

The qualitative case study particularly broad interpretive approach was applied to the research problem. The philosophical basis of interpretive research is inherited from the ethnographic research tradition in anthropology, hermeneutic, and phenomenology (Klein & Myers, 1999; Walsham, 1995a). Interpretive approach can better explain the complex socio-technical interaction process using ethnographic interviews, thick case description, and empirical observation (Devinder 2011). The research approach adopted an interpretive within multi-level Case Study context, case study as described in (Yin, 2013, P. 16) as "an empirical enquiry that investigates a contemporary phenomenon in depth and within its real-world context, especially when the boundaries between phenomena and context may not be clearly evident". To gain deeper and richer data this research explored five cases of ICT adoption in the state, even though all the five case has similar aims and objectives which is economic empowerment however the approach to each of the case differed, each of the case findings has given us a new dimension and richer context to the overall research. The research has adopted triangulation (Yin, 2014) as mix-method of data collection has been employed. In the earlier phase of the research data collection methods like document review, contents analysis, informal interview, brainstorming, field trip and observation was performed, this has given us a deeper understanding of the cases and contextualised our research.

In this phase five pilot studies has been conducted. In the five pilot studies, 18 open-ended interviews and 43 closed-ended interview were conducted in Jigawa and Abuja. Participants were drawn from previous and current stakeholders of the policy, intervention. This has given a critical understanding of the holistic view about the current and past issues associated with the policy, such as the key formulators of the policy, beneficiaries, and the current policy implementers of the intervention. However phase three of the research will evaluate extent to which policy implementation approach to ICT4D differ in Veracruz, Mexico to that of Jigawa in Nigeria and will assist in theorising and deepening the understanding of the application of ICT in development practice and propose a new model on how Sen's Capability Approach and Heek's Design Reality Gap model be combined to examine and improve ICT4D policy outcomes.

3.2 Data analysis and interpretation

All data collected were analyzed using set of principles of thematic analysis (Braun and Clarke, 2006), in order to capture the main themes generated during interview, content analysis, observation, field trip, and the context generated from the literature review. In total 7 themes was generated using the ITPOSMO dimension as adopted from design reality gap (Heeks 2003), with a guide from capability approach framework.

4. Preliminary findings

4.1 The State ICT4D policy formulation in the capability approach perspective

Even though the role of technology which ICT is a major components was not clearly mentioned in the capability approach perspective, but as argued by (Sen, 1999) it can be seeing or well positioned as an intervention that can offer set of functioning which can help in stimulating development and wellbeing of an individual. The capability approach framework as applied by (Zheng and Walsham, 2008; Hattaka and De, 2011; Hatakka and Lagsten, 2012) reveals that ICT has well fit in within the capability approach perspective. The case of Jigawa state ICT4D can be as well rooted within the framework of Sens capability perspective as stated by one of the key policy maker:

> *"Jigawa state has very low GDP and par capita income, is lacking industries and it has high level of unemployment, very agrarian state, in 2001 to solve the problem, Jigawa state adopted the notion that there is huge demand of ICT graduate and a justification that ICT can become an enabler to the economy through which we can become outsourcing destination or export of man power and we can as well leverage on that to improve public service delivery and efficiency."*

The ICT intervention in Jigawa has emerged through several loop that can be associated within the political timescale and is rooted within the state developmental strategy, however the policy is still lacking proper inter-institutional collaboration and coordination as argued by another policy maker is well grounded within the various Government establishment:

> *"There was a high level of collaboration, in the sense that, part of the governing council of informatics consist members from Ministry of Science and technology, by default the have the direct linkage at that level I can say yes, there is some kind of policy coordination between the two. But beyond that there was no linkage that you expect and say this is related administratively; even the relationship to provide the service by galaxy to the ministry of science and Technology is of commercial services agreement."*

Our findings indicated that the difference between the potential and achieved functioning (Robeyns 2005a) of the policy is not well accounted by the various policy implementation agency, this has make it very impossible to clearly justify if the policy is a success or a failure, our findings reveals that:

> *"Well we don't have anything empirical, but I do know that if you look at the land scale across the industry, if you mention ICT skills in Nigeria, Jigawa state still top in the rank, it has developed a reputation in the Federal level, it has developed a high scale ICT manpower who manned many organizations, right now as a product of Jigawa system I am the MD of Galaxy backbone which is in charge of implementing Nigeria ICT policy, the Managing director of Nigeria internet exchange is from Jigawa, in PPMC one of their lead network operation people is from Jigawa, if you go to EFCC you will find spread of people around there, there is quite a lot of personal in many MDA, I think there is need to do an empirical research to find out this" (Former MD/CEO)*

Another CEO of one of the policy coordination agency reveals that:

> *"There is two things there, even policy in general need to be review periodically, what is right 10 years ago my not be right today, I think as a first step is to review the policy as a whole. However to the extent the initial policy was partially gotten right then, but now may not be right. For now the policy around ICT manpower training has been run very well, a lot has been trained and are actively engaged and the impact is visible."*

The result from our findings suggested that the policy has enable many functioning in the area of developing ICT capability set which has placed the state in a competitive edge, however poor coordination among the implementation agency has hindered the state to achieve other potentials like generating revenue for the

state. Our findings also reveals that the policy was challenged by many conversion factors like poor state of basic infrastructure like power supply, poor literacy level, high level of politicization of the intervention among the opposition party.

4.2 Critical Evaluation of Jigawa ICT4D interventions

The level of ICT4D in Jigawa state is still at threshold level, even though the availability of basic infrastructure is commensurable, however the primary objectives of Jigawa state ICT4D in generating 2 billion naira beginning from 2013 fiscal year is not feasible, considering that all the strategic action plan is not properly implemented. The second objective of producing about 500 ICT professional is realisable considering the number of indigenous professional graduated from the Institute which are now major key stakeholders in the public sector reform. To date our findings (Kanya& Good, 2012) reveals that the state ICT4D strategy revolves around five intervention project, this paper summarised findings of the three interventions as detail below.

4.2.1 Jigawa Informatics Institute

Since its establishment in 2001, our findings reveals that "*about 7,000 students graduated and many of them are today either part of the emerging eGovernment sector or part of entrepreneur's community setting up small ICT businesses outfit in the new Jigawa*" (I. Umar). The institution has evolved through two region of a political time scale from 1999 to 2007 and from 2007 to date, our findings reveals that the first political cycle of the intervention have witness "*a massive physical infrastructural development, aggressive campaign to sensitize general public to embrace the intervention and building franchising, linkage and international collaboration with institutions like informatics, C-tech among others*" (Former Permanent Secretary).

However the second cycle of the policy encompassed "*localization, indigenization of the institution through transferring the management of the institution to the indigenes, passing an act by the state legislature to recognized the institution as a state owned institute, and getting an accreditation from the National Board of Technical Education.*" (Director Academic Planning).Our analysis reveals that there is coherent continuation of the institute within the two political loop however the quality and quantity of the graduate produce, the reputation, and the national acceptance of the institute has significantly reduce within the second political loop.

> "*You can't localized ICT knowledge transfer, previously we have students from every state in Nigeria, we have more than 15 expatriates Lectures and instructors from south East Asian countries who are proven to be qualified and up-to-date in the area they are teaching, the level of teaching facilities we have then are not up to what is obtainable in the institution now, I don't think there is any resident expatriate in the institution now, and I am not sure if there is students from each local Government of the state not to talk about other states. You can have a check of the lecture notes the are still similar to what they have been using over 10 years ago, there is need for a total overhaul of the institution*" (Former Executive Secretary).

The above fact have been validated by our visit to the institution in which we confirmed that the enrolment has significantly reduce and there is poor quality control and the curriculum used has not been updated for over 10 years even though there is little adjustment in the modules tough by the institution.

4.2.2 International ICT scholarship

Jigawa State government sponsored about 500 indigenous students to study ICT courses in foreign schools. (Jigawa State Comprehensive Development Framework 2009). Our findings indicated that quite number of beneficiary of the scholarship are among the key stakeholders of Jigawa State ICT sector and Nigeria Government, other have found a placement in public sector, however a larger number of beneficiaries are stranded as they are yet to complete their studies considering the nature of the scholarship. Our findings indicated that there is a mismatch between the skill set required by the state eGovernment and the skill set obtained by majority of the graduates, for example the state owned official website was outsourced to a third party providers, and majority of other ICT services like basic computer literacy trainings for Government employee are seek from a third party. A graduate from the interventions reveals that "*Our skills and capability are not valued by the state Government, we are very much underrated, most of the consultant they are engaging as service providers are not well experience and qualified like what we have in the state*" Another

graduate maintained that *"what we study is not what we are really doing for the state, I studied Software Engineering, and what I do now didn't go beyond typing for my bosses".*

A visit to Ministry of Education reveals that, more than 100 graduates were employed by the Ministry and are posted to teach ICT at Secondary Schools, but have find it very difficult to do that as majority of the schools has no functional computer laboratory or there is no power supply to be use by the labs.

> *I was employed as a computer teacher, but ever since I came here I have never teach anything related to computer, .I am now teaching Geography and Mathematics".*

Another encounter with a graduate who operate a Computer Business centre in one of the Local Government call for a Government intervention to create linkage between ICT graduate from the state and the business, like in the area of outsourcing.

4.2.3 Computerisation of Government operations

Our findings reveal that the state has an objective to achieve 100% computerization of government strategic Government operations such as Procuremen.t, Payroll, and Integrated Financial Management Information Systems (IFMIS) to manage all aspects of Government expenditure and financial management by the end of 2012 (Jigawa State Comprehensive Development Framework 2009). However our findings reveals that very few has been done in this intervention as none of the Government business can be perform online by the citizen, nevertheless the Government has perform considerable in the area of Payroll and IFMIS, but nothing has been done in the area of making the procurements electronically. Our previous findings (Kanya and Good, 2012) examined the state eGovernment policy using the lens of Dode (2007) who cited Yusuf (2006) in which he identified four main phases in the development of eGovernment (publish, interact, transact and integrate).

5. Conclusion and Further work

The above findings culminated the end of phase two of the research which encompass five pilot studies as described in session 4.2.1 to 4.2.3 Findings from the 3 studies reveals that the state ICT4D intervention has offer some set of capability and functioning to both supply and demand side of the state (Government and the citizens). This research has help in operationalizing the notion of capability approach in evaluation of ICT4D intervention (Madon, 2008; Kleine, 2010; Hatakka and De 2011; Hatakka and Lagsten 2012; and Thapa et al 2012).This study has equally help in theororising and operationalising design reality gap (Heeks 2003) in evaluating ICT4D intervention. The design-reality gap is a broad framework that was drawn upon from the literature on contingency in organizational change (see Venkatraman, 1989) and social construction of technology (see Suchman, 1987). The practical implication reveals by Design reality gap framework from the pilot studies is that it can be used as a mid- implementation evaluative tool with two lenses in analyzing the process through which ICT4D intervention emerged and to analyse what need to be put in place to make the project more realistic and derives value from the intervention. The validation issue associated with qualitative data has culminated reason for doing the proposed phase three of the research. In this phase of the research, the qualitative data obtained during the pilot study will be validated. Two context specific interview will be administered for selected participant from each of the five pilot study conducted, this will bring a total of ten interview and 300 questionnaire will equally be administered to the beneficiary of the policy to obtain their opinion for the purpose of gaining deeper understanding of the policy. After the interviews a focus group will be conducted with some of the participant interviewed during the pilot study, the focus group will help in deepening the understanding of the factors responsible for the disconnect between ICT4D design expectation and policy implementation realities.

The most essential limitation of the research is poor response from the current policy makers of the intervention, as majority of them usually responded by saying "I am not authorised to speak". However, to address this issue last phase of the research, an approval has been obtained from the state cabinet office, which will help facilitating further research.

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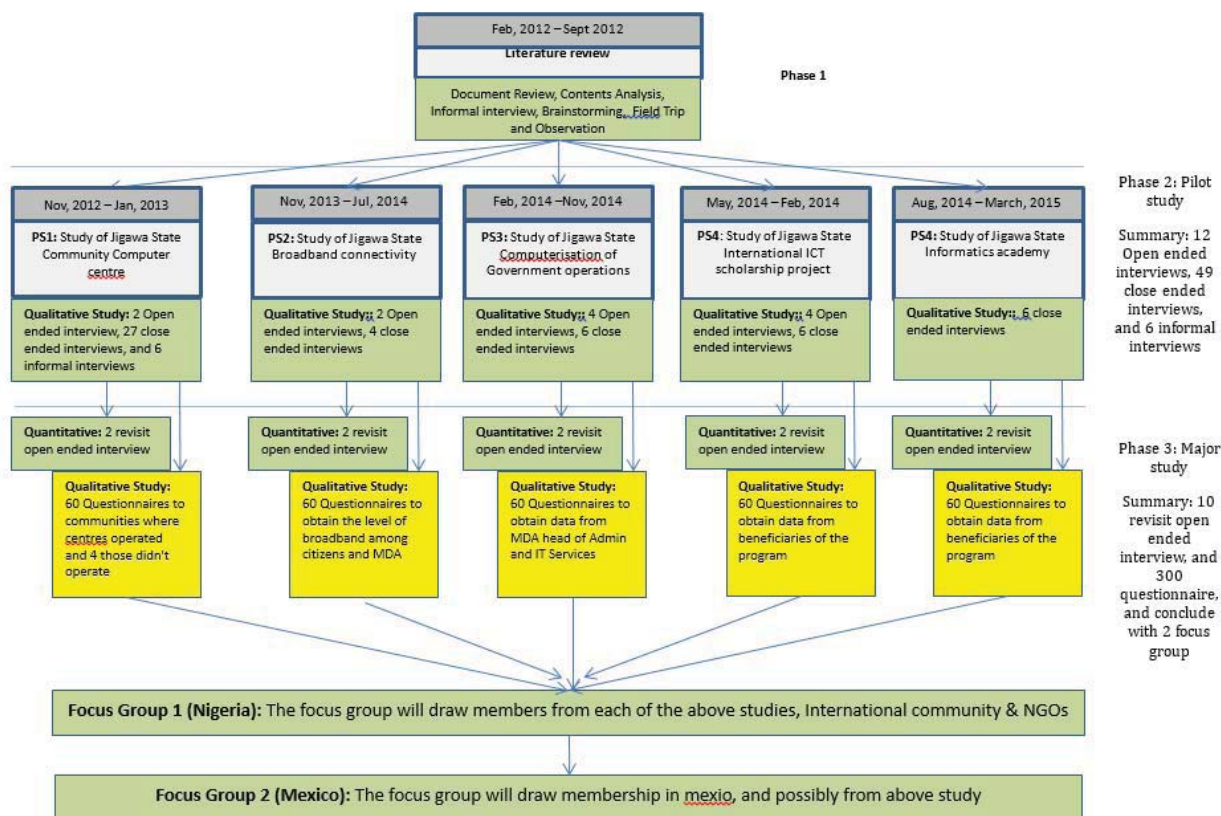
Appendix 1

Figure 3.1 Research plan

Different Patterns of Usage of e-Government Services: A Preliminary Study

Muslimin Wallang, Paul Henman and Philip Gillingham
The University of Queensland, Brisbane, Australia
muslimin.uum@gmail.com
p.henman@uq.edu.au
p.gillingham@uq.edu.au

Abstract: The aim of thisarticle wasto evaluate the conceptual framework that was proposed by conductinga scoping study. From the extant literature, this study identified several factors related to an individual's use of e-government services. In addition, previous studies showed that there are different patterns of use of e-government services, particularly for developing countries.Therefore, a scoping study was undertaken in order to understand the nature of how individuals determine their use of different e-government services, especially for Malaysian citizens. The template analysis proposed by King (2004) was employed for the data analysis. As a result, a number of determinants were reduced after the scoping study and the conceptual framework was revised and a list of hypotheses was formulated.The themes and codes generated from the scoping study helped the researcher in the second phaseof the research –questionnaire design.

Keywords: e-government use, relative advantage, scoping study, adoption model

1. Introduction

Despite e-government still being in its infancy, recently,this topic has become popular and attracted the attention of many scholars, political leaders and policymakers around the world (Fu, Farn, & Chao, 2006; Nor Hazwani Hassan & Mohd Rizal Palil, 2011; Zaherawati Zakaria, Kamarudin Ngah, Jamaludin Mustaffa, & Nazni Noordin, 2011). Several potential benefits of e-government have been identified in the literature, including: increasing citizen-centric engagement (Alsaghier, Ford, Nguyen, & Hexel, 2009), improving access to public services(Europe's Readiness for E-Government Report, 2000) and increasing citizen confidence in government services (Warkentin, Gefen, Pavlou, & Rose, 2002). Public agencies also use ICTs to widen the option for providing the services (e.g. mobile phone, information kiosk and smart card). However, the questionof whether citizens will embrace these new technological procedures and initiatives taken by the government has both academic and practical implications.In addition, the factors that influence an individual's acceptance ofdifferent e-government services have not been well understood. This study extends the knowledge concerninge-government use to better understand how people choose to use or not use e-government services. It is hoped that this study could help the implementation of e-government tobe successful and to make sure that the resources and cost allocated and spent are not in vain.

2. Problem statement

The aim of this study was to examine the determinants that influence an individual's patternof usage of different e-government services, with Malaysia as the case study. Despite the benefits of e-government, previous studies have shown that citizens are not utilising e-government services fully, even in countries that lead in the UN e-government rankings, such as Australia and the United Kingdom(Australian Government Information Management Office, 2007). Furthermore, several studies of G2C found that people are more likely to use e-information services than e-transaction services; that is, they are willingto obtaininformation from the Internet, but are reluctant to use it for more advanced processes, such as paying bills and taxes (Ampang Jaya Municipal Report, 2012; Inland Revenue Board of Malaysia, 2012; Maizatul Haizan Mahbob, Mohammed ZinNordin, Ali Salman, Wan Idros Wan Sulaiman, & Mohd. Yusof Abdullah, 2011).Although there have been many studies on e-government, little is known about the main reasons for the different patterns of e-government used by an individual. Detection of the patterns of use of e-government services by individuals is important for the development of e-government strategies to ensure that government expenditure on IT-related projects is worthwhile.

This study is significant in terms of its contribution to the theoretical and practical perspectives. At the heart of this body of research is a model that seeks to understand and predict e-government use by individuals, namely, the Unified Theory of Acceptance and Use of Technology (UTAUT) model. However, the model only deals with predictions fora single system atone time, and does not explain an individual's usage ofdifferent systems

simultaneously. Therefore, this study contributes to the e-government literature by developing a new knowledge from the UTAUT model and highlights the main factors affecting e-government acceptance.

Secondly, the findings of this research have practical implications for e-government design and deployment. The research identifies the main determinants that lead to users' decision making to adopt e-government services. Thus, by identifying these main determinants, it develops a new dimensionfore-government implementation.

Another contribution of the present study relates to the methodology, which providesthe opportunity to determinethe pattern of an individual's usage by comparing different types of e-government services in a single study, through the use of the same data, and data collected from the same period. In doing so, the present study identifies the factors associated with an individual's usage of three different policy areas – income tax, property tax and traffic fines. By taking into consideration the different features of the systems and different individual needs that may influence the use of technology, the present study look at two different e-services in each of these domains, namely, e-information and e-transaction services.

3. Types of e-government service

The study examines the adoption of e-government services by Malaysian citizensin three different systems. Two of the services are offered by the federal government (income tax and traffic fines) and one service (property tax) is offered by the local authorities. In detail, the systems involved are e-assessment and online payments (property tax in local authorities), summons service and online payments (MyEG-traffic fines in the Royal Malaysian Police), and e-filing and online payment (income tax in the Inland Revenue Board of Malaysia, IRBM). The reason for selecting these e-government services is because the services operate within different tiers of government, namely, the national and local levels. Such government agencies operate differently in their major relationship with citizens. Therefore, different government agencies use different systems, which is an attribute that is examined in this study.

3.1 Level of e-government user

There is no specific number of stages involved due to the different approaches beingundertaken by researchers. According to Layne & Lee (2001), the e-government maturity indexcomprises four major stages, specifically: (i) cataloguing, (ii) transaction, (iii) vertical integration and (iv) horizontal integration. In the early stages, the government only sets up itsinitial website with a limited purpose (e.g. sharing the information). The second stage involves transaction activities in whichboth citizens and the government engage in electronic transactions. The third stage is characterised by integration with different agencies in the government (i.e. federal, state and local authorities) whereas in stage four, the integration occurs internally in government agencies. However, the dominant services that are mostrelated to the citizens of developing countries are the transactional and informational services (United Nations, 2012). Therefore, in acknowledging this factoronly two types of e-government use arefocused upon, namely, service use (transactional) and information use (informational).

3.2 Determinants of e-government use

In this study, relative advantage is defined as the level to which citizens perceive interaction with e-government services as superior to the traditional methods. In their study, Carter & Bélanger (2005) confirmed that perceived usefulness, relative advantage, and compatibility are significant factors in increasing citizens' adoption ofe-government services. Similarly, in Malaysia, the study by Lean, Suhaiza Zailani, Ramayah, & Fernando (2009) showed that perceived relative advantage has a direct positive relationship with technology usage; the more unfriendly or inaccessible the e-government services are, the lower is the intention to use the e-government services. Therefore, this study predictsthat an individual's usage on different e-government services is positively influenced by the relative advantage.

Effort expectancy is defined as the degree of ease associated with the use of the system. This construct is similar to the perceived ease of use constructs in the TAM model. Numerousreviews of the literature have previously been carried out to explore the factors that influence an individual's usage of IT services (AlAwadhi & Morris, 2008; Al-shafi & Weerakkody, 2009). In the UTAUT model, effort expectancy and social influence are the most influential factors recognised by scholars to explain an individual's use of technology (AlAwadhi & Morris, 2008; Al-shafi & Weerakkody, 2009; Carter & Belanger, 2005; Israel & Tiwari, 2011; Kumar, Mukerji, Butt, & Persaud,

2007; Warkentin et al., 2002). The study by Venkatesh et al. (2003)revealedthat there is a positive correlation between perceived ease of use and social influence withthe system adoption among users.

Social influence has been discussed in previous studies as a direct determinant of behavioural intention (Norazah Mohd Suki & Ramayah, 2010; Oye, A.Iahad, & Ab.Rahim, 2012; Yu, 2011). Hence, in relation to this study, an individual's belief concerningeffort expectancy and social influence is predicted tohave a positive relationship withthe individual's usage ofe-government services.

The relationships among trust in the Internet, trust in the government, and perceived security have also been widely explained in previous studies (Al-Adawi, Z., Yousafzai, S., & Pallister, 2005; Belanger & Carter, 2008; Pavlou, 2003; Welch, Hinnant, & Moon, 2005). In addition, some studies (e.g., Hung, Chang, & Yu, 2006; Kumar et al., 2007) integrated trust and security concerns with other technology acceptance theories in explaining the factors that influence an individual's usage ofe-government services. An increasing lack of confidence in the government's capability to implement e-government services may cause a lack of support from the citizens.

In the Information Systems Research literature, previous researchers have identified that service quality is a key term for determining the success of electronic services (e.g. Petter, DeLone, & McLean, 2008; Zeithaml, Berry, & Parasuraman, 1996). Several studies have shown that interactive government websites promote openness and lead to better service delivery and citizen participation in government(Carter & Belanger, 2005; Welch et al., 2005). As stated by Rotchanakitumnuai (2008), the dimensions of the quality of e-services are different from that of traditional services in which theuser interface and web designs are absent in traditional services.

4. Research methodology

The aim of thisscoping study wasto obtainfeedback and opinions about an individual's actual experience with e-government services and reasoning about why they use or do not use government e-services. A scoping study was conducted to assess if the current issues covered in the literature about usage and non-usage of e-government services were adequately addressed, in particular from the Malaysian context. It is important to identify and create a clear understanding of the constructs proposed in the conceptual model, and, at the same time, to obtaininsights into the phenomenon being studied.

The main inclusion criterions for participants in the scoping study were currently using or have used any e-government service in the last two years. Therefore, people who hadnot used any e-government service were excluded from the scoping study.Interviews were conducted at one local university in Malaysia. The researcher chose heterogeneous participants with diverse ages, both genders, and also those who had exposure to diverse e-government services (such as property tax and traffic fines) in order to increase the study's applicability and to achieve a rich variation in the study. Twelve participants from various departments in the university were interviewed. An interview guide was used to ensure that the conversations focused on the main topics, to collect the information needed, and to ensure consistency in asking the same set of questions toall participants.It should be noted that the interview guide was used as a guideline for conversation rather than as a rigid interview protocol. The interview guideline used was largely based on the UTAUT model (AlAwadhi & Morris, 2009; Venkatesh et al., 2003), trust in the government (Rehman, Esichaikul, & Kamal, 2012), website quality(Alsaghier et al., 2009) , and perceived risk (Hisham Alsaghier et al. 2009) with some adjustment to fit with the Malaysian context.

In analysing the data, the researcher decided to employ template analysis as proposed by King (2004). This technique was used because it provided a way to manage unorganised data, for discovering the themes in the data and to clearly show the potential for matching up the participants' views (King, 2004). Some reasons explain the factors this technique fitted well with this study. First, the template offered a meaningful way to organise and analyse various types of dataset (such as interview transcripts, text from email, and open-ended question responses) according to the themes. Second, most researches start with the interviews, followed by developing the codes and themes, and finally end up with initial coding. Initially, the template analysis fitted well with this study because the analyses and process were started with pre-defined themes discovered from several theories. Finally, the chosen approach for analysing the data relied on several factors such as limited time and the purpose of the study (Lacey & Luff, 2009). As stated by King (2004), template analysis does not require a long period of time to analyse compared to other techniques (e.g., ground theory) and suits the researcher's limited ttime.

5. Results

This section discusses the main findings that have been gathered from the template analysis technique. The researcher identified themes that were found in the initial conceptual framework about use and non-use of e-government services, particularly regarding the technology acceptance models such as UTAUT and the technology acceptance model (TAM). The themes identified from the previous studies were: performance expectancy, effort expectancy, facilitating conditions, social influence, trust in the Internet, trust in government, quality of website and security concerns.

The codes for meaningful analytical units were identified according to the interview transcript. The demographic information related to the scoping study participants in which, seven of the respondents were males, and five were females. The race was dominated by Malays (6), followed by Chinese (4) and Indian (2). In terms of education level, all respondents had at least a diploma certificate.

From the scoping study, three main findings were identified. First, in the initial model, performance expectancy was proposed as one of the constructs to determinehow the technology would enhance the user's performance. Although some authors define relative advantage and performance expectancy as the same (Venkatesh et al., 2003), Carter & Bélanger (2005) measured both differently because of the conceptual distinctions between the two constructs. Relative advantage is defined asan individual's belief that a new system has benefits above and beyond the current system (Carter & Weerakkody, 2008).Based on the distinction, previous studies showed that relative advantage is the most suitable construct to discuss an individual's usage ofe-government systems (Carter and Belanger, 2005; Lean et al., 2009; Bhattacharya, Gulla, & Gupta, 2012). Based on the scoping study results, most participants were more likely to talk about the relative advantage rather than performance expectancy. As one of the participants mentioned:

> "… I find e-government services are useful… I think using e-government services increases the effective use of my time… as well as… in handling my e-government tasks… to me, as a busy man… I would prefer to interact with the government through online".

Therefore, in this study,performance expectancy was replaced with relative advantage, as the respondents were more familiar with the former.

Second, most participants agreed that social influence would be one of the factors influencing their usage. However, when participants were asked about other factors that also had a major impact ontheir usage, especially in new technology, they mentioned advertising and the government's role as a service provider. Having experienced clear instructions from the service provider (i.e. government agencies) about how to use e-services, one of the participants believed that this effort had encouraged her to use e-government services.

> "… Instruction is clear, easy to follow step-by-step… I and most of my friends… mostly influenced by the instruction given by IRBM [tax office], which encourages the use of e-filing".

Most of the participants agreed that the use of e-government services depended mostly on the government's initiatives to promotethe services. As mentioned by one of the participants, they never knew about the system until they watched the advertisements on TV.

> "… As a new user… I believed… my intention to use e-government services were influenced by advertising through the electronic media and newspaper, and, absolutely, I used MYEG for the first time after watching the advertisement on TV"

Therefore, advertisingand provider's role were identified as antecedent factors for social influence. This finding is similar to the study by Norazah Mohd Suki & Ramayah (2010), who reported that several external factors, such as advertising, the Internet, and the mass media have a positive relationship with e-government usage among the citizens.

Finally, from the interviews, the participants showed a generalised sense of trust in the e-government service. The participants expressed that their good experience withthe services made them feel confident aboutthe online services provided by the government. As one participant explained, he trusted the online channels because he has been using that service for a long time and has never experienced any failure.

> *"… Used online services almost 3 years… never encountered any problem during the transaction… so… any services provided through the Internet by the government are reliable"*

In addition, some of the participants mentioned that the security issue concerningonline government services was a factor that would influence their trust in the e-government. Although some participants were aware of the technological safeguards (e.g. data encryption, authentication mechanisms), they still feared that someone could steal their financial information during the online transaction, especially if a large sum of money is involved. For example, one participant commented on his lack of trust in the current technology used for online transactions, but he would continue to use any e-government service, as long as the systems are reliable.

> *"… For small amounts… yes, I'll do it online… but… I'm a bit cautious in making transactions when involving a large amount of money… but…as long as the government is concernedabout their Internet security, and it is well maintained and good protection… for me… that's enough to make the Internet safe and reliable to transact e-government services".*

6. Implications and proposed model

Based on the scoping study results, the pre-identified and revised concepts were shown in Table 1.From the analysis of the scoping study data, it was concluded that several constructs in the UTAUT model (e.g., effort expectancy and social influence) and quality websites were identified and applied to examine the factors influencing an individual's use of e-government services in Malaysia.

Table 1: Pre-identified and revised concept

Pre-identified concepts	Revised concepts
Performance Expectancy	Relative advantage
Effort Expectancy	Effort Expectancy
Social Influence	Subthemes: Advertising Provider's Role
Trust in the Internet	Trust in e-government
Trust in Government	
Security Concerns	
Quality of Website	Quality of Website

The conceptual framework also was revised. As shown in Figure 1, the present study concludes that several constructs on the UTAUT model are applicable in examining the factors influencing an individual's pattern of usage on e-government services. The model has to be broadened by including existing themes (effort expectancy and quality of a website), modifying themes (trust in the e-government and relative advantage), and new themes as the antecedents of social influence (advertising and provider's role).

7. Limitations of the study

This study has some limitations that need to be addressed. Firstly, due to financial and time limitations, the interviews were conducted at one local university in Malaysia, with a small number of participants. Thus, it could not be used to formulate a generalisation for the whole population and issues under study. This study provides good direction for future research to enhance this study to involve a large number of participants. Secondly, although this study discusses the role of the UTAUT model in the conceptual framework development, the moderators in the UTAUT model are not included. Therefore, future studies could consider these moderators as variables that will determine the different use of e-government services.
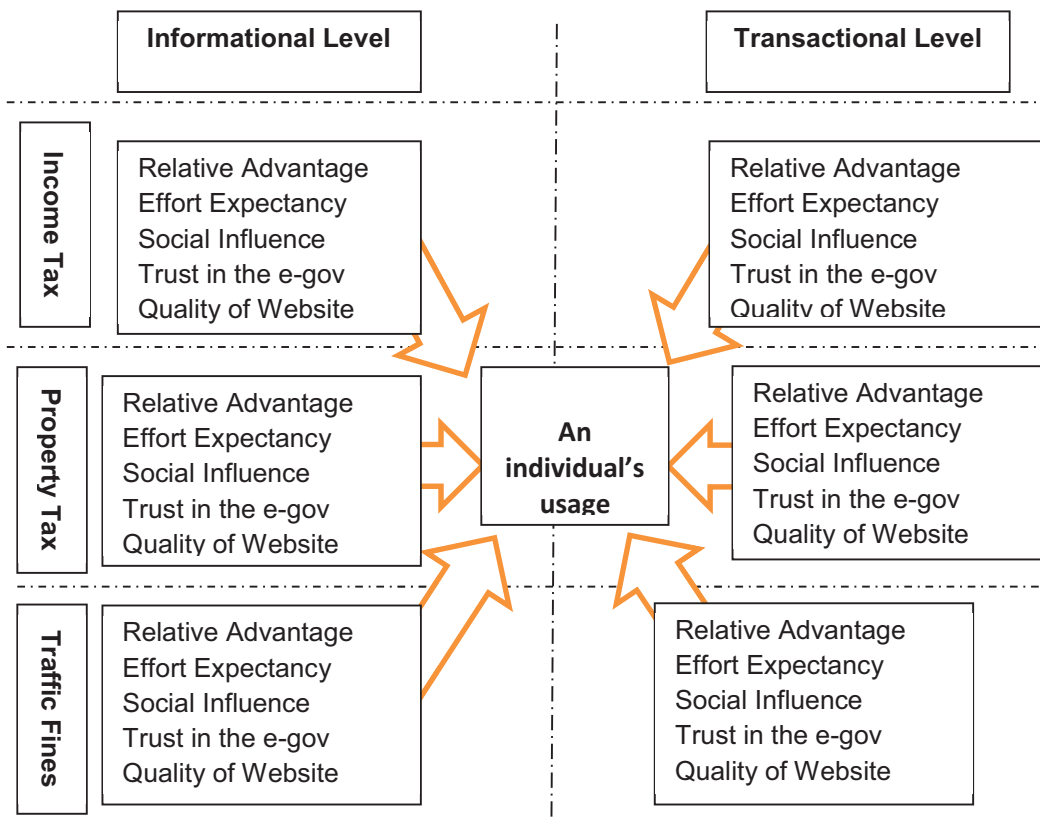
Figure 1: Revised conceptual framework

8. Conclusion

This study justifies the selected conceptual framework used in this study, including the variables retrieved from previous models and the type of e-government services, as well as the level of e-services. Thestudy also explains the need to employ a scoping study as a preliminary study with the aim to understand the nature of how individuals determine their use of e-government services, to revise the conceptual framework, hypotheses development and to generate the survey questionnaire. This study hopes to continue further investigation and produce findings thathave practical implications for e-government design and deployment. By identifying the main determinants, a new dimension may emerge fore-government implementation.

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In-Depth Comparative Case Study in Participation: Interpretative Approach

Muhammad Yusuf, Carl Adams and Kate Dingley
School of Computing, Faculty of Technology, University of Portsmouth, Portsmouth, UK
muhammad.yusuf@port.ac.uk
carl.adams@port.ac.uk
kate.dingley@port.ac.uk

Abstract: The case study is the most dominant research method in the e-government field and researchers are using various methods, techniques and tools to conduct the case study research). Therefore, this paper compares the process of two case studies, provides insights and discussion for other researchers on the process of conducting robust case study research. The research method was conducted in the case studies of a grammar school in Hampshire, UK and a private school in Surabaya, Indonesia to get an in-depth understanding of the communication, interaction and participation process through technology in both schools. The case studies are interesting since the research was conducted in different countries, continents, multi-language and across social-cultural contexts. This paper captures the research processes in conducting case studies around e-participation within school education. Because the two case studies are in different countries, cultural environments and context enables some explicit comparison of processes and options, involved in conducting case study research. The options and processes compared include preliminary research (examining context and case example selection), designing interview questions, selection of stakeholders and participants for in-depth interview, approaching and recruiting participants for in-depth interview, conducting in-depth interview, coding processing, and analysing responses. Also the paper compares coding manually and using software such as NVIVO 10. Additionally, the paper captures translation process during the research process as well as provides reflection on the methods and the options available for conducting case study research. Therefore, it is hoped that this paper makes a contribution to the e-government, particularly e-participation research area by providing step by step research process of conducting in-depth case study across country, continents and social-cultural contexts, challenges, and insights. Also the paper makes contribution in understanding options for processing and comparing responses in multi languages. Also this paper is focus on developing guidance for conducting case study research on a distance.

Keywords: in-depth, comparative, case study, e-participation, guidance, interpretative approach

1. Introduction

Case study research has been used in various fields and departments, such as business, marketing, computing, politics, sociology and anthropology. Case study research is also the most widely used qualitative research method in information systems research (Orlikowski & Baroudi, 1991). This type of research is useful to capture and understand context for studying phenomena using diverse data collection and analysis method (Darke, Shanks and Broadbent, 1998). Yusuf, Adams and Dingley (2014) examined case study research is the most dominant in E-Government area. Furthermore, Bannister and Connolly (2010) identified that case by case approach as investigation paper is dominant on e-government. In addition, an empirical research method, such as case study is more dominant rather than non-empirical on E-Government (Bolivar et al, 2010). Indeed, comparative case studies offer opportunities to get better understanding of e-government, particularly e-participation activities, such as similarities and differences in both case studies. Also, there is limited guidance on conducting comparative case studies which span across countries, language and cultures. It also has extra challenges as well, such as language, context, socio-cultural, and others. Therefore, there is a need for research into comparative case studies. This paper captures reflection and insights on two such case studies as a qualitative and interpretive research. This study also aims to develop guidance for other researchers to conduct comparative case study research at distance and local access. It captures the process of the in-depth comparative case study in a grammar school in Hampshire, UK and a private school in Surabaya, Indonesia. In summary, the structure of this paper will consist of research process, then discussion, reflection and insights, and finally conclusion.

2. Research process of in-depth comparative case study

The in-depth comparative case study consists of stages as describe in figure 1 below. The process will be explained in more detail below.
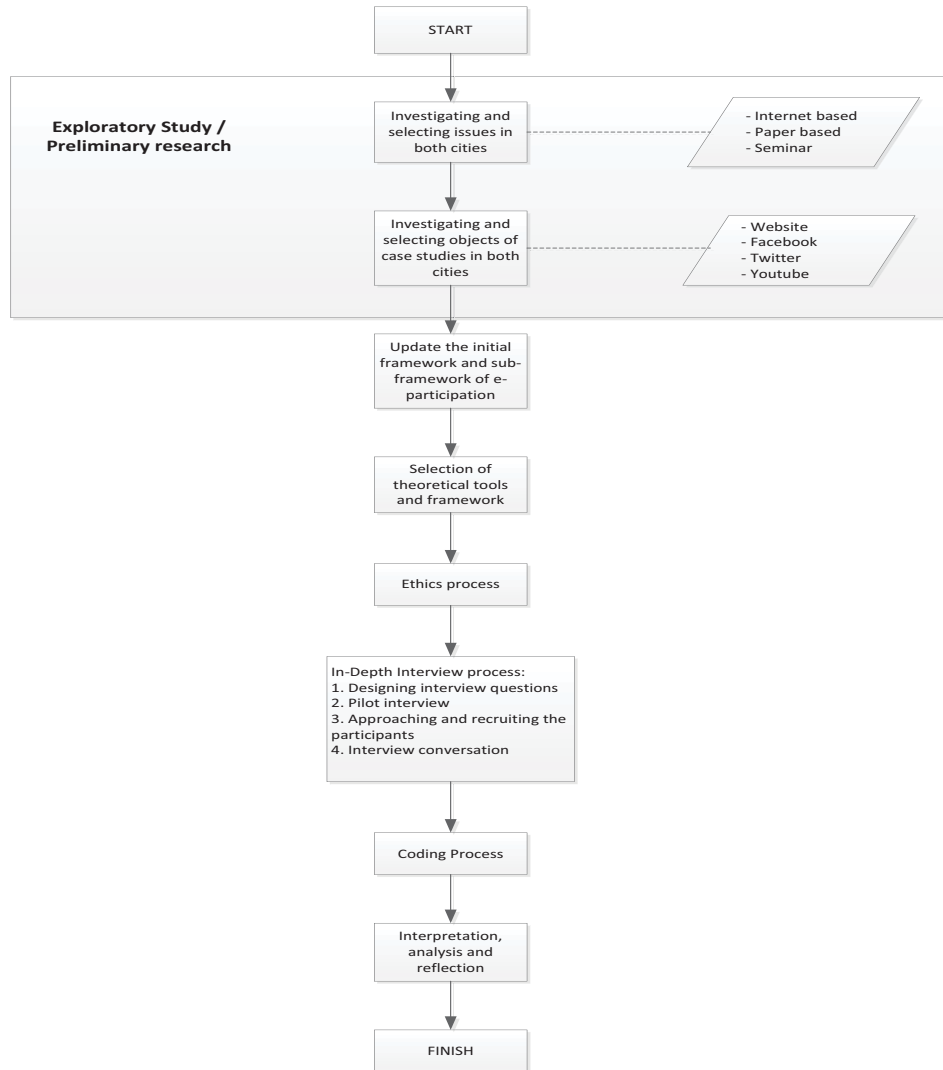
Figure 1: Step by step process of in-depth comparative case study research

2.1   Exploratory study as a preliminary research

Exploratory study as a preliminary research is needed to get initial understanding, information and knowledge about the case study and context. In this study, the research process was started with investigation into urban and socio-economic issues in Portsmouth, UK and Surabaya, Indonesia. The investigation process was completed through searching information from the websites of those cities, documents and other references. Furthermore, the information also gathered from seminar in London, UK about Development of Surabaya. In a comparative case study, researchers should choose one single well-justified issue for comparison. In this study, education issue was selected since it is very important and strategic for most of the people in both cities for long term. Furthermore, the objects of each case study must be as similar as possible. In this study, the authors investigated objects of each case study in both countries which have similar characteristics. The investigation processes were completed through the websites of schools, Facebook, twitter and YouTube. A grammar school in Hampshire, UK and a private school in Surabaya, Indonesia were chosen since both schools have the same characteristics, such as good management, facilities and education system, and both offer the same education programmes from nursery, primary school, junior School and senior school. The initial framework and sub-framework of e-participation were updated based on the preliminary studies above.

2.2   Selection of theoretical tools and frameworks

Selection of theoretical tools and frameworks is needed to interpret the results and identify questions to ask and issues to consider. For this study, the actor network theory (ANT) is used as theoretical tool to capture the role of technology, actors, networks, and changes in the case study. ANT is important as a base for identifying

main points of the interview questions. In addition, ANT is also suitable with case studies, qualitative research and interpretative approaches. This will be discussed in section 3.2.

2.3 In-depth interview

The in-depth interview process includes designing the in-depth interview questions, the pilot interview, approaching and recruiting the participants, and then conducting the interview conversation. Each of those stages will be explained in details below. The discussion and insights will be presented in section 3.3.

A. Designing the in-depth interview questions

In the design of interview questions, researchers should draw upon theoretical tools and frameworks for their work. In this process, researchers also must consider research questions and the aim of the research since researchers would ask questions to get data and information for answering the research questions and achieve the aims of the research. In this study, the authors were design of the interview questions based on the updated framework and sub-frameworks of e-participation in both schools and ANT. In the comparative case study, interview questions need to be in a different language based on the case study context. In this study, the first draft of the interview questions was in English, and then it translated into the Indonesian language as the questions will be asked to stakeholders of a grammar school in Hampshire, UK and a private school in Surabaya, Indonesia.

B. Pilot interview

A pilot interview was conducted in order to validate the in-depth interview questions and preparations. Based on the pilot interview processes and results, researchers can evaluate the interview questions, preparations and then improve them. The pilot interview also needs to be done in multiple languages if the participants have different language. In this study, the authors conducted the pilot interview with a former school governor of another grammar school in Hampshire, UK and a young parent of school in Hampshire, UK, in English. Then, the authors interviewed a former teacher in a private school in Surabaya, Indonesia, in Indonesian.

C. Approaching and recruiting the participants of the in-depth interview

An approaching and recruiting processes should choose participants as similar as possible in both case studies. The process is different in each context. In this study, the authors conducted processes below.

a. The participants of a grammar school in Hampshire, UK

The interviewer/first author contacted the school through email and original letter. Then, the deputy head (communications and co-curriculum) replied through email that he was happy to do the in-depth interview along with the marketing manager. For another interview, the interviewer/first author also contacted a parent of the grammar school through email and came to the parent's office for a face to face meeting. Then, the parent agreed to do the in-depth interview. The interviewer/first author tried to contacted alumni as well, but failed to get interviewees. Therefore, the interviewees were only three people who represent the stakeholders of the school.

b. Participants of a private school in Surabaya, Indonesia

The process of contacting, approaching and recruiting participants started when the interviewer/first author contacted the head of a private school in Surabaya, Indonesia by telephone. The head of the school gave recommendation of participants include one of parent, one of the vice head of school for student affairs, two of teachers, one of admin staff and one of foundation staff. The interviewer/first author also contacted those candidates by mobile phone and four of alumni by Facebook

D. Interview conversation

Process of interview conversation should consider different techniques, participants, media, time zone, and other things due to different contexts. Also, researcher should have flexibility and sensitivity whilst conducting the interview. The interview process in this study will be described below.

A grammar school in Hampshire, UK

All of the interview conversation in this context was conducted by face to face meeting. The interview with a vice head of communication and co-curriculum and a marketing manager was conducted together in the school. Those persons are the representative of the stakeholder in the school. Furthermore, the interview with a parent was conducted in his office. Additionally, the interview was conducted fully in English since all the interviewees speak English and the interview was recorded. All consents were written by the interviewees.

A private school in Surabaya, Indonesia

Most of the interview conversations were conducted at distance since the case study and the interviewees are located in Indonesia and Japan. One of interview was held by face to face meeting since the interviewee is staying in UK. The interviewees consisted of a head of school, a former head of school (he was a head of school when the in-depth interview was conducted), a head of the school, a former vice head of school for student affairs (she was a vice head of school for student affairs and is a vice head of infrastructure now), two of teachers, one of an admin staff, one of a foundation staff, four of alumni and a parent. Participants were chosen since those are the main stakeholders of the school. Some consent was written and others were verbal and recorded since only a few participants returned the consent form. The participants who did not send back the form, were then asked for verbal consent and recorded in the interview process before the interviewer asked questions. Since the interview conversation was at distance, the interviewer was using various media such as mobile phone, landline phone, LINE application, Skype. Furthermore, there were different time zones such as six hours of different time between UK time and Indonesia time, and eight hours difference in the time between UK time and Japan time; consequently the researcher had to adjust the available time of the participant based on Indonesia and Japan time.

2.4 Coding processes

Coding are processes to get codes or themes from the conversation in the interview. Those processes consist of transcribing process, coding, classifying the codes and finding themes, patterns and relationships. The process in this study will be explained in more detail below.

A. Transcribing process

Transcribing process may be needed depends on researcher preference, request of participants or other factors. Some researchers may transcribe the interview results using software and others manually. The transcript may need to be passed back to interviewee for checking, however it depends on the condition. In this study, the authors transcribed four of the interview results of the interviewees in Indonesia. The transcripts were also passed back to the interviewees since the head of school, vice head of school for student affairs and one of alumni requested the interview transcript to check it. In this case study, the transcribing process was completed manually without using any transcribing software. It aimed to keep the authors intimate with the data as the author could still remember the context of conversation. Also, the researcher should consider the translation process. It may not be necessary to translate the transcripts depends on the researcher preferences and justification. In this example, the content of transcript remains in Indonesian language since the researcher avoid to loss contextual and implicit meaning of the text. Some words cannot translate into English and the meaning can change if translated into English or other languages.

B. Coding activities

Coding activities should consider various techniques, tools and processes. There are various tools, such as: NVIVO and Atlas Ti. Researchers should also consider how to represent the coding results. In this study, the authors were using various techniques and tools for coding process and tools as follows:

- The coding process manually using MS Word and MS Visio based on transcript of the interview

- The coding process manually using MS Word based on the audio recording of the interview

- The coding process using NVIVO 10 based on the transcript of the interview

- The coding process using NVIVO 10 based on the audio recording of the interview

Those different ways aim to explore the advantages and limitations of each way. The discussion and reflection about the coding activities will be explained in the section 3.5.

C. Visualisation using Software of NVIVO 10

Software of NVIVO 10 can proceed to visualize the coding results through various visualisations, such as: charts, cluster analysis, tree map and graphs as shown in the figure 6 below.
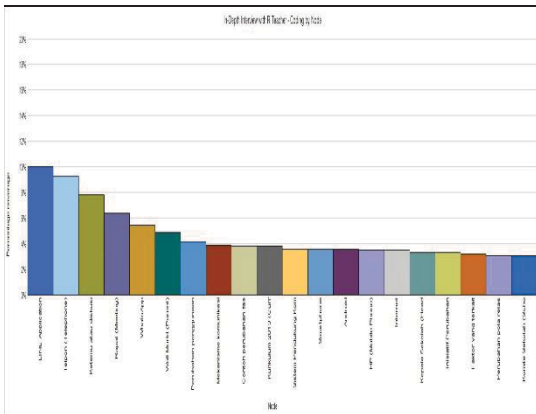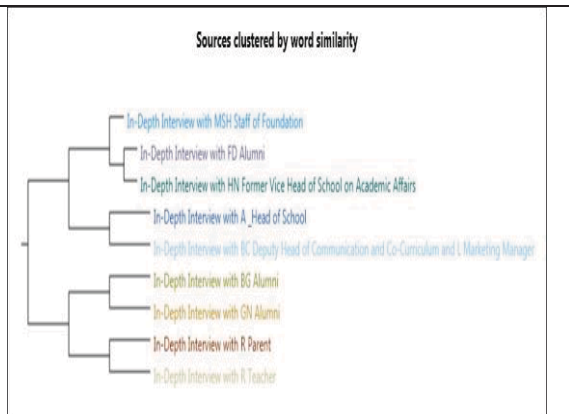

Figure 2.a. Coding by Node

Figure 2.b. Sources Cluster Analysis by Word Similarity using Pearson Correlation Coefficient
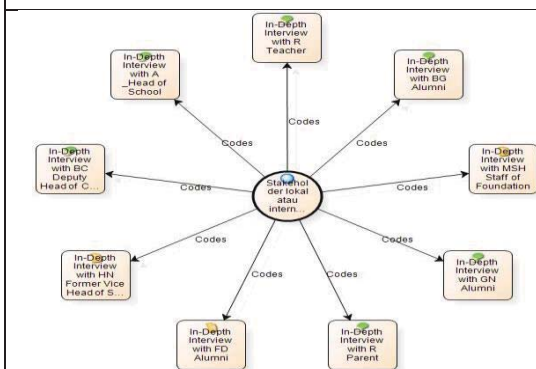
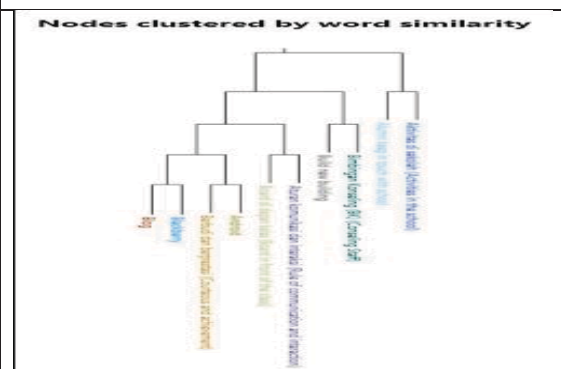Figure 2.c. Graph of local or internal stakeholder

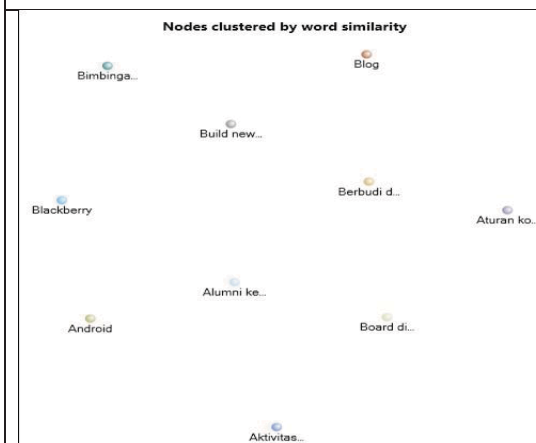Figure 2.d. Nodes Cluster Analysis by Word Similarity using Vertical Dendogram
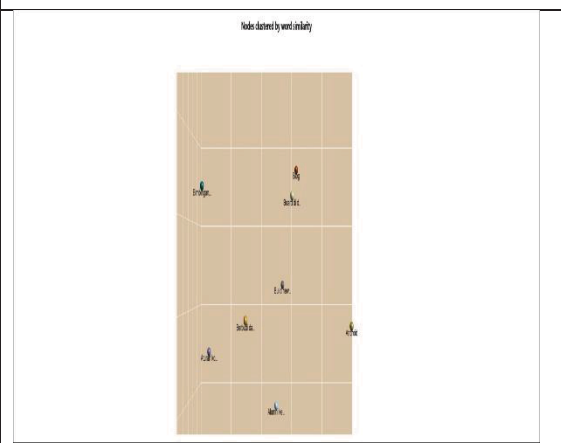
Figure 2.e. Cluster Analysis using 2D Cluster Map
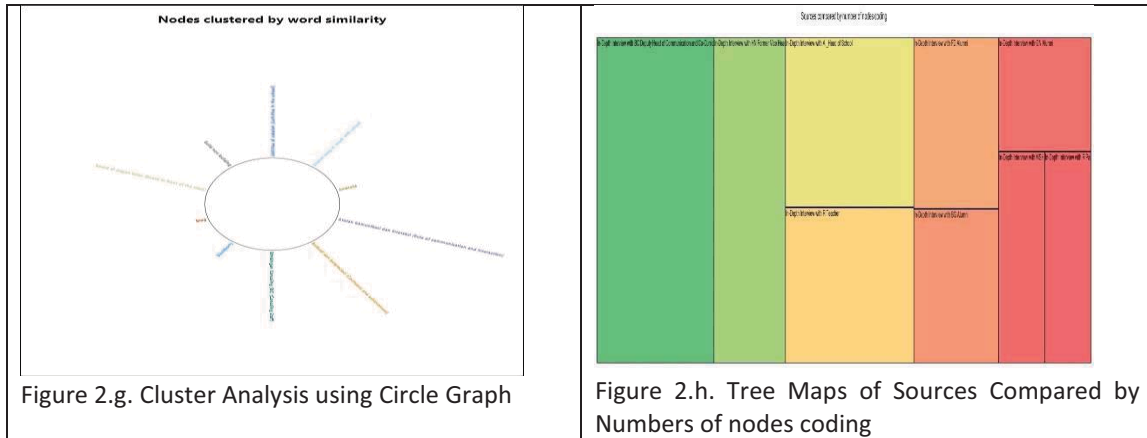
Figure 2.f. Cluster Analysis using 3D Cluster Map

Figure 2.g. Cluster Analysis using Circle Graph	Figure 2.h. Tree Maps of Sources Compared by Numbers of nodes coding

Figure 2: Variation of visualisations using NVIVO 10

3. Discussion, reflection and insights

There are some discussions and insights based on reflection of the research process as explained below:

3.1 Differences process of conducting case study research in Indonesia and United Kingdom (UK)

Some differences of process for conducting case study in Indonesia and UK are shown in the table 1 below.

Table 1: Difference in processes for conducting case study research in Indonesia and UK

Case study in Indonesia	Case study in UK
The approaching and recruiting of the participants started from the Head of the school as the most responsible person for all activities in the school. It also made it easier for the interviewer/first author to get other interviewees. When the head of the school contacted and recommended other interviewees, most of them agreed to do interview. It happened since the head of the school has a higher position than other interviewees and is respected by other interviewees. Alumni as a young generation were different were easily contacted through Facebook since the author had recommendation from one of the alumni. Trust between researcher and participants are an important factor. Trust developed as the first author and all of the interviewees in the school already know each other. Researcher should consider informal approach for contacting and recruiting participants	The approaching and recruiting process was more difficult since the interviewer did not know anybody in the school. Also, the school stakeholder did not know the interviewer. Therefore, the interviewer used formal approach by sending email then followed by original formal letter to the school. There were few communication media, such as email, original letter and face to face meeting for approaching and recruiting participants. It happened since the research was conducted locally. Researcher should consider rule and formal approach for contacting and recruiting participants.
Various communication technologies are important to support interview at distance. Various communication media made the cost of interview cheaper than face to face meeting. The interview conversations considered time differences between UK, Indonesia and Japan. Consent was more challenging for interview at distance. There were some challenges to get written consent because the participants were busy or had technicalities problems for returning the consent form, therefore verbal consent and recorded was the solution	Communication media was not used, since all of the interview conversations were a face to face meeting No difference in time zone All consents were written and easier to get since the interview was done locally and face to face meeting.

There were options chosen in UK context, such as: face to face interview, using email and original formal letter, written consent and three participants. The face to face meeting, email, original formal letter and written consent were chosen since the research was conducted locally. Furthermore, there are only few participants since the researcher had less access in the context, even though the research was conducted locally. In Indonesia context, there are some options chosen, such as: interview at distance, using various communication technologies (mobile and internet based), using verbal-recorded consent and 11 participants. Those options

were selected since the research was conducted at distance. There are more participants since the researcher has more access in the context, even though the research was conducted at distance. In summary, different context of case study has different challenges regarding to environment, socio-cultural, participants, norms, values, and rules. Researchers should be flexible and have sensitivity about those factors. Also, researchers should avoid generalisation for different context. Some options may work in one context, but it may not be suitable for different context. The process and justification should be explained explicitly to support credibility of the result. Additionally, the case study result influenced by some factors, such as: time, funding, resources, subjectivity of researcher and regulation.

3.2 In-depth interview process

In the setup of pilot interview, some questions were raised such as: how many participants should be interviewed and who will be suitable participants. The aims of the pilot interview should be considered as to evaluate the interview process and validating some points of the questions of the in-depth interview, such as:

Are the questions understandable for participants?, Can the questions answer the research questions?, Can the questions achieve the aims of the research?, What are the challenges for conducting the interview?, Is there anything that has been uncovered yet in the preparations, processes, tools and the questions of the real interview?

If some of the points above are already answered by the participant of pilot interview, then the numbers of participants were enough and real interview ready to conduct. In the interview process, researchers should have an open mind about the answer of interviewees, environment, body language, norms and others. In the in-depth interview process, the process should be flexible depends on the participants, situation and context. Interviewers sometimes needed to change the questions, did not ask the questions, or explored some questions in more depth. It happened since the interviewers should consider the relevance of the questions to the participant. Some questions may irrelevant for some participants. Also some of the participant's answers were interesting to be explored more depth. Walsham (1995) argues that interviews are the primary source data since the researcher can understand that the participants have actions and events, as well as the views and aspirations of themselves and other participants. Therefore, flexibility in the process of asking questions is the important factor, even though the interviewer has prepared the list of questions. Thus, social skills and sensitivity is important to access people's thoughts, views and aspirations. Not only to follow previous technique of interview (Walsham, 1995). Based on the study, there are some advantages and limitations of the interview at a distance and face to face meeting as shown in the table 2 and 3 below.

Table 2: Advantages and limitations of interview at distance

Advantages	Limitations
Cheaper, it was cheaper conducted interview by phone or through internet based, rather than the first researcher/interviewer flying to Indonesia by plane. Time saving, researchers just allocated time for calling through phone or internet based, rather than researchers has to come to the participant's office.	Researchers could not look the body language and the environment, since body language and environment have messages which support for collecting data and information. Researchers should prepare for various options to get consent, such as written, verbal, and others. It is more challenging to ask the comments of the participants about the model or framework which is proposed by researcher. There are some technicalities problems, such as network problems, lack of internet connection, communication media problems and others.

Table 3: Advantages and limitations of interview by face to face meeting

Advantages	Limitations
Easier to get non-verbal message from boy language and environment of interview Easier to obtain written consent Easier to discuss model/framework proposed by researchers	If the location of interviewees is far, such as abroad, it may costly

3.3 Ethics

Resnik (2011) examined the most common way of defining ethics is norms for conduct that distinguish between acceptable and unacceptable. These norms also help members of the discipline to coordinate their actions or activities and to establish the public's trust of the discipline. Therefore, confidentiality and anonymity are the important things in the ethical consideration of the research. Researchers have to ensure that the data should keep confidential and personal data of the participants should be anonymised. Those things are parts of the integrity of the research and developing trust to the researchers. In UK, there are various organisation which developed research ethics, such as: Economic and Social Research Council (ESRC), Association for Research ethics, NHS, and universities. Bank et al (2013) examined examples of Ethical challenges in community based participatory research as following:

(1) Partnership, collaboration and power, (2) Community rights, conflict and democratic representation, (3) Ownership and dissemination of data, findings and publications, (4) Anonymity, privacy and confidentiality, (5) Institutional ethical review processes, (6) Blurring the boundaries between researchers and researched, academic and activist.

Furthermore, in Indonesia, there are various bodies of developed research ethics, such as Indonesia science institute (Lembaga Ilmu Pengetahuan Indonesia/LIPI), Universities and other bodies. All guidance are different and have consequences. However, there is not a single guidance for social science research in Indonesia; therefore there are many interpretations of ethics from different researcher. This condition may bring out potential dispute of ethics. Since Indonesia has around 1128 ethnics with different traditional languages, cultures and norms as well as 5 formal religion (Islam, Christian Protestant, Christian Catholic, Buddha and Hindu), therefore researcher should consider those pluralities. Those things also carry out challenges for researcher that different ethnic and religion may has different ethics consideration based on their norms and cultures. Therefore, researchers should also consider norms, rules and have sensitivity what is acceptable and unacceptable in the both of case study. Additionally, researchers should be careful for knowledge bias when researchers conduct research in the place or object which has emotional relationship, such as: home city. Researchers should also be balance when conducting comparative case studies. For example, one case study is conducted in the home city and another comparative case study is conducted in another city. Balance processes, analysis, discussion, and insights should be considered by researchers.

3.4 Coding process

In the coding process, there was a transcribing process which was a challenging process. One of the challenges of the transcribing process without software was it became time consuming. The researcher had to listen to every single conversation and type it up, then re-listen and re-type again many times. Other researchers on qualitative approach have been coding manually and some others using software, such as NVIVO, Atlas Ti, and others. Basit (2010) argued that coding, a crucial stage of qualitative data analysis, is tedious and time-consuming when carried out manually, and it may take several weeks to get acquainted with a software package to code qualitative data electronically. Another researcher, Welsh (2002) is one of the researchers who using NVIVO argued the searching tools in NVIVO allow the researcher to interrogate the data at particular level. However, the software is less useful for addressing issues of validity and reliability in the thematic ideas that emerge during the data analysis process. In this study, the authors coded the results manually without software of NVIVO 10 and using software of NVIVO 10, also based on transcript and audio recording. The authors found some advantages and limitations as explained in the table 4 and 5 below.

Table 4: Advantages and limitations of coding process without and using software of NVIVO 10

Coding process	Advantages	Limitations
Without Software of NVIVO 10	Easier to operate since the researcher and people more familiar with word processing such as: MS Word Easier to trace the codes and the sources	Limited visualisation Need more than one applications for visualisation
Using Software of NVIVO 10	It has various visualisations, such as described in the figure 6 above. Easier to query and trace the codes and sources Easier to make reports and	Complicated features, the researcher should learn or get training to operate the software of NVIVO 10 Expensive price for the license

Coding process	Advantages	Limitations
	It has specific features for qualitative data analysis	

Table 5: Advantages and limitations of using transcript and audio recording as sources of coding process

Coding sources	Advantages	Limitations
Transcript	More intimate with data whilst transcribing Easier to re-reading and translating	Longer process since transcribing process is time consuming There were some challenges when the transcript need to be passed back to interviewees, such as busy, technical problems, and others
Audio Recording	Can do coding directly from audio recording and do not need for transcribing process Faster and Easier to re-listening	Sometime difficult to understand the content when the interviewees speak in different language or accent Takes time to translate

The authors are going to choose using NVIVO based on audio recording for the next case study since those have some advantages as mentioned above.

3.5 Limitations

There are limitations of this work, such as: limited time, funding and theoretical tool. This research was limited by school activity, for instance: the first author have to wait the next academic year to interview the participants. Also, there is limited funding for conducting field work, therefore the research in Indonesia context was conducted at distance. In the future, the researcher will evaluate for possibility to conduct field work regarding this case study after the result analysis has completed. Another limitation is the researcher has not used ANT as theoretical tool in the analysis. ANT will be used to analyse the result of this case study. Furthermore, this research is limited only two case studies. In the future, this case study can be extended to get more interview and interviewees, different type of schools, different cities, interview other stakeholders and using other techniques, such as questionnaire.

4. Conclusion

This paper makes contribution to the e-government area, particularly e-participation research area by providing guidance of conducting an in-depth comparative case study from different countries with different language and social-cultural contexts, including research by distance and local access research. Also, the paper makes contribution in understanding options for processing and comparing responses in multi languages. Insights were gained covering selection of issues, selection of case studies, ethics consideration, coding across multiple language using various techniques and tools, transcribing, translation process and others. Thus, those things will be important for researchers, especially young researchers. The future work is interpreting, analysing and reflecting the result of the study.

Acknowledgments

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Masters Research papers

Measuring Success of Higher Education Centralised Administration Information System: An e-Government Initiative

Nazhatul Shahima Hassan and AfzaalH.Seyal
Institute Technology Brunei, Brunei
Nazhatul.hassan@moe.gov.bn
Afzaal.seyal@itb.edu.bn

Abstract: The study undertaken and validated the DeLone& McLean (2003) instruments' through its six dimensions measuring the success of Higher Educational Centralised Administration System (HECAS) in Brunei. HECAS system success investigations were carried out both quantitatively and qualitatively, examined using SPSS and further analysed through statistical approach. The study focused on the constructs that were in the reach of control of stakeholders and has direct influence to HECAS success. HECAS degree of success was explored through System Quality, Information Quality and Service Quality dimensions. Out of these, system functionality to System Use, only Service Quality is significant that is related to System Use, while System functionality to Satisfaction, all variables were significant predictor of Satisfaction with 64% of the variance in Satisfaction is shared by three variables; System Quality, Information Quality and Service Quality. Satisfaction is determined by the System Use and the Benefit of the system is determined by User. Use of System and their level of Satisfaction with 41% of the variance are shared by the two variables. Finally, system success is determined by the overall system benefits that account 60% of the shared variance towards the success by the benefits. The DeLone& McLean 2003 model has been tested and it has implication in Brunei. The findings assist the decision maker to use the instrument to tune the different weight of other success dimension. The study add values and fill-in the gaps to the IS Success literature in Brunei that uses DeLone& McLean 2003 model as the IS success instruments.

Keywords: higher education, centralised administration information system, information system success, e-government initiative, instrument, Brunei

1. Introduction

The motivation of this research is two-fold. The first is from intrinsic point of view. The impact on the initiatives such as national strategic plan towards the *Wawasan 2035* vision, the e-Government Strategic Plan, Ministry of Education Strategic Plan, Education strategy and the introduction of the 21st century national education system (SPN21), major revision on the schools and administration business processes have emerged, thus the investments in Information Systems requires transitional architecture within the organization's domain.

In response to the national Bruneistrategic plan towards the *Wawasan 2035* pressure and other demands, the Ministry of Education Brunei need to identify what variables influence the success of HECAS. Thus, this research will study the role of students'demographics and how it affects HECAS success. It then examines and validates the HECAS success dimensions based upon DeLone& McLean (2003) model. It is normal practice under Information System (IS) that to study the impact of information system by measuring the system success and user satisfaction that is an author reason for conducting study on measuring system success.

Another motivation to conduct this study is on the extrinsic view point, that is, from the current literature reviews; the environmental factors impact on IS, the instruments or model used in measuring the IS performance and how these contexts positively and negatively affect the IS success.

2. HECAS overview

Higher Education Centralised Admission System which known as HECAS was first operational in February 2009 and HECAS is open for applications for twice a year that is in February and August. It is an application for Advance Diploma, Higher National Diploma (HND) and first Degree programmes.

The implementation of HECAS aims to provide a platform for Brunei students for Higher Institutions applications and secondly, to support operation of four Higher Education Institutions in Brunei, and Scholarship sections in Ministry of Education (later in this document known as MOE) on the undergraduate programmes admission activities.

HECAS allow students to apply online to local higher education institutions or the Scholarship section through any computer with Internet access. Once students' online applications completed, HECAS will produce a list of

student application with up to three programme options and reroute these applications to the system owner that is Higher Education Section in MOE (which later in this document known as HE) and the respective Institutions (system administrator) for further admission process. HECAS is simple online application system, no decision making process nor document storage capability built in the system. Students' has to come down to the institutions to get their qualification certificates verified by the institutions registrar.

3. Review of literature

3.1 HECAS study significance to other IS success studies in Brunei and in Papa New Guinea (PNG)

Table 3.1 summarise research studies on Information Systems success in Asia Pacific; Papua New Guinea and South East Asian i.e Brunei perspectives.

Table 3.1: IS Success studies in Papua New Guinea (Kelegai 2005), and Brunei (Mohiddin 2007, Seyal& Cheong 2014)

HECAS (Proposed Study)	ISS in PNG (Kelegai, 2005)	ISS (Mohidin,2007)	TAFIS (Seyal&Cheong,2014)	Elements
Students	Public & Private Organisations	Public & Private Organisations	Accounts Personnel	IS User
Periodic (Twice a year)	Operational Routine	Operational Routine	Operational Routine	IS Usage Frequency
Same organisation	Different organisation	Different organisation	Same organisation	Target Sampling
All	All	Limited	Limited	Sampling User Size
Specific	Multi System	Multi System	Specific	Type of IS Under Study
Developing	Developing	Developing	Developing	Countrys' Economic Status
DeLone& McLean (2003) model	Adopt study design (Miles & Huberman 1994)	DeLone& McLean (1992) model	DeLone& McLean (2003) model	ISS Instruments

From the above table it can be seen that HECAS study will fill-in the gap in the IS literature. HECAS elements for the study investigation and analysis are specific compared to the previous studies. In contrast ISS study by Mohiddin 2007 and in PNG 2004, the target user and target sampling was not focused; therefore, success construct may have different results if both were specifically targeted. Also, the study of multiple IS success at a point of time will produce a considerable impact as each system under study has different aims and goals and should have not be generalised. Seyal&Cheong 2014 however, their study sampling size were limited and it is believed that if the sampling covered at least half of the sampling size (i.e the TAFIS users) the outcome of their analysis will produced differently than to what they have concluded.

3.2 Review of Education Administration Information Systems in United Kingdom (UCAS) and Australia (UAC) to Brunei (HECAS)

UCAS is the University Centralised Admission System to higher education courses for University or college in the United Kingdom. It has been implemented for 50 years since 1961 and every year has helped over 600,000 applicants for entry to university or college in the UK. UCAS is open for applicants of all over the world offering qualifications available in England, Wales and Northern Ireland as well as in Scotland. Further enhancements to UCAS system was planned to be undergone in 2014.

One similarity of UCAS to HECAS is that the system does not have storage repository that is a service to upload attachments. UCAS applicants still have to submit their qualifications and other supporting documentations via manual delivery.

On the other hand, the UAC is the centralized admission centre to higher education in Australia. UAC was setup in 1995, where its services include centralized applications and assessment processes for undergraduate, postgraduate and distance education courses, Educational Access Schemes (EAS) and Equity Scholarships (ES) applications, and applications from specific groups of international student. In total, there were 24 participating institutions mainly located in NSW and the ACT, Australia. Annual report 2012-2013 (UAC Annual Report 2012-13, 2013) stated that over 88,237 Undergraduate domestic applications with 82,069 offers whereas 2,702 International applications and 4,890 offers have been lodged. There were 11,057 postgraduate applications and 12,263 offers.

It can be concluded that UAC has no direct similarity with HECAS. Unlike HECAS, UAC has physical operation centre which is based in Sydney and the UAC centre open for public for enquiries either through walk-in, telephone or email. As part for their continuous improvement, UAC has produced annual report which public can access it online.

HECAS is a pilot project of Ministry of Education, as part of the initiative towards paperless. HECAS has been operational periodically for students since 2008 and has not received any comments on the system since then. Therefore, this study will be the first to highlight its performance though outcome with positive or negative impact. It is no argue that there are still room for improvements in terms of its system functionalities and features. Therefore, HECAS capability is far beyond the UCAS and UAC system performance and is unfair to compare UCAS and UAC success constructs as both have different goals and expectations.

4. Methodology

4.1 Methodology criticism

The intention of the study is to use a suitable model in efforts of finding the methodology that works in a particular context. The Study of Information Systems Success (ISS) and its instrument for measurement have been exercised since late 1970's (DeLone&McLeans 1992, 2003 and Gable et al. 2008). The scope of and approaches to ISS studies has varied much and there is little consensus on the appropriate measures of IS (Sabherwal et al 2006). Diversity of methodologies has been employed such as case studies and surveys. Both measures; subjective and objective have varied greatly in terms of research paradigm, scope, assessment level, context, perspective and data collection approach.

With regards of it generalisability, this tool however, have not been exercised by IS researchers mainly in Asia though fully validated as it was only being introduced in 2009. Many researchers have discussed the use of DeLone& McLean's model as their Information Systems Success (ISS) model and proven to be appropriate to be used as generalised or extended model.

4.2 Research methods

There are two broad approaches to conduct a research, first is the 'interpretivist' and the second 'positivist' approach (Crotty, 1998). Qualitative research is based on three paradigms; Positivist, Interpretivist and Critical paradigms. Qualitative research is used to explore the social/human problems. Researcher builds a complex holistic picture of the situation, analyse the data and conduct the study.

As positivist approach, the purpose of carrying out a research is to understand as to find out how the world works so that events can be controlled or predicted (Neuman 1991). Positivist studies tend to test theory in order to deepen understanding of certain phenomena.

In selecting which research techniques is much depends on the goal of the research. If the goal of the research is to develop a conceptual model for the purpose of building theory around the phenomena, an interpretive approach using qualitative methodology maybe appropriate. However, if the primary goal is to test the validity of a model where all variables which influence the phenomenon is known then positivism approach using a quantitative methodology maybe appropriate.

This research study has applied both 'interpretivist' and the 'Positivist' approach. The paradigm of the study is quantitative based on the data that have been collected qualitatively during the preliminary study believed to be important variables affecting HECAS success. According to Creswell(2007) qualitative research is the best

method for exploring research. The technique of qualitative data collection, semi-structured interviews and survey aim is to identify and explore the antecedents and factors associated with the study phenomena based on the user's perception. The interview and survey data will be transcribed and analysed through coding and constant comparison process while the resulted data will be used to integrate and for the development of conceptual thinking and theory building.

4.3 Comparative review of information systems success theory / model

This section establishes the reasons for choosing the appropriate model for measuring HECAS success. Table 4.1 shows a comparative review over the six IS Success theories with a view of selecting one theory for the adoption to fit into this research study context. The criterion for theory and model selection is highly dependent on the researcher confidence in the theory. Confidence in this context covers areas as firstly, *Simplicity* - that is easy to understand and apply the model or concept, secondly, *Flexible* in the context of its flexibility to be applied in a particular situation or country. Finally, the chosen model/theories should have been well tested and validated, thus increase the author confidence level adopting the said theory/model.

Table 4.1: Comparative review on six IS success theories

Model & Criteria	DeLone& McLean 1992	Seddon et.al 1998	DeLone& McLean 2002	Wang and Liu 2005	Sabherwal et.al 2006	Gable et.al 2008
1. Simplicity	Yes	No	Yes	No	Yes	Yes
2. Flexible	No	No	Yes	No	No	No
3. Well Tested and Validated	Yes	No	Yes	No	No	No

A research study on determining an instrument to assess Information Systems Success in developing countries by Mukassa (2012) has concluded that of all theories reviewed between 1992 to 2008, DeLone and McLean 2002 model was deemed flexible for use in developing country. Mulira (2007) in her study highlighted that major challenge identified in developing countries is lack of expertise in such domain, thus theories used shall the one that exhibit simplicity. Of all theories reviewed, DeLone and McLean 1992, 2002 were the most tested and validated (Petter et.al 2008, Wang and Liu 2005, Seddon et.al 1998, Seddon and Kiew 1994).

For this research study, the decision to adopt the DeLone& McLean 2003 model was based on the last ten years findings on the IS success evaluation, as it has been widely used for understanding and measuring the dimensions of IS success (Stacie et al, 2008). Furthermore, this study will fill-in the gap on the IS success literature in Brunei with reference to the findings of the recent IS success study carried out by Seyal& Cheong (2014) that uses DeLone& McLean (2003) model as the ISS instruments. The investigation of HECAS success will be measured using DeLone& McLean (2003) Information Systems Success model as shown in Figure 4.1.

Figure 4.1: DeLone and McLean (2003) IS success model

4.4 Research design

4.4.1 Sampling selection

This research study have used the sampling that directly involved with HECAS; there were four of five institutions selected; UBD, ITB, Politeknik and Scholarship Section, while UNISSA was omitted in the target sampling simply because of the language barrier. Most of the questions in the questionnaire was written in English medium

therefore, it would be inevitable difficult to translate the questions into Arabic language as to preserve the IT/IS terms and the jargon used in the research questionnaire. The other criteria for selecting these four institutions were that they have the same system – HECAS. The unit of analysis focuses on the HECAS direct user; students whereas the HECAS administrator, academic registrar and clerk were approached to filled in the questionnaire and answer the pre-planned questions. A total of 80% of sampling was explored during the HECAS evaluation discussed in the next section in which it will contributes to the depth and detail quantitative analysis.

4.4.2 Instrument reliability and validity

Case study protocol was reviewed and verified for Face and Content validity before being implemented. In this case, the questions on the survey and interview were reviewed and modified and appear valid to the sampling under study.The study has employed the correlation coefficients of Cronbach's Alpha (1951) for reliability test of the questionnaire with +/-.70 or between +/-.30 to +-.69 moderate scoreare acceptable. For factor analysis, the technique of varimax rotation with Kaiser-Normalisation as criteria was used to examine the individual items and the relationship among them (Hair et.al 1998).

Final assessment was the testing of Construct Validity through convergent validities as suggested by Churchill (1979). The convergent validity was assessed from the six constructs an attempt to examine the composite reliability (CR) and average variance extracted (AVE). Table 4.2 shows the composite reliability (CR) calculations as well as statistics consistency as part of the quality control measures.

Table 4.2: Quality control statistics

	Constructs	Number of original items	Number of items retained	Alpha value (0.70 and above)	Mean	Variance <0.50	Composite Reliability (CR)
	System Quality	8	8	.87	3.21	.63	.84
Questions designed based onDeLone& McLean 1992	Information Quality	4	4	.78	3.21	.59	.67
	Service Quality	4	4	.90	3.73	.78	.87
	System Use*	2	1				
	User Satisfaction	3	3	.90	3.17	.80	.84
	Net Benefits	6	6	.86	3.00	.65	.82
	System Success	2	2	.91	3.15	.83	.81
	Total	29	28				

During the initial screening test, the *System Use* construct has not been validated for reliability test as it has only one unit dimension left (as one item was dropped during initial screening) and predicted not supporting the correlational relationship since *System Use* is mandatory. Thus, *System Use* value was eliminated from the constructs. However, all the seven constructs were between the suggested minimum 0.70 (Hair et.al 1998) and it has shown the constructs correlation and variances. When composite reliability (CR) is above 60% or .60 and average variance extracted is greater than 50% (.50), then the instrument used in this study have significant construct reliability (Fornell& Larker 1981).

5. Data analysis

5.1 Data collection

Structured Interview method was used in the research in collecting the required data as to explore what system actually serves. The interview questions focused on areas i) the Institution's view on HECAS application process, and ii) the HE's view on HECAS. The author has been able to interview the administrators via face-to-face and confirmed through phones. Feedbacks from interviews were transcribed on the same day as to avoid missing the key points. A total of ten users (2 from each Institutions; administrator and clerical staff) were involved in the study. The other method chosen for data collection was the questionnaire, for its speed and assurance of anonymity.

Approximately 250 questionnaires were distributed both manually and electronically via email to users in ITB, UBD, Politeknik and Scholarship Section. 216 were returned and only 190 were useful for data analysis. The non-useable responses were majority due to late respondents receivedwhereas all the valid responses 100% were collected from ITB. At around half of the respondents are female with 56.8% of total counts and the remaining are male with 43.2% of ages ranging between 18-30 years old covering respondents from Computing, Business & Management and Engineering faculty. The demographic data has been collected and discussed. To test the hypothesis of relationships between the variables, the survey were analysed using *Descriptive statistics, Factor analysis, Correlation* and *Regression* aspects by using SPSS version 21.Majority of the users were relatively female with 56.8% over male within age group of 18-30 years at 98.4% of total count. At 65.3% majority of the users used the system once and 29.5% have used it twice. This is due to a reason that HECAS system registration are only open for registration twice a year, that is after the Government public examination GCE 'A' level examination results has been released. Majority of users at 79.5% never had a formal training on how to use the HECAS system, some users refer manual and with the assistance of school's representative on how to operate the system both account of 10.0%.

5.2 Correlation analysis

A zero order correlation between the independent variables was conducted prior to the regression analysis testingas shown in Table 5.1. This testing hope to present the predicted relationship and showing the co-linearity among the independent variables are within acceptable range (Hair et.al 1998).

Table 5.1: Correlation matrix

CONSTRUCTS	SQ	IQ	SERQ	USE	US	NB	OverallSuccess
System Quality (SQ)	.722**	1.00					
Information Quality (IQ)	.547**	.524**	1.00				
Service Quality (SERQ)	-.123	-.153*	-.205**	1.00			
Use (USE)	.707**	.690**	.561**	-.067	1.00		
User Satisfaction (US)	.565**	.539**	.369**	-.092	.642**	1.00	
Net Benefits (NB)	.630**	.628**	.435**	-.025	.709**	.768**	1.00

5.3 Regression analysis

The regression analysis was conducted in attempt to determine the relationship of the three constructs; system quality, information quality and service quality in effort of measuring the system success. The system success will be influenced by the predictive indicators of net benefits which are mediated by the System Use and User Satisfaction. The result of regression analysis is presented in Table 5.2, 5.3, 5.4, 5.5 and 5.6 the model format was adapted from Wang and Chen (2011). The four models produces statistically significant F-ratio and possessed moderate explanatory power as indicated by R^2 coefficient which shows that 64% of the variance in User's Satisfaction in Table 5.2are explained by the three independent variables. All qualities construct are significant to User Satisfaction. However, Table 5.3 shows that none of the independent variables contributes towards the *System Use*, as the model explained that moderate explanatory power with 0.5 of variance is explained towards the use. The result in Table 5.4*System Use* is significant contributor to User Satisfaction. In Table 5.5, both *System Use* and *User Satisfaction* is significant contributor of *Net Benefits*. Finally, the overall system success in Table 5.6 has significant F-ratio with R^2 coefficient 60% of the variance in overall success is explained by the *Net Benefits*.

Table 5.2: Regression analysis on qualities (independent variables) to user satisfaction

VARIABLE	Beta	t-statistic	p-value	Remarks
System Quality	.37	5.219	.000	Significant
Information Quality	.33	4.653	.000	Significant
Service Quality	.20	3.297	.001	Significant
Durbin-Watson	2.179			

Dependent variable: User Satisfaction, R^2 = 59%, F=89.467

Table 5.3: Regression analysis on qualities (independent variables) to system use

VARIABLE	Beta	t-statistic	p-value	Remarks
System Quality	.04	.355	.723	Not Significant
Information Quality	-.09	-.814	.417	Not Significant
Service Quality	-.18	-2.061	.041	Not Significant
Durbin-Watson	1.744			

Dependent variable: System Use, R^2 = 0.05%, F=2.965

Table 5.4: Regression analysis on user satisfaction

VARIABLE	Beta	t-statistic	p-value	Remarks
System Use	.60	13.700	.000	Significant
Durbin-Watson	1.91			

Dependent variable: Satisfaction, R^2 = 64%, F=187.702

Table 5.5: Regression analysis on net benefits

VARIABLE	Beta	t-statistic	p-value	Remarks
System Use	-.05	1.644	.324	Not Significant
User Satisfaction	.64	6.248	.000	Significant
Durbin-Watson	1.87			

Dependent variable: Net Benefits, R^2 = 41%, F = 72.615

Table 5.6: Regression analysis on overall success

VARIABLE	Beta	t-statistic	p-value	Remarks
Net Benefits	.77	16.435	.000	Significant
Durbin-Watson	1.905			

Dependent variable: Overall Success, R^2 = 60%, F = 270.123

The results in Table 5.2, 5.3, 5.4, 5.5 and 5.6 provide quite strong support for six of the research hypothesis in Figure 5.1. The t-statistics are so large that rejects the null hypothesis for H1, H2, H3, H4, H9 and H10. The *Net Benefits* of the HECAS were only determined by *User Satisfaction* which have more significant path (β=0.64**). The overall Satisfaction have very significant path coefficient as shown in the Figure 5.1. Support for H5, H6 and H7 were the weakest as a result the effect on *System Use* provide no support for H8. The 41% of the variance in *Net Benefits* is shared by the *System Use* and *User Satisfaction*. The overall success of HECAS is determined by the *Net Benefits* of the system bring in which is reported to have significant Beta Coefficient (β=0.77**) and the model finally shown that 60% of the success in HECAS is shared by *Net Benefits*. To conclude, the model has the parsimony with good predicting power.
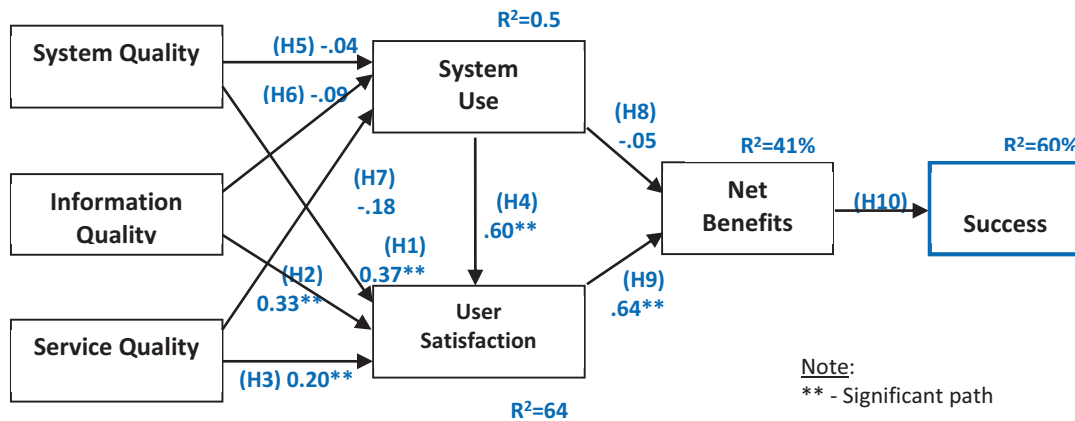

Figure 5.1: Results for the proposed researchmodel

6. Discussion

This study explored the success of HECAS and highlights the factors that contributed to its success. The ten research hypothesis based upon the DeLone& McLean (2003) conceptual model for measuring HECAS success are listed in Figure 5.1. Examining student demographics data prior undertaking the DeLone& McLean (2003) six dimensions analysis could not predict nor influence the HECAS success when conditions of HECAS use is mandatory. This study attempted to validate the DeLone& McLean (2003) instrument to measure the system success on 29 items. The instrument was revised to measure only the 28 items on seven constructs as depicted in Table 4.2. The model in Figure 5.1, a construct 'Overall Success' was added and the 'USE' in DeLone& McLean (2003) model was renamed as 'System Use' as it was believed that the designation were better reflected the construct. The results from the analysis revealed significant relationships between variables which justified as follows.

First, it was found that there were strong relationships existed between *system quality*, *information quality*, *service quality* and *user satisfaction*. This study results are in line with previous literature where Petter et.al (2008) in their meta-analysis found strong support in these variables. Research studies by Seddon and Kiew (1994),Halawi et.al (2007),Wang and Chen (2011)had found a significant relationship only between two variables, their study results were only support the *information quality* and *user satisfaction* variable. This study result is also in contrast with Seyal&Cheong (2014) in their attempt to measure the success of Financial Accounting Information System (TAFIS) implemented in Brunei Public Sector. Their results found that strong relationship only on two variables between *Information quality* and *User satisfaction*, while the non-significance thr*system quality* and *service quality* to user's satisfaction were believed to be due to internet connectivity problems as a result TAFIS system down and also the impact of small sampling size in which exhibited their full findings.

Secondly, the results signify strong relationship between *User satisfaction* and *Net benefits* that measured on the six-items. Iivari (2005) was in line with this study finding, their empirical results found a strong relationship between *User satisfaction* and *Net benefits*. Petter et.al (2008) is supporting this result in which their meta-analysis found out that fourteen out of fourteen studies showing the positive results. In contrary, Seyal&Cheong (2014)found statically significant relationship between the *user satisfaction* and *net benefits*.

Result from the third finding, the independent variables (System, Information and Service Quality) did not support *System Use*. The result is in line with Kositanurit et.al (2006)and Halawi et.al (2007) hypothesis. Petter et.al (2008) on the other hand, found that 43% of the studies support the positive relationship between Service quality and Use, while 50% of their studies could not establish relationship between Information quality and Use. In Brunei context, when the use of HECAS is mandatory, this further explains that predictor of *System Use* is insignificant as user have to use HECAS in order to submit their application to higher institutions for acceptance, regardless of the system performances it will not have impact on the degree usage of HECAS. As a result of this impact, the results in Table 5.5 could not find any relationship between the *System Use* and *Net benefits*. This study results are in line with previous studies Iivari (2005),Wu and Wang (2006),and Seyal&Cheong (2014).

Finally, this result highlighted that another strong relationship revealed between *net benefits* and overall

Success. This shows that how significant and important are these variables on account towards the system success. DeLone& McLean (2003) highlighted that the positive net benefits obtained from the information system will eventually influence or reinforce the subsequent Use or User Satisfaction.

7. Limitation of the study

This study has a number of limitations in which common to most researchers. The conceptual model was based upon the DeLone& McLean (2003) model in which was held for the primary model for the measurement of HECAS success. At the outset, this study attempted to extrapolate its findings to all population sampling (UBD, UNISSA, ITB, Politeknik and Scholarship Section) however, due to language barrier in questionnaire presentation thus, UNISSA was omitted in the sampling, moreover due to late receiving the questionnaire responses; 4 questionnaires from UBD (email), 20 questionnaires from Politeknikand 36 accounted from Scholarship Section

sampling were not evaluated. Unlike ITB, no direct clearance given to the author to distribute the questionnaires to the three institutions therefore the questionnaires hardcopy were distributed via the institutions contact personnel.The electronic questionnaire through email were the weakest means of distributing questionnaire as out of 50 sent only 4 returned from UBD.Nevertheless, the 190 responses received from ITB considered viable and valid to be analysed as it represents the same demographical data from all targeted sampling which influences the final validated model.

Another key differences in the proposed research model compared to original DeLone& McLean (2003) model was that the relationships between *User Satisfaction* and *System Use* was not included as part of the conceptual model. This was due to the fact that *User Satisfaction* was not predictor *to System Use*in which the users were not using the system as a result of satisfaction but due to the use of the HECAS system is mandatory as manual application to higher institutions is not an option.

8. Conclusion

This research study in which the DeLone& McLean (2003) IS success model was adapted to the evaluation of HECAS success. The results provide considerable support for the DeLone& McLean's (2003) model of IS success. The DeLone& McLean's model can be interpreted as 'User Satisfaction' is a response to a three types of HECAS key factors; System Quality (H1), Information Quality (H2) and Service Quality (H3). As predicted (DeLone& McLean 2003), over 64% of these three factors explained a large proportion of variance in User Satisfaction in this study which in turn leads to net benefits gained and finally counts the HECAS overall success. The model has proven its validity and suitability for the measurement of HECAS and the model explained the results obtained. The success dimension which contributed the most and has impact on net benefits was the User Satisfaction thus, the findings in line with other literature (Petter et.al 2008).

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Insights, Issues and Challenges of Applying DBMS in Hospitals Within Developing Countries

Henry Chukwuemeke Okoro, Carl Adams and Tineke Fitch
University of Portsmouth, UK
up506832@myport.ac.uk

Abstract: Developing countries often face challenges in applying technology projects at the local level. This is particularly relevant to projects related to health services, such as hospital systems, since any implemented service is likely to directly affect citizens or patients. This paper reports on an investigation capturing insights from people working at hospitals in developing countries that have undergone a transition from a paper based system to the implementation of a Database Management System (DBMS). Most rural hospitals in Nigeria still use paper as a means of creating patient records manually. One such hospital, Sapele General Hospital is considering moving towards a DBMS and is used as a case study to capture the challenges, opportunities, issues and concerns of people working at a hospital considering implementing a DBMS. The paper is informed by a literature review covering relevant previous DBMS implementations in hospital systems and the challenges they faced. It is also informed by interviews and surveys of both people working at hospitals in developing countries that have implemented a DBMS and people from the case study considering such an implementation. The paper provides various contributions. First, it provides insights and guidance on issues, benefits, challenges and practical considerations in moving from a paper based hospital records system to an electronic system – informed by previous implementations - and which can be used to inform similar hospital implementations of DBMSs. Secondly, it provides insights on current concerns and challenges that hospitals face in moving from paper based systems to electronic DBMSs. It will further capture a balanced perspective on some of the likely benefits and challenges in implementing a DBMS within the context of developing countries.

1. Introduction

This paper will adopt a mixed method approach in gathering primary data, both qualitative and quantitative, as well as undertaking a wide-ranging literature review. The focus of this paper's is the feasibility of implementing electronic medical records (EMRs) and using various mobile devices for creating records, across rural hospitals in Nigeria. Comparison will be made with creating paper records, for instance, Sapele General Hospital which uses paper records.

The research will ascertain if it is feasible to implement EMR, with nurses, doctors and administrative staff based within Sapele General Hospital using various mobile devices.

The research is aimed at identifying:

- Potential setbacks of using paper to create patient records;

- Potential benefits of implementing EMRs;

- Challenges of implementing EMRs within the setting of rural hospitals in developing countries.

2. Literature review

The research interest is aimed at investigating the feasibility of using various mobile base devices and implementation of EMRs within rural hospitals in developing countries. The research is prompted by setbacks and weaknesses seen in using paper files to manually collect and store information within rural hospital settings in Nigeria. These issues may include misplacement of patient file due to carelessness (Nwazor, Okozie, Inyiama & Ufoara, 2011). Using paper files means a patient file can only be one place at a particular point in time and so cannot be shared concurrently (Abdulkadir, et al, 2010).

The literature review does not ignore the challenges that could be encountered in implementing EMR. These may include:

- Sustainability of implementing EMRs in rural parts of Nigeria;

- The ability of rural hospital staff to comply with the data protection act;

- Availability of networks in rural Nigeria;

▪ The reliability of electricity supply to power mobile devices and computers.

2.1 Paper medical records

Collecting and storing patient information can be referred as health reporting, in most developing countries, or rather sub-Saharan Africa, most hospitals and health institutions still use paper to create records. Using paper to manually store patient information may dispose them to error (Kiberu et al., 2014, p. 3). Several hospitals in Nigeria have not adopted EMRs, they still use paper records which can get misplaced easily, so making tracking of medical history difficult (Achampong, 2012, p.10). The first documentation is usually begun by administrative staff based in hospital reception, the patient's paper file then being transferred to a doctor prior to the patient being called in for consultation (Nwazor et al, 2011). In developing countries and emerging economies, manual data approach is relied upon for creating records and accomplishing administrative tasks (Cline & Luiz, 2013, p. 2). Challenges that can be attributed to paper records include: misplacement of patient files/information due to carelessness; poor time management during the process of storage and retrieval of patient information, loss of patient records due to natural disaster. Access to a patient's paper record is only available to one person at a particular time (Nwazor et al, 2011). In the event of natural disaster such as fire, flood and storms, paper files can be damaged, or lost completely (Awokola, 2012, p. 3). In several hospitals in Ghana and Nigeria, staff within the same hospital cannot share patient file concurrently (Achampong, 2012, p.10, Abdulkadir et al., 2010). Resourceful management of data can be challenging in a manual system and often involves replication of effort and is time consuming (Krishnan, Nongkynrih, Yadov, Sing & Gupta, 2010, p. 2). Hospitals in rural Africa that continue to adopt a paper approach to collecting and storing patient information often produce poor data quality in terms of consistency, accuracy and completeness of records (Kiberu et al., 2014, p. 3).

2.2 Electronic medical records and its benefits to rural hospitals

In the recent decade, the demand for Hospital Management Information System has been high globally. Several research studies have recently publicised the benefits, which include: decrease in medical documentation error, fewer adverse drug reactions, decreased spend on manual/paper purchase, reduction in the rate of billing errors, better follow-up of patients requiring long time treatment due to reminder systems (Mukherjee & Babu, 2014). Electronic health records can be very useful instruments which can positively affect health care in rural communities; their adoption by rural health care providers can lead to profitable changes to rural residents. This may imply that changes in illness can be appropriately monitored and timely intervention provided (He et al., 2014). Implementing electronic health records can also facilitate health care managers' informed decision-making within rural health care subdivisions, resulting in more productive and proficient care administered to patients. (Nkqubela, Marlien & Dalenca, 2014). Electronic health records can assist doctors and other medical staff in evaluating patient health status, enabling consistent diagnosis and up to date treatment of disease. Taking on EMRs by doctors, nurses and administrative staff in both rural and specialist hospitals can assist in more effective and diligent daily record keeping by hospital staff. (Kuo, Liu & Ma, 2013).

2.3 Challenges and issues of implementing EMRs

Money has to be available for investment into hardware, software, Information Technology (IT) technicians, and training for staff; this may amount to a huge cost for hospitals in rural settings, so adequate funding is required to allow for smooth day to day running and continuity (Abukhousa, Mohammed & Al-Janoodi, 2012, p. 3). Information security is a major threat related to electronic health implementation; it can be tackled by regulation and putting in place strong policies (Betjeman et al., 2013, p. 5). Devices used in hospitals where EMRs have been implemented are susceptible to theft, particularly in rural areas. Theft of computer devices may mean unauthorised access to patient information, which in turn may put confidentiality of hospital patients at risk (Were & Meslin, 2011).EMRs are also susceptible to privacy and security issues as a result of storing patient information or information transfer across various devices and computers. (Sao, Gupta & Gantz, 2013, p. 8). Constant power failure in many developing countries like Nigeria, could affect the use of EMRs within rural hospitals, as frequent power outages and low voltage can result in desk top computers and other electronic mobile devices being damaged, resulting in huge financial burdens (Awokola et al.,2012, p. 4). Electricity problems can have negative impact towards health informatics project in developing countries, electricity in most developing countries can be describes as undependable (Ebo, Amosa, Adenusi, 2012, p. 2). The telecommunications infrastructure in rural Africa is revealed to be poor, resulting in limited Internet providers in remote areas; declined level of access to transnational bandwidth can be a foremost contributor leading to reduced ICT application in rural areas in Africa, which can impede electronic health implementation in these localities (Yusif & Jeffrey, 2014,

p.13). In addition, connectivity problems and inadequate software updates can also be major challenges to electronic health record implementation in rural hospitals (Wilson, 2009, p. 13).

2.4 Accomplishments and success story

Chen et al (2014, p. 5) report, village doctors in rural Sichuan province of China, being provided with mobile phones containing an app for monitoring and tracking immunization records.

- Appointments: registration of children takes place in the township, after entering the child's information in a computer , the system automatically assigns a child to a village doctor with various dates of appointment regarding immunization, and this automatically appears on village doctor 's mobile phone app.

- Tracking: The app is also designed to send reminders to the village doctor when a child has missed an appointment up to 3 times. The reminder contains telephone number and address of the child's guardian. Based on this information, the village doctor can call or visit the address in order to inform guardian about missed appointments (Chen et al 2014, p. 7)

2.5 Literature review conclusion

Implementation of DBMS in rural hospitals can impact positively on health and well-being of patients. The health sector of several developing countries suffers from various setbacks ranging from misappropriation of funds to under-investment in the health sector. Encouraging such hospitals where there is underfunding to adopt EMRs will not resolve these problems (Aranda-Jan, Mohutsiwa-Dibe & Loukanova, 2014).

Figure 1: Summary of papers used for literature review

Stakeholders and local health authorities across developing countries frequently ask questions regarding benefits of implementing EMR. They also emphasized concerns regarding cost of implementation and maintenance of such projects. There have been several accomplishments in the use of mobile devices to create records in various developing countries. The Tanzania Health Authority provided field health care workers with digital de-

vices which are used to monitor various neglected tropical diseases, the health care workers showed great optimism regarding the use of such devices. Successful implementation and support of this project in Tanzania suggests that it is feasible to use mobile devices to create record in rural Sapele General Hospital. Nevertheless, adequate requirements gathering needs to be conducted to ascertain various challenges, concerns and benefits that can be derived from implementing EMRs in rural hospitals across developing countries.

3. Methodology for primary data collection

There are several means of conducting research of this nature; due to limited amount of time and resource, telephone interviews and online surveys were used. All primary data for this research was gathered from various categories of health care professionals and clinicians, working in Sapele General Hospital, the hospital used as a case study for the research. Survey was also conducted using staff of other hospitals that moved from paper to EMRs.

3.1 Research methodology

The research methodology for this paper was based on the following research questions:

- What is the feasibility of implementing EMRs in Sapele General Hospital?
- What is the feasibility of staff at Sapele General Hospital using mobile devices in creating records?

3.2 Research approach

We choose a mixed method approach for this study, the combination of both qualitative and quantitative method, to provide answers to linked questions. It has the benefit of combining both and so limiting the weakness of using separate or individual methods (Ary, Jacobs, Sorensen and Walker, 2010, p. 597-603). Using mixed methods adopts a logical approach; examples are: consequence-oriented, problem-centered, and pluralistic approaches. It employs strategies of enquiry which involve collecting data either concurrently or successively to best understand research problems. This data collection process also involves gathering both numeric information as well as text information. The final databank will demonstrate both quantitative and qualitative facts (Creswell, 2003, p. 18-23). Finally, mixed method enables researchers to provide answers to more complicated questions, which in most cases are hardly achieved by using just a single method (Shao & SHAO, 2012, p. 18).

3.3 Telephone interview

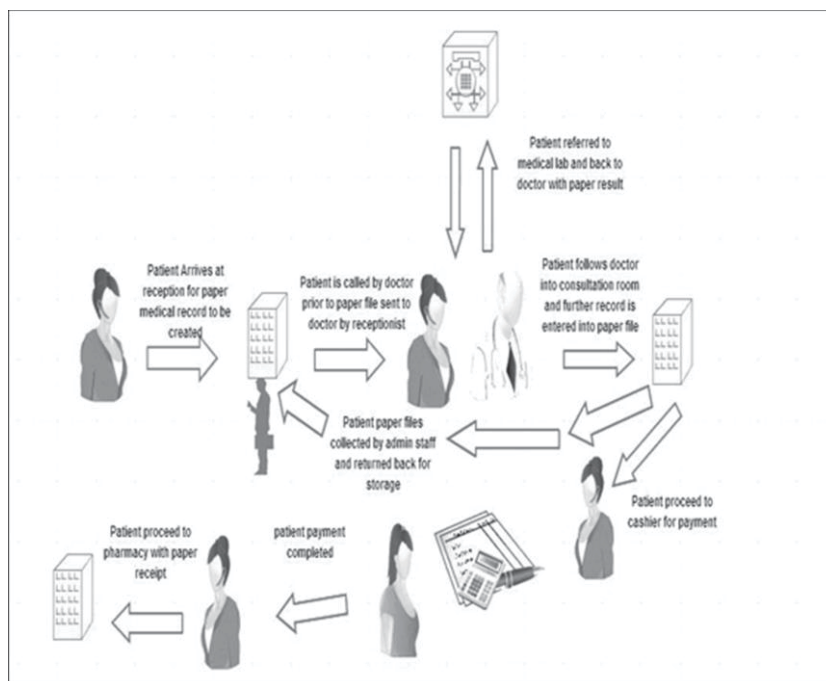Figure: 3 shows existing process of creating records

Figure 2: Process of creating paper medical records in Sapele General Hospital

The initial stage of analysis was to produce a process map, this was done through telephone interview with Dr V, Manager of Sapele General Hospital, to gain insight on process of creating paper medical records; next stage was to pass the design to hospital manager to establish similarity with current system who confirmed he was satisfied with design; the diagram identifies main stake holders, which helped in developing the survey, targeting participants and developing survey questions. The diagram also explains basic process involved in creating paper records; this process is similar to the identification by Nwazor et al (2011) and Abdulkadir et al (2010).

4. Results and discussion

The method adopted for collecting data is through the use of telephone interview and online survey

The online survey was powered by Survey Monkey, open for 3 weeks; we have two sets of online questionnaires to be discussed. 18 responses from first online survey and 3 responses from second online survey these are: Insights on paper hospital patient records and Insight from different hospitals already using DBMS. The first online questionnaire with title "Insight on Hospital Paper Patient Records and Challenges" is aimed at gaining insight from hospital staff working at the hospital which is used as a case study for the research. The second online questionnaire with title "Insights from Hospital DBMS" is aimed at capturing views from other hospitals that transformed from paper to Hospital DBMS.

4.1 Respondents' views on challenges of using paper patient records

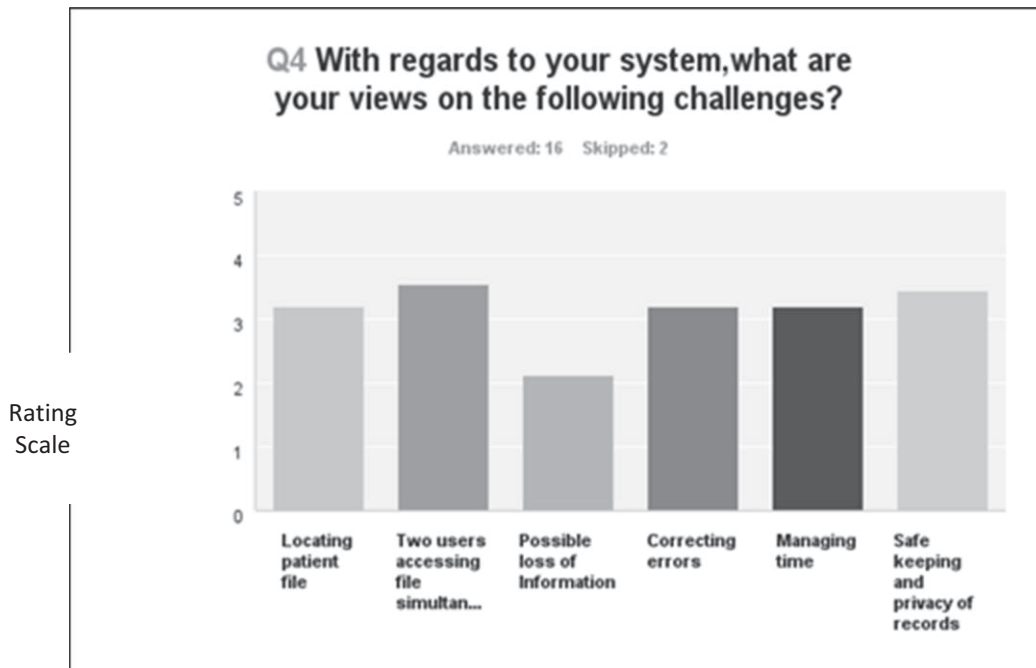The chart below shows respondents' opinions on the challenges of paper medical records

Figure 3: Respondents' views on challenges of paper medical records.

Respondents were asked to share their opinions regarding the following challenges of using paper to create records. In terms of locating patient paper file, a total of 16 respondents answered this question; greater percentage of respondents expressed their view which implies difficulty in locating a paper file.

Large proportion of the respondents (88 % (n=14) choose difficult compared to (6 % (n=1) that said easy in terms of locating paper files and (6 % (n=1) answered don't know.

As to simultaneous access to paper files, 16 respondents answered this question with a large number of the respondents (79 % (n=13) agreeing it is difficult to access paper file simultaneously, compared with the portion of respondents who think it is easy (6 % (n=1) and (13 % (n=2) answered don't know. Respondents' opinions that confirmed difficult correlate with papers of Achampong (2012), Abdulkadir et al (2010) in several hospitals in Ghana and Nigeria, staff within the same hospital cannot share patient file concurrently.

One common challenge of using paper records can be the possible loss of information, this was confirmed by the greater proportion of respondents (75 % (n=12).In terms of correcting error, overwhelming majority of respondents (94 % (n=15) explicitly stated difficulty towards correcting error on the use of paper medical records. This supports the interpretations of Kiberu et al (2014) which states using paper to create record can be prone to error and recovering from such error can be very hard.(94 % (n=15) Confirmed difficulty in managing time when paper is used to create records compared to just (6 % (n=1) stating easy time management for paper medical records. Using paper to create record can lead to replication of effort and so can be time consuming (Krishnan et al, 2010), as did Nwazor et al (2011). These findings are supported by the respondents. As to privacy and safe-keeping of paper records, (94 % (n=15) suggested this is an issue; only (6 % (n=1) of respondents supported easy safe keeping of paper records. Several hospitals in Nigeria have not adopted EMRs, suggesting security and privacy of records could be a major concern.

4.1.1 Findings from the Hospital under Investigation:

Reponses from the hospital under investigation are remarkable, this hospital still uses paper to create records but highlighted various challenges of using such records and there seem to be a good acceptance level towards adopting EMRs.

{Respondent 6 "It's becoming obsolete in a dynamic world of information technology where time and money can be saved in relation to vital patient data"}.

{Respondent 16 "Paper can be easily damage if not handled carefully. Damage of paper record will lead to loss of medical history. Loss of medical history can have a negative effect in times of emergency"}.

Findings from this study have shown that majority of the respondents do not support the use of paper to create record, in line with literature reviewed. Dislike shown by respondents for paper medical records can be attributed to the various challenges that have been highlighted causing several drawbacks in several hospitals that never transformed from paper medical records.

4.2 Respondents' views on challenges of implementing hospital DBMS

The chart below shows respondents' opinions on the challenges that could affect implementation of hospital DBMS across rural hospitals in developing countries.
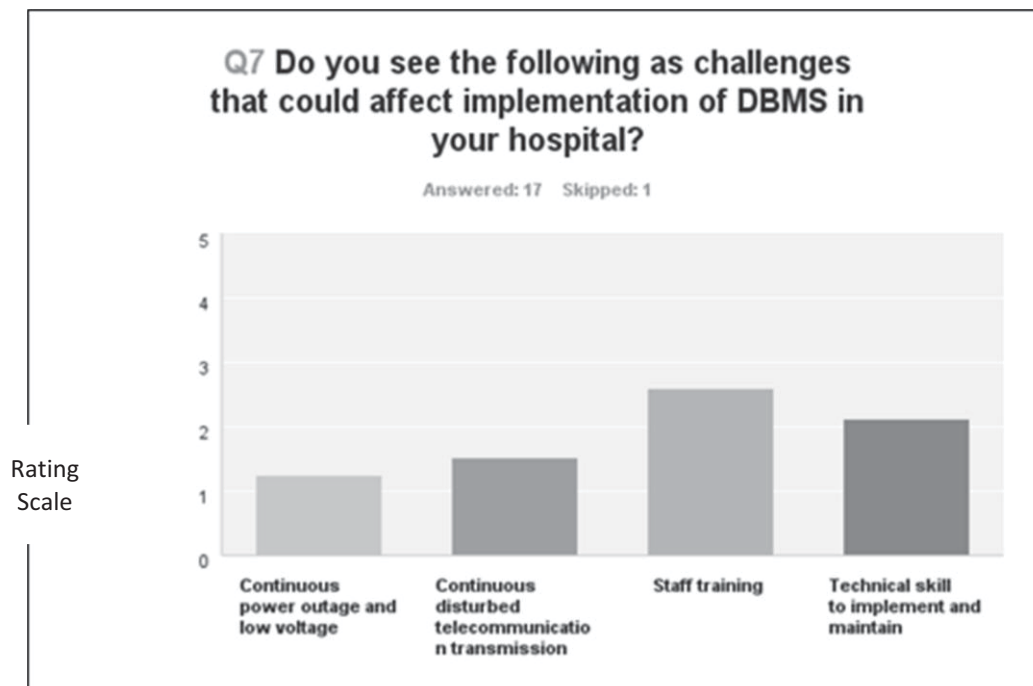

Figure 4: Respondents' views on challenges of Implementing hospital DBMS in developing countries

All respondents (100 % (n=17) agreed that lack of continuous power and low voltage is a barrier towards implementing DBMS in their hospital. Electricity problems can have negative impact towards health informatics project in developing countries (Ebo, Amosa, Adenusi, 2012, p. 2).

(94 % (n=16) agreed that continuous disturbed telecommunication transmission has a huge negative impact on rural hospital implementing DBMS. The telecommunication infrastructure in most developing is described as poor. This can hinder Health Informatics projects (Yusif & Jeffrey, 2014, p. 13).

Regarding issue of staff training, respondents; answers are almost evenly divided between agree, (41 % (n=7) and disagree (35 % (n=6). (Mean = 6.5; SD= 0.394) It is also significant to note that views may be different depending on the concern.

Large percentage of the total respondents (65 % (n=11) agreed lack of technical skills can be a setback towards implementation and maintenance of DBMSs in their hospitals.

Furthermore, respondents have identified challenges that could affect implementation of DBMS in hospitals across developing countries, resolution of which remains a major issue due to corruption and lack of accountability in government. Other factors hindering implementation include inadequate funding and misappropriation of funds within the health sector (Health partners international, 2010). There are several suggestions that the sustainability and effective running of hospital DBMS will depend on tackling these respective challenges.

4.3   Respondents' views on benefits of implementing hospital DBMS

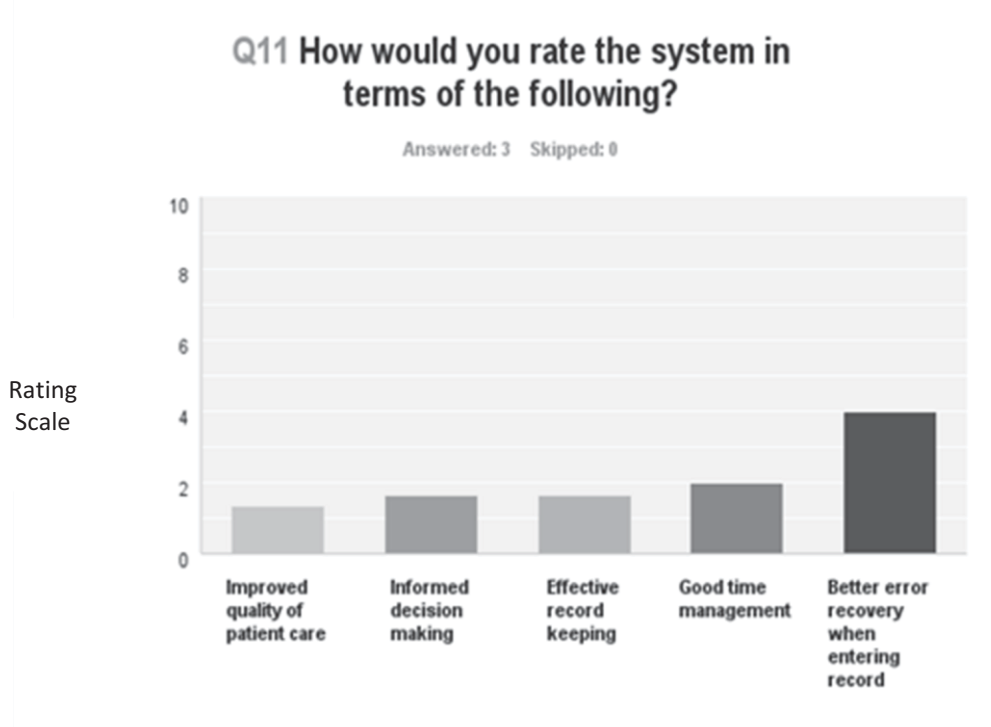The chart below shows respondents' opinions on benefits of hospital DBMS:

Figure 5: Respondents' views on the benefits of hospital DBMS

This questionnaire is aimed at gaining insight from hospital that transformed from paper to DBMS. Based on literature review findings, participants were asked to provide their opinion on the expected benefits associated with the implementation of DBMS in their hospital, the opinions expressed by respondents are as follows:

All respondents (n=3) agreed that hospital DBMS will facilitate improved quality of patient care, this correlates with the point highlighted by Nkqubela et al (2014) which states that introduction of EMRs has resulted to thriving healthcare system in rural part of South Africa therefore leading to improvement with regards to the quality

of care provided and better health care accessibility. The introduction of electronic health record tends to close the gap on health care delivery between rural and urban health care sector.

Implementation of electronic health records can also facilitate health care managers' informed decision-making within rural health care subdivisions, resulting in more productive and proficient care administered to patients (Nkqubela et al 2014), this idea shares similarity with respondents opinions as follows ; (n=3) respondents affirmed that hospital DBMS has resulted to informed decision making.

 (n=2) respondents agreed that hospital DBMS has led to effective record keeping, this views are highlighted by Kuo et al 2013 which states that taking on electronic medical records by hospital staffs in both rural and specialist hospitals can assist in more effective and diligent daily record keeping by hospital staff and (n=1) respondent disagreed.

A study in Washington, United State of America shows that EMRs could save 40% of health care workers time compared with paper means of patient record (He et al 2014). Some respondents (n=2) stated that hospital DBMS has ensued good time management and only (n=1) respondent stated disagree. Lastly, regarding the question better error recovery when entering patient record only (n=1) respondent agreed, (n=2) respondents answered don't know to this question.

4.3.1   Findings from the hospital that have already adopted EMRs

Some respondents' identifications on positive achievements of hospital DBMS are as follows:

A Registrar responded "Easier access to patient data".

Junior doctor responded "Easy Accessibility and Sharing of information among the managing team".

Whereas their respective negatives elements of hospital DBMS are:

A Registrar responded "Poor implementation across departments with system breakdown".

Junior doctor responded "Electricity and system failures".

The benefits highlighted by respondents from the online questionnaire draw a parallel with other literature that has been reviewed.

5. Results

Findings captured based on respondent views are as follows:

- Respondents are generally open towards electronic medical records;
- Respondents are in agreement with the survey
- They have good ICT skills;
- Survey questions was well understood by respondents;
- They mentioned their main worries and concerns;
- Due to other hospitals have adopted electronic medical records, they seem to be more acceptance.

6. Conclusion

The aim of this study is to establish the feasibility of   implementing DBMS in rural hospitals across developing countries, from the primary data and literature reviewed, there are several indications that implementation of DBMS in rural hospitals has numerous benefits which include informed decision making, tracking and monitoring patients on long term treatment, security and privacy of information and backup/recovery. Reports generated from literature review have also assisted in identifying various challenges associated with using paper to create records, challenges of implementing EMRs and success stories regarding EMRs in rural areas.

This paper provides novelty in gaining insight and views from hospitals that have previously gone through EMR/DBMS process as well as capturing views from a hospital considering such adoption.

During early years of introducing hospital DBMSs, there were many problems as said in the literature review, one such problem is the issue of acceptance, but now it is completely different, acceptance level is reasonable, but challenges facing adoption remain, such as continuous power outage and continuous disturbed telecommunication transmission.

Findings from literature also provided guidance on starting point for gathering primary data, primary data collection adopted a mixed method approach which entailed telephone interview (Qualitative) and online surveys (Quantitative). Online surveys indicated how large proportion of respondents expressed dislike towards using paper to create records. Respondents showed support for benefits associated with DBMS. Literature review also reported great optimism shown by certain field health care workers in Tanzania towards the use of mobile devices to monitor and control neglected tropical diseases, high level of positivity was also expressed regarding the benefits of EMR by respondents working in hospital that transformed from paper record to hospital DBMS, Both literature review and primary data indicate several benefits of adopting EMRs; tackling challenges that could hinder implementation would encourage many hospitals to adopt.

7. Limitations towards this research

Due to researcher knows few of the participants working in the hospital used as a case study; this could lead to unfairness in their response. Responses received from the two sets of online questionnaire are quite small.

18 responses was received from the hospital which is used as a case study for the research and 3 response received from hospitals that has already implemented hospital DBMS.

Several emails were sent out to various hospitals in developing countries that have transformed from paper record to hospital DBMS, only one of such hospital agreed to participate in the online questionnaire.

Time and financial constraint brought about hindrance in not making personal contact towards asking for participation.

Nevertheless, future research will be carried out on a larger sample size.

Majority of the academic papers used for literature review were based on findings in Sub Sahara Africa and few based on findings in Southeast Asia and China. Future research will not ignore literature review findings from other developing countries across the globe.

Furthermore, certain information's regarding literature review and primary data collection have not been reported due to limit on word count.

8. Possible areas for further research

This research highlighted various challenges of implementing hospital DBMS, benefits of hospital DBMS and challenges of using paper to create patient record. The research also highlights that context has changed to that of previous studies; in that there is overall a greater level of technological skills (particularly with mobiles) and increased expectation, this change in skill level and expectation is clearly an area for further investigation.

Areas for further research could include:

- Tackling the challenges that could affect smooth operations of hospital DBMS

- Role of stakeholders, policy maker's involvement and issues of funding towards EMR.

- Various security breaches have been reported in course of sharing information in hospitals across developing countries. Further research is also needed as a means of addressing these security challenges by putting appropriate counter measures in place that could limit security breaches.

Henry Chukwuemeke Okoro, Carl Adams and Tineke Fitch

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E-Government Development in Bulgaria – Status-Quo, Comparative Study and Perspectives

Tsvetelina Prodanova and Kate Dingley
School of Computing, University of Portsmouth, Portsmouth, UK
up761625@myport.ac.uk,
tsvetelina.prodanova@gmail.com
kate.dingley@port.ac.uk

Abstract: Bulgaria is going through an enormous change as it takes its place as a full member of the European Community and embraces new technology. E-government systems are part of the plans for future growth but there are infrastructural, organisational and legal issues to be solved, both of which are barriers to expansion. The e-government development actions for Bulgaria are set in the Roadmap to the e-Governance Development Strategy 2014-2020 in the Republic of Bulgaria in which all administrations providing public services are expected to deliver them online by the end of 2018. A comparative study on e-government development in both Bulgaria and the United Kingdom has been used to find out what the governments are doing to improve the electronic services provision. This should help identify priorities in the development of useful electronic services (e-services) in Bulgaria. This work also reviews some of the successful e-government projects which have recently been implemented in Bulgaria and have had very high value to the public and the Bulgarian economy. One of them is the Customs Agency's e-Portal and other two are the National Revenue Agency's Information system "Mutual assistance for collection" and the Data warehouse "Management information system". Adopted innovations, recent initiatives and best practices are also covered in the paper. Finally, the future perspectives and world tendencies enhancing innovative public services, SMART governance, open data and big data are discussed showing the way forward for the Bulgarian e-government.

Keywords: Bulgaria, e-government, e-services; innovations, e-administration, e-procurement development

1. Introduction

Over 10 years of efforts to implement e-government in Bulgaria have not been enough for the transformation to take place. Bulgaria is still going through enormous changes to reach its targets as a full member of the European Community and engage citizens in using e-services while prioritising new technology adoption by administations. The way forward has been defined through a number of strategic documents most of which are now related to its European membership obligations and funding opportunities such as the Operational Programme "Good Governance" 2014—2020 (Council of Ministers, 2014a).

The United Kingdom (UK) being at the 8th place according to the United Nations (UN) E-Government Survey 2014 (UN, 2014) is substantially ahead striving not only to deliver the needed online services to its citizens but also to redesign the already existing ones. A comparison between Bulgaria and the UK could be used to provide best practice examples that can be adopted by the Bulgarian government.

This difference between the two countries is long-dated and grounded in the variance in the administrative systems, the insufficient administrative reforms in Bulgaria, as well as the lack of a proper focus and related funding before the European membership. More concentrated efforts are needed by the Bulgarian authorities to prioritize large-scale e-government developments that are centrally coordinated and overcome various problems such as (Council of Ministers, 2014a):

- organisational problems - lack of a single system integrator; lack of a clear HR strategy; lack of quality control of implemented projects;

- technical problems – partially developed infrastructure; poor quality and unfinished digitization of key public administration registers; front offices providing e-services not fully established, especially in areas at risk of digital exclusion;

- lack of sectorial working models in public administration - e-health, e-education, e-procurement, etc.; lack of complex administrative service delivery.

Although some online services in Bulgaria are already in place, many large e-government projects are still on-going or have not started yet. That is why it is beneficial to know which sectors are performing better and what is left to achieve. It is crucial that the administration constantly benchmarks and measures e-government

progress and is open to innovations that could improve its processes and relieve administrative burden. Besides, bridging the digital divide (Spassov, 2014a) is another main issue that should be constantly be addressed.

1.1 E-Government benchmarking

According to Rorissa, Demissie and Pardo (2011) decision makers apply benchmarking and ranking tools, such as the United Nation's E-government Development Index when devising information and communication policies and allocating resources to implement those policies.

The UN E-Government Survey 2014 (UN, 2014) is a systematic assessment of the use and potential of Information and communication technologies (ICT) to transform the public sector by enhancing efficiency, effectiveness, transparency, accountability, access to public services and citizen participation in the 193 UN Member States, and at all levels of development. It asserts that countries in all regions of the world continue to make significant investments in public sector information and communication technologies (ICT) because they are potent enablers of broad public participation in decision-making, enhancing access to information and removing barriers to public services to assure economic growth and sustainable development.

The survey is based on two main indices: E-Government Development Index (EGDI) and E-Participation Index (EPI). The EGDI consists of: the Online Service Index (OSI), the Telecommunication Infrastructure Index (TII) and the Human Capital Index (HCI). The EGDI is not designed to measure e-government development in an absolute sense but it rather aims to give a performance rating of member states relative to one another. As for the EPI, it measures the provision of information by governments to citizens ("e-information sharing"), interaction with stakeholders ("e-consultation") and engagement in decision-making processes ("e-decision making").

Korea has been the leader for the third consecutive time and holds a continued focus on e-government innovation, followed by Australia (2nd), Singapore (3rd) and the UK (8th). Bulgaria is 73rd, which means there is still a long way to go. In this context, it is important to note that the UN E-Government Survey 2014 shows e-government not only increases efficiency and effectiveness, but also reduces corruption (UN, 2014). Constant improvement and openness to innovations is the way to a transparent and effective e-administration that is trusted by citizens.

1.2 Innovations

Organisational and environmental factors that may explain the adoption of innovations in public sector organisations are examined by Naranjo-Gil (2009) who also shows that organisations combining both technical and administrative innovations increase their performance.

Potnis (2010) in "Measuring e-Governance as an innovation in the public sector" explains how innovations in the public sector could be measured using the Innovation Management Measurement Framework (IMMF), which is one of the most widely accepted theoretical frameworks for measuring innovation initiatives. In this framework innovation management is measured through the lens of seven inductively derived constructs: inputs, knowledge management, innovation strategy, organisation and culture, portfolio management, project management, and commercialization (Adams, Bessant and Phelps, 2006).

In this respect, it would be beneficial to research how e-government is related to innovation adoption by governments around the world and whether the most innovative countries are ahead in e-government development. The current paper presents some innovative Bulgarian projects related to e-governance.

1.3 Research approach and paper focus

This paper studies the efforts Bulgaria has made so far to start and improve the e-government development and mainly focuses on the current level of provision of online administrative services. It looks forward to the next steps the Bulgarian government has planned to do with the most recent strategy and roadmap stretching from 2014 to 2020 while reflecting the world tendencies and perspectives.

Mixed methods research design has been used for the purpose, with a basis in the grounded theory and case study research (Williams, 2011). A variety of research papers, studies, official presentations, online quantitative and qualitative resources and publicly available government documents have been collected, analysed and

evaluated and data has been extracted and summarised in the paper. The main focus is kept on the current status of the Bulgarian e-government and when appropriate comparisons between the Bulgarian and UK e-government development have been made. Primary data has also been collected when comparing the single points of access (SPA) in both countries (http://www.egov.bg and http://www.gov.uk) and the services available through them.

2. E-Government system in Bulgaria

2.1 Historical aspects

The first large-scale e-government initiative in Bulgaria started in 1998 with the establishment of a Council of Ministers' Programme for Effective Information, Management Technologies and Human Resources Development in the Public Sector (EC, 2014). Its goal was to interconnect ministries and other state administrations through an e-government-wide communication system.

2.2 Strategic aspects

As described in the E-Governance Development Strategy in the Republic of Bulgaria 2014 – 2020 (MTITC, 2014a) the current e-governance progress is mainly associated with developing and upgrading the core systems and infrastructure elements, as well as equipping the central, judicial and local administrations with ICT facilities, extending the list of the offered e-services and conducting intensive trainings of civil servants. The Strategy defines the framework of all present and new activities in the e-governance sphere. It includes: a current state analysis, a vision for the e-governance in Bulgaria, strategic objectives, sectorial e-governance policies, activities needed to reach the objectives, coordination and management of the Strategy's implementation and e-governance model – informational and technological (Council of Ministers, 2014a).

The specific actions to achieve the Strategy's objectives are outlined in the Roadmap to the e-Governance Development Strategy 2014-2020 (MTITC, 2014b). According to this document by the end of 2015 short-term projects will be implemented including access to electronic portals of individual administrations and automated access to key administrative records. Pilot projects to promote effective and efficient models will be implemented by the end of 2017, and no later than the end of 2018 all administrations and organisations providing public services will have to provide them online by accelerated introduction of e-services in more administrations and achieving scale of results. The final stage of expansion and improvement shall be completed by the end of 2020 with expected results such as transaction and fully automatic mode of service processing as well as high level of cyber security in compliance with the current standards in the field.

2.3 Legal aspects

The main legislative acts impacting the development of e-governance are as follows: Electronic Governance Act; Access to Public Information Act; Protection of Personal Data Act; Electronic Document and Electronic Signature Act; Electronic Commerce Act; Electronic Communications Act; Telecommunications Act; Public Procurements Act; Access to Spatial Data Act. It has to be noted that amendments to these relatively new acts are introduced quite often and the e-governance legal framework in Bulgaria is not fully established yet.

2.4 Provision of e-services by central and local public authorities in Bulgaria

Due to the limited progress of the administrative reform, the e-services offered by the central and local authorities in Bulgaria do not yet have the necessary efficiency and quality. Services are still not provided through various channels (such as servicing on the phone or by email), services grouped by life events/business events type are not provided at all. The e-government development has been carried out slowly and the capacity to provide services electronically is still unsatisfactory. In this respect, the business demand for the implementation of an operational single point of access (SPA) to electronic administrative services is still high. Assessments indicate that a further streamlining of the SPA procedures could lead to a growth of up to 0.2-0.3% of GDP in the mid- to long-term (Council of Ministers, 2014a).

According to the available data processed by 30/04/2013 (Spassov, 2014c) central administrations in Bulgaria offer 161 services of which 149 are fully active. The territorial administrations offer 1082 services of which 653 fully active. E-services are provided by 21 central authorities. Only 55 local administrations out of 264 municipalities and 28 regions provide services online. This information slightly differs from the one given in the

Report on the state of administration for 2013 (Council of Ministers, 2014d). According to it at the end of 2013 the situation noticeably improved and a total of 101 out of all 586 administrative structures (representing 17%) started to provide services online: 30 central and 71 local ones.

Another aspect of e-governance throughout Bulgaria is that full data integration has not been achieved yet, as well as complete interoperability between the existing and the developed systems. Besides, connectivity to a very small portion of registers has been provided in state administration (MTITC, 2014a).

2.4.1 E-services provided by local public authorities

The list of the most often used e-services delivered by the Bulgarian territorial administrations, sorted according to the number of repetitions in different authorities, begins with the following 5 services (Spassov, 2014c):

- Issuance of a marriage certificate - duplicate /21 administrations/;

- Issuance of a birth certificate - duplicate /19 administrations/;

- Issuance of a death certificate - duplicate /19 administrations/;

- Issuance of a certificate of current address /14 administrations/;

- Issuance of a certificate of inheritance /13 administrations/.

The analysis also indicates that the greatest number of functioning e-services are offered by the relatively very small municipalities of Brusarci, Strumyani and Lom, which shows that the speed of online services provision is not related to the size of the municipality. This is mainly due to the administrative independence of each municipality to implement its own projects.

2.4.2 E-services provided by central public authorities

The central administrations with highest number of functioning e-services (Spassov, 2014c) are given in Table 1:

Table 1: Central administrations with largest number of e-services.

№	Administration	Active e-services
1	National Revenue Agency (NRA)	61
2	Ministry of Regional Development – Geodesy, Cartography and Cadastre Agency	23
3	Ministry of Finance – Customs Agency	13
4	Registry Agency	10
5	National Health Insurance Fund	10

For the NRA it is vital to provide services online for reasons such as increased tax collection, reduction of the processing time and costs of services for businesses and citizens, and reduction of the administrative burden and their leadership is expected in every country. In Bulgaria their leadership is quite distinctive.

2.5 Implemented best practices

There are a number of achievements within administrations that have led to significant improvements of the working conditions. This paper reviews some main e-governance projects in Bulgaria implemented so far that could also serve as best practices (Jekov, 2014a) and briefly describes the e-services provided through them.

2.5.1 The National Revenue Agency's (NRA) e-services and projects

Yanev (2014) states that the NRA is the "leader" in e-services provision in Bulgaria. This is supported by Spassov (2014c) who quotes processed data as of 30/04/2013. According to Yanev (2014) the NRA offers over 80 e-services to citizens and businesses. In 2013 it has provided over 160 million e-services which is 82% of all e-services in Bulgaria. The e-services delivered by the NRA are grouped in four major types: e-services provided with e-signature (58 services), open access e-services (15), e-services provided with personal identification code (8) and web services (5). It is an achievement that over 75% of the companies registered under the Value Added Tax (VAT) Act send their VAT declarations over the Internet (Jekov, 2014b).

Among the NRA's multiple achievements are: e-data exchange with commercial banks (2002); VAT declarations via the Internet, payment of taxes on the Internet (2004); a queue management system (2005); a system for revenue management, VIES declarations, KIOSK terminals (2007).

According to the Annual Progress Report on the Operational Programme (OP) "Administrative Capacity" for the year 2013 (MF, 2014) a Management information system (Data warehouse) has been developed and introduced in the NRA. In 2014 the project was honoured best practice out of all projects funded under the Operational Progamme (NRA, 2014). Another NRA's project that was pointed out as best practice in 2014 was the project "Development and implementation of electronic registry for supporting the administrative cooperation with Member States in the collection of public receivables - Information system "Mutual assistance for collection". The software solution provides effective interaction of the NRA with the revenue administrations of other EU Member States in the process of collection of public receivables.

2.5.2 Bulgarian Customs Agency's e-Portal project

The Customs Agency's e-Portal best practice project is a SPA to customs' e-services to business and citizens currently offering online access to seven new e-services (https://ecustoms.bg/eportal). It was launched in 2014 and greatly facilitated the access to the customs' services, improved the communications between the Customs Agency, business and citizens and decreased the feedback time from registered users. The Customs agency, however, keeps active another website that also provides services to customers (http://customs.bg).

2.5.2 E-Census 2011

The e-Census conducted in 2011 proved to be another good practice. It also demonstrated that 41% of Bulgaria's population is on the Internet (Jekov, 2014a) with significant number of users in the most populated municipalities - Sofia (66%), Varna (51%) and Plovdiv (41% of the population).

2.6 Recent results

The recent results achieved during the last 7 years are mainly funded under the Operational Programme "Administrative Capacity" 2007-2013. The EU funding opportunities enhanced the strategic focus and speed of e-government progress. The results achieved with European Structural Funds (ESF) over the 2007-2013 programming period were: improving the legal framework related to the electronic provision of administrative services and ensuring the ex-officio principle in the delivery of services, including intra-service access to 34 of the most used public administration registers. A start has been given to the development of a Central administration cloud including 70 services based on widely used international standards. A Local administration cloud is being developed with 50 of the most common local e-services (Council of Ministers, 2014a).

According to the Annual Progress Report on the Operational Programme "Administrative Capacity" for 2013 the e-governance progress could be summarised in the following categories (MF, 2014):

- 127 administrations have introduced quality management systems;
- 105 administrations have introduced internal electronic document management systems;
- 4 newly developed/updated information systems for the judicial authorities;
- 51 administrations have introduced some practices to improve the access of disabled people;
- 5144 administrative services have been reviewed for their online provision.

Totally, 2412 online services have been provided under the Operational Programme by the end of 2013. These changes have brought improvements to the administrative services. However, some services are only accessible on the providing administration's website but not on the portal www.egov.bg. As a result of the investments made under the ESF there is an increasing number of electronically delivered services, but each of them is provided by a particular administration through its own platform. Practically, the SPA to e-services is not in use as a single point of access (Council of Ministers, 2014b).

2.7 Innovative developments in the public sector of Bulgaria

Although the e-government system is still in its development stage, there are innovation adoptions some of which could be considered best practices.

One of the innovative initiatives in Bulgaria is the Unified management information system for the EU Structural instruments in Bulgaria for the period 2007-2013 found on https://umis.minfin.bg. Its public module (http://umispublic.government.bg/Default.aspx) provides unrestricted access to view the spending of EU and national funding under all operational programmes in Bulgaria. It shows the calls for proposals under different

programmes and lists the beneficiaries, partners, contractors and the projects they implement. The tools available provide financial information grouped by regions, programmes, priority axes, etc. The module is open and accessible to everyone. The newly introduced electronic submission of documents and monitoring options for the programming period 2014-2020 adds to the innovative nature of the system (https://eumis.government.bg).

The Centre for prevention and countering corruption and organised crime (CPCCOC), also named "BORKOR", is an analytical structure that proposes a new way of thinking when designing administrative processes. It is an innovation in the public sector in both technological and organisational aspects, as it generates new knowledge on vulnerabilities in the working patterns of different Bulgarian administrations. Expertise from various public authorities is used in a matrix organisational structure. In its first project it emphasised the strong need for e-procurement in Bulgaria by identifying a number of vulnerabilities in the public procurement process (CPCCOC, 2013). Another project identified the preconditions for corruption in the implementation of the Operational programme "Innovation and Competitiveness" 2014-2020 and proposed measures to prevent the identified corruption risks (CPCCOC, 2014). These two projects are directly related to preserving the Bulgarian budget and the European funding.

The Centre uses a complex analytical system and is capable of performing multiple analyses. Its workflows are built in compliance with the German government standard for planning and implementation of complex projects V-Modell-XT (http://v-modell.iabg.de/index.php?option=com_docman&task=cat_view&gid=15). The innovative software of the Centre is designed to assist analysts in developing anti-corruption measures in support of more than 30 national authorities to implement them (INIT, 2011). The Centre has been established to promote multi-agency working to the aim of corruption prevention. Partner collaboration (http://borkor.government.bg/en/page/10) is a main principle of the Centre. By sharing the expertise of various project partners coming from civil society, administrations, business and media the Centre's activities contribute to a high level of transparency. As stated on its website, NGOs, society, companies, international organisations and other potential partners are welcome to discuss their ideas to support the project with their specific knowledge and know-how. In the future the Centre will be able to provide a Web 2.0 platform (Extranet) to collaborators to share information.

3. E-Government in Bulgaria and the United Kingdom

For this research a small comparative study on e-services development in Bulgaria and the United Kingdom has been used to find out what are the current initiatives for improvement of e-services provision in both countries. The study also shows their ranking according to the UN E-Government Development Survey 2014. This study should help identify priorities in the development of useful e-services in Bulgaria.

3.1 E-services

For the purpose of the study and with compliance with art. 8, para. 1 of the Bulgarian Electronic Governance Act (e-Governance Act) electronic administrative services will be considered the administrative services provided to citizens and organisations by administrative authorities, the services provided by persons entrusted with public functions, as well as the public services that can be requested and/or provided distantly by electronic means. According to art.8, para. 2 of the Act "Administrative authorities, persons performing public functions and organisations providing public services are obliged to provide all services within their competence electronically, unless a law provides for a special way to perform certain activities or the issuance of the relevant acts" (MTITC, 2014). Currently, the information available (Jekov, 2014b) indicates there are 48 124 services (172 services distributed over 264 municipalities, 32 services, distributed over 28 regions as well as 1820 central services) according to the List of unified names of administrative services. At this time, about 9% of all services have been implemented.

Table 2: Total number of services in the List of unified names of administrative services (Jekov, 2014b):

Type of Administrations	Number of Administrations	Services	Total Services
Central	N/A	N/A	1 820
Regional	28	32	896
Municipal	264	172	45 408
Total administrative services			48 124

The e-services implemented under the OP "Administrative Capacity" towards the end of 2013 are 2412 or 5% (MF, 2014) and the ones implemented with other resources are about 2000 or 4% of all services (Jekov, 2014b).

3.2 Rankings in the UN E-Government survey 2014

Bulgaria has slowed down its e-government development as compared to the other 193 United Nations member states. In 2012 Bulgaria occupied the 60th place and the last survey from 2014 shows it lost 13 places to 73rd place. Conversely, the E-participation index shows improvement from position 134 in 2012 to 122 in 2014. The UK moved from 3rd place in EGDI and EPI in 2012 to 8th place in EGDI and 6th place in EPI for 2014.

Table 3. EGDI and EPI 2014 – UK and Bulgaria.

Country	EGDI 2014	EPART 2014
UK and Northern Ireland	0.8695 (rank 8)	0.9608 (rank 4)
Bulgaria	0.5421 (rank 73)	0.2549 (rank 122)

In relation to the improved status of Bulgaria in terms of the e-participation framework the initiation of the web portal http://www.strategy.bg is worth mentioning as a good e-consultation practice. It is a single e-consultation point where all administrations upload their draft strategic and legislative documents for certain periods of time for public discussion before their adoption.

3.3 Responsible authorities

In Bulgaria the public authority responsible for the policy, strategy, coordination, implementation and support for central e-government projects is the Ministry of Transport, Information Technology and Communications (EC, 2014). For regional and local projects the Ministry is only responsible for the policy and strategy. The coordination is given to the municipalities and the implementation is delegated to both regions and municipalities. The single point of access to administrative services is http://www.egov.bg.

The British authority responsible for e-government development is the Government Digital Service (GDS). It is a part of the Cabinet Office and the Efficiency and Reform Group. The GDS helps the government to make the digital services and information simpler, clearer and faster. In this effort, they are committed to putting users' needs before the needs of government (https://www.gov.uk/government/organisations/government-digital-service). Therefore, they are responsible for:

- GOV.UK, the single website, designed to make information and services clear and accessible;

- making sure people can sign in to government services easily, securely and safely;

- building new digital services so good that people prefer using them to the old paper versions;

- choosing the right technology for government; rejecting big IT contracts in favour of shorter, more flexible relationships with a wider variety of suppliers;

- measurement and analytics, tracking how people use government information and services in order to keep improving them.

The centralized UK e-government development unit seems to be a better solution than the totally decentralized Bulgarian structure, especially in terms of the ease of coordination. The effects of the decentralized system are major obstacles to the e-government implementation in Bulgaria, such as: lack of standardization and unification when implementing e-government projects by institutions and municipalities; poor progress in the introduction of complex administrative services and a lack of integrated services of the type life events/business events; significant costs for developing certain information systems and a lack of compatibility and interoperability between them. The existing fragmentation of the administration leads to duplicating and overlapping functions and impedes the implementation of sectorial and horizontal policies (Council of Ministers, 2014c). A particular problem is that re-engineering analyses are made on projects of essentially the same municipal services and municipalities allocate national and European resources to improve identical services. One reason is the lack of a reference model for services delivered at municipal level (Council of Ministers, 2014c).

The Public Administration Development Strategy 2014-2020 (Council of Ministers, 2014c) suggests ways to overcome the above-mentioned problems and envisages a variety of activities such as: ensuring interoperability between existing information systems and registers and free-of-charge ex-officio information exchange between

administrations; ban on funding e-services projects without a prior interoperability assessment with other electronic systems; ban on requesting documents and data from citizens when they have already been collected by the same or other administration; introducing complex administrative services (the complex services are composite while the primary ones are elementary); optimization and re-engineering of business processes for provision of administrative services based on a single methodology.

3.4 New initiatives in Bulgaria and the United Kingdom

3.4.1 New initiatives in Bulgaria

Here are some of the most recent developments in the Bulgarian e-government system from the second half of 2014. They are classified in four major groups: projects implemented, legislative acts, infrastructure and new e-services provision.

The implemented projects were (Spassov, 2014b): connecting the Traffic police with the Local taxes departments; connecting the Ministry of Interior with the hotel accommodation services; connecting the systems for video monitoring at schools with the Ministry of Interior. These initiatives are important because they strengthen the police's capabilities to distantly access data and thus enhance the public order through the use of ICT.

Legislative amendments to the E-Governance Act were prepared in the second half of 2014 and were uploaded for public consultation on the portal http://www.strategy.bg. Work has begun on elaborating an Electronic Identity Act (Spassov, 2014b). Processes with e-identity and e-signatures are not developed and improved yet, which greatly hinders citizens in their use. For electronic identity, different identification codes are provided to use the services of various administrations and the lack of a universal electronic identity is of utmost importance. The electronic signature is used by very few users as the process of its acquisition and maintenance is complicated (MTITC, 2014a). Currently, work is underway on the legal framework and technical solutions for the unified e-identification system for all Bulgarian citizens, including the development of a system prototype and the issuance of 5000 e-identity certificates (Council of Ministers, 2014b).

In 2014 the long-awaited results from the Sofia municipality's project for provision of 50 e-services have finally been achieved (Spassov, 2014b). In comparison, Spassov (2010) underlines that the Municipality of Seoul in 2003 had already introduced over 700 functioning e-services for citizens and businesses.

3.4.2 New initiatives in the United Kingdom

User satisfaction is considered to be a crucial factor for the continuous use of e-government services as well as for the success or failure of e-government projects (Alawneh, Al-Refai and Batiha, 2013). Taking this into consideration, the UK Government represented by the GDS, have engaged in a Digital Transformation Initiative. In this transformation the Government aimed to provide services that were simpler, clearer and faster to use. They redesigned and rebuilt 25 significant "exemplar" services by March 2015 and people were able to follow the whole progress on the page https://www.gov.uk/transformation. This was done by dashboards showing what progress was made and the estimated scale of the digital service. Another development was moving 75% of the agencies' websites to www.gov.uk by July 2014, and all of them by December 2014.

The future priorities of the Government Digital Service can be summarised as follows:

- publishing clear data on how many people are using digital services;
- creating a new, simple, secure way for people to sign in to digital services;
- helping departments leave unsuitable IT contracts, spend less and get better value for money;
- building a new Digital Marketplace for the public sector to buy digital products and services;
- working with public, private and voluntary sectors to help people go online, so that by April 2016, the number of people lacking basic digital capability is reduced by 25%.

3.5 Analysis of primary data collected from the single points of access (SPA) www.egov.bg and www.gov.uk

The analysis of primary data related to the functionality of the single point of access to administrative e-services in Bulgaria www.egov.bg shows that the portal gives access to contact information and hyperlinks to all municipalities, regions and central public authorities. The services available on it are: 443 services for citizens, 123 services for businesses, 164 services for citizens and businesses and 9 services for administrations, all listed in alphabetical order and without a logical integration around life or business events. Interestingly, the research shows this only refers to the Bulgarian version of the portal as the English one is much better structured around life/business events, although e-services are mainly delivered on the online information provision level. In addition, some services on the Bulgarian version are irrelevantly classified or put into more than one category. The 9 services designed for administrations are listed but not functioning as of 24/02/2015. Just 6 of the municipalities have their e-services shown on the portal providing a total of 208 services. 131 of them are classified as services for citizens, 70 are services for businesses, 132 are services for citizens and businesses and 5 are services for administrations. The results indicate that the institutional websites' e-services functionalities are not fully integrated with the SPA and the information on the portal is not reliable and thorough.

In comparison, the UK single point of access www.gov.uk is better integrated with the municipal e-services (for example, different council tax services) and gives an adequate access to the respective services on the municipalities' websites. For example, from the moment a citizen enters the life event "council tax" he/she is able to choose the appropriate service related to the event and then be transferred to the right place on the relevant municipal website, without having to undertake any additional actions. Thus the portal performs its function as a SPA.

Last but not least, still, the majority of the Bulgarian administrations do not research and measure user satisfaction from administrative services, including e-services. In 2013, 64.96% of the administrations did not take steps to study and measure user satisfaction (Council of Ministers, 2014d) which is typical for the UK administrations.

4. Perspectives

The perspectives for Bulgaria are to progress towards the main priorities of the European E-government Action Plan 2011-2015, which together design a vision of an open and user-centred government, leveraging innovation to provide better services at lower costs (Capgemini et al, 2014).

The world's future perspectives on e-governance are smart governance and innovation for sustainable development as discussed at the Global E-Government Forum 2014. Governments that succeed in tackling complex issues are those engaged in finding new ways to effectively create public value through innovative, effective, inclusive, collaborative, open and citizen-oriented service delivery and public policy decision-making leveraging the potential of modern ICT. This is not possible to achieve without a transformation of government's role, leadership capacities, functions and processes. Alberti (2014) states these are the main pillars of smart governance, along with citizen engagement and co-creation of public value.

Another aspect of modern e-governance perspectives is that governments release open data to catalyse innovation (Glidden, 2014). Various open data initiatives and portals are already in operation throughout the world such as data.gov.uk, data.gov, data.gouv.fr and the European Union Open Data Portal (https://open-data.europa.eu/en/linked-data). They are to show that "all roads lead to open government" (Kavanagh, 2014). However, open data policies, procedures and practices should be devised, which will take time. In addition, open government requires transparency of processes and many governments are not ready to open their doors to public scrutiny, and some never will be. The Bulgarian open data government portal is https://opendata.government.bg. Currently, it only includes preprocessed public data examples with a possibility to upload new data. People are enabled to propose what should be published there in order to prioritise the publication of certain data sets.

Finally, the transformative promises and potential of big and open data are indispensable for e-government services, openness and transparency as well as for the interaction between governments, citizens, and the business sector (Bertot et al, 2014). From "SMART" government to transformational government, big and open

data can foster collaboration, create real-time solutions to challenges in different sectors, and usher in a new era of policy- and decision-making where citizens take an active role in the process.

5. Conclusion

The Bulgarian e-government system is already in place, but there are many challenges that need to be addressed to improve the current e-government development, including new technologies, amendments to legislation and further administrative reforms. There is a strong will to bring more e-government services to citizens in spite of these challenges, as well as the difficulty to implement large-scale projects. As the research indicates, more concentrated efforts are necessary to integrate online services in complex packages for the provision of which administrations should work together to satisfy users' needs. These packages should be formed around certain business or personal life events or journeys as it is on the UK's Government services and information portal https://www.gov.uk. Applying an integral approach to service design would bring more benefits to the users and more satisfaction that would eventually lead to increased use of the services.

One of the most important aspects of e-government is bringing citizens and businesses closer to their governments (Fang, 2002). This could be achieved by transforming the public sector, delivering more targeted, personalised e-services and creating new business opportunities. For this purpose, governments should make communications and services easier and more accessible to all. They are challenged to adapt to a new open relationship with their citizens and businesses in order to fully exploit the opportunities created by new technologies. However, there is still a long way to go if governments want fully open and transparent services and organisations. Convincing citizens to go online and keeping them there could be a challenge to Bulgaria as there is a lack of awareness of the existence of public e-services, more prevalent in young people, which has the potential to be a barrier to their use (Capgemini et al, 2014).

In conclusion, Bulgaria should maximize the benefits of both European funding and new ICT and introduce demand-side elements to e-service delivery to assure user-friendliness and meet citizen and business expectations. For the purpose, established mechanisms to design e-services corresponding to the target groups' consumption motives are needed (MTITC, 2014a). Also, when part of the initiative for using e-services is to prevent corruption, it is key to keep momentum going. Bulgaria could learn from the UK in finding a more unified and well-coordinated way to manage its e-government development. A good practice are also the standardised regular usability measurement and analysis of the provided e-services which show whether they are well-designed and easy to use. Lasts but not least, helping citizens go online and reducing the number of people lacking basic digital capability is of vital importance to e-government success in Bulgaria.

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Non Academic Paper

An Integrated Web-Based System for Managing Payrolls of Regionally Spread Governmental Offices

Dimitrios Assimakopoulos[1,2], Giorgos Betsos[1], Eirini Chalelli[1,2], John Garofalakis[1,2], Ioannis Giannoudakis[1,2], Andreas Koskeris[1] and Apostolos Stamatis[1,2]
[1]Computer Technology Institute and Press Diophantus, Patras, Greece
[2]University of Patras, Computer Engineering and Informatics Dept, Patras, Greece
asimakop@ceid.upatras.gr
betsos@westgate.gr
chalelli@ceid.upatras.gr
garofala@cti.gr
giannoudak@ceid.upatras.gr
koskeris@westgate.gr
stamatip@ceid.upatras.gr

Abstract: A system managing to automatize the payroll administration of a big governmental agency and at the same time to deal with drawbacks like constant need for adaptation and customization, is of high importance since it can reduce internal bureaucracy and support the efficient management of Human Resources used for payroll administration. This is important especially in the current period of economic crisis where governments are trying to work towards a smaller and at the same time more efficient public sector. The aim of the current document is to present a case-study of a web-based integrated centralized payroll system for the Greek Ministry of Education. This system, called DIAS Payroll System, is customizable and configurable, reassuring its consistency with labour, insurance and tax laws changes. It is also designed for ease of use providing a user-friendly interface avoiding user errors, omissions, and wrong choices through prohibition or warning messages, providing automatic calculations and automated reporting capabilities. The main goal of the system is to give users the opportunity to process the payroll process with the click of a button. It integrates personnel and payroll related data collection, processing, automatic calculations, fast data retrieval and payroll audit in an efficient and less time consuming way. Moreover, the system presented provides multiple user data access. According to the level and the permissions of each user, the application interface is organized appropriately rendering only the content that the user is authenticated to deal with. Furthermore, the system's design flexibility allows the use of the system from any other governmental agency with slight modifications and additions. The DIAS Payroll System is considered advantageous as it provides a user friendly environment, it increases security and minimizes human calculation errors. It can help any governmental agency to streamline efficiently the time consuming and complex tasks of employee payroll scheduling and planning.

Keywords: e-Government, payroll system, web-based, education, security, hierarchical

1. Payroll systems: Added value of the presented work

A payroll system includes functionalities dealing with everything related with payment of employees and their employment taxes. Such systems have to include a big set of functionalities such as (Stenihoff, 2000), (MAPICS, 2000):

- Collection of data (e.g. classification) for each employee.
- Timesheets (data about hours worked).
- Leaves processing.
- Pay processing (including social security payments, overtimes etc)
- Reporting
- Interaction with other applications (e.g. Bank systems for automatic payments)

Such systems include significant difficulties which must be taken into consideration on their design phase (Steinhoff, 2000b) (KPMG, 2012) (Lambert, 2005):

- Need to co-operate with other information environment including employees administrative data management (e.g. leaves, absences) to ensure efficient payroll calculations.

- Constant need for adaptation to changes on relevant legislation (e.g. taxes) and a therefore needed open architecture in the design to assure that such changes will be easy to incorporate without facing important incompatibilities with the system's data base and user interface.

- Existence of several differences between salaries calculation for types of workers and therefore needs for several customizations without creating a system which will be difficult to maintain and expand.

- A payroll system involves a very big amount of need for administrative work (e.g. data entry of needed data). As a result the user interface must be designed that way to assist users and prevent common mistakes (e.g. no valid data entry) and multiple data entries of the same data.

- Need to maintain historical data.

- Specific and very strict time limits between data entry, payment processing and payment dates.

- Extensive security specifications. A system dealing with payment is by default the most "sensitive" e-government tool.

A system managing to automatize the payroll administration of a big governmental agency and at the same time, deal with the beforehand drawbacks is of high importance since it can reduce internal bureaucracy and support the efficient management of Human Resources used for payroll administration (Rob, 2008). This is important especially in the current period of economic crisis where governments are trying to work towards a smaller and at the same time more efficient public sector.

Aim of the current document is to present a case-study of a web-based integrated centralized payroll system for the Greek Ministry of Education. This system, called DIAS Payroll System, can be considered as an innovative payroll supportive tool as it deals with the difficulties mentioned above as identified from the bibliographical research):

- It is customizable and configurable reassuring its consistency with labour, insurance and tax laws changes,

- it is designed for ease of use providing a user-friendly interface avoiding user errors and minimizing human calculation errors,

- it includes a module for importing massively administrative data,

- it provides automatic calculations and automated reporting capabilities, printing/ exporting options for official documents and reports,

- it holds a logging system for preserving historical payroll periods, payroll changes, changes in pension funds, employees data record changes,

- it increases functionality and flexibility due to the fact that it offers role based access control: permissions are associated with roles, and users are made members of appropriate roles, thereby acquiring the roles' permissions. This approach improves scalability and adaptability of access and security control.

The system has been constructed to simulate the Administration of the Education System: Central Administration, Regional Offices, and Local Offices. The uppermost level of Central Administration is the Ministry which has the administration of the system and supervises every Regional Office. The next level includes the Regional Offices which supervise and have access to the data of Local Offices in the prefecture. The bottom level is the Local offices. According to the level and the permissions, the application interface is organized appropriately rendering only the content that the user is authenticated to deal with.

The current presented version of the system was applied for the first time 1 year ago. It is being used by 160 governmental units and the payroll of 150000 employees is calculated and exported each month from it eliminating bureaucracy costs and providing administration with a constant view/reporting on salary costs as well as specialized reporting (e.g. social security payments, costs for overtime).

Within the next sections we present in details the beforehand system, as follows:

- System Architecture

- Functionalities

- Technologies used

- Results from its use.

2. System architecture

The system presented is a web application resembling a payroll management system for the Greek Ministry of Education. The application is accessed after authentication through a browser. It offers role based access control: permissions are associated with roles, and users are made members of appropriate roles, thereby acquiring the roles' permissions. This approach improves scalability and adaptability of access and security control. The authenticated users belong into three levels with different privileges and rights. After the authentication the system understands the level of the user and customizes accordingly the interface and also the functionalities of the web application. In the following paragraphs there is an extensive description of the structure and the special characteristics of the system. In order to understand better the system, we will first depict the structure of the administration of the Educational System in Greece upon which the project has been based. Next, we will analyse the input of each level, the functionalities of the system and the way it integrates the information and manages to act as a payroll supportive tool for the administration to the Ministry.

2.1 Multilevel system

The e-government project of the presented system has been constructed in a way to simulate the Administration of the Educational System (Garofalakis et al, 2007). The organizational model of the Ministry includes three levels of structures (Figure 1).
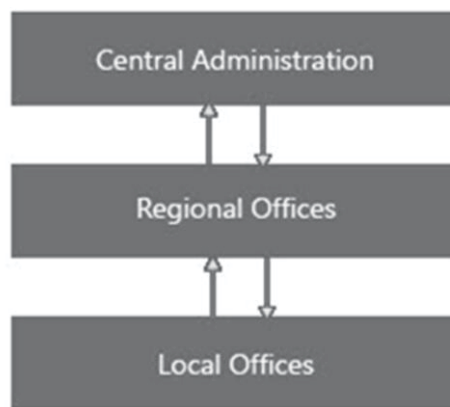

Figure 1: Levels of administration of the educational system

Starting from the top, the uppermost level of the Central Administration is the Ministry departments which has the administration of the system and supervises every Regional Office. The next level includes the Regional Offices which supervise and have access to the data of Local Offices in the prefecture. The bottom level is the Local offices. According to the level and the permissions, the application interface is organized appropriately rendering only the content that the user is authenticated to deal with.

Every level is responsible for its own data storage and manipulation. Every level has access to the units that supervises. The schema that has been described is not strict and allows every higher level to have access to the data of a unit. For example the data of a local office are available to the Ministry and to the Regional Office it belongs to.

This model proposes a concrete interaction method in which each level has to collaborate only with its predecessor and successor. Each user belonging to an upper level can access queries, statistics and services referring to all other levels below them. For example: Central administration authorized users can have access to integrated statistical reports concerning the employees of the ministry in the whole Greece.

2.2 Data input and manipulation of each level

As it was mentioned earlier, the DIAS Payroll System is an integrated web application. The access requires authentication. Every user of the system has access codes for entering. According to the user codes the application interface is organized appropriately rendering only the content that the user is authenticated to deal with. In this paragraph there is a description of the data that each level enters and manipulates.

Every local office imports data about the employees that belong to it and data about the unit. More specifically, the data imported about the employees is personal information (name, surname, gender, birth date, marital status, etc), address and contact information, information about the type of employee (category, specialty, years of service, type, additional studies, working status), insurance information, information about special characteristics, working hours etc. The data imported for the unit are address and contact information and information required for the payroll. Moreover, every local office enters the information data of the schools that belong to it: address and contact information. Finally, the data imported for the unit is address and contact information and information required for the payroll.

The next two levels of administration, the "Regional Offices" and the "Central Administration" enter the same data. They store information about the administration unit like address, contact information, and employees that are occupied in this unit.

The system has been implemented for users in different levels and with different rights and functionalities for every level. The data entry of the information is completely converse in the way that it can be accessed. By this we mean that the higher level which is the central administration, can access the whole information in contrast with the local offices which are the lowest level and can have access only to their data.

From the description of the data storage in every level it is obvious that there is a strong interconnectivity among them. Each level is responsible for importing and updating the information required for the employees that are occupied in it. Upper levels have the right to access data from the lower levels that they supervise and to manipulate it as well.

3. Functionalities

By the term of functionalities we mean the abilities and the services of the system presented. Next, we will refer to the innovating and more important operations, services and outputs of the system presenting in that way the functionalities.

▪ *Account Management.* Starting with entering the system, the first important functionality is the account management. This technique enhances the security so access is forbidden to malicious users. Every user in every level has to be authenticated so as to enter for filling in, extracting or manipulating the data, giving the opportunity of a control to the users that use and interact with the system. The account management is also used for the specification of the interface to the users of every level.

▪ *Understandable and Navigable Content.* The developers aimed at a user friendly application and this mission was carried out. The user friendly interface of the web application gives every user the ability to understand every action and every procedure, despite their poor experience in computers and World Wide Web. The main advantage of the system is that it controls errors, avoids delays and keeps the steps simple: modules for insertion, data update, deletion, etc are provided.

▪ *Helpdesk – Ticket System.* The system presented, so as to be a well designed e-government system aiming to be used as an important supportive tool for the payroll management, should be enhanced with a powerful helpdesk ticket system for the users. Considering the fact that the users of this project are mainly teachers, with poor experience in computers and World Wide Web and limited knowledge and experience in payroll laws and processes, the helpdesk ticket system is designed in such a way to satisfy any need that may appear in fast response time through one centralized point of contact. The system is currently being used by the majority of Greek education operators for submitting requests on the corresponding payroll application as well as for establishing a better and more direct communication with the technical support team. The system functions as a repository of information and guidelines concerning the current payroll decisions made by the Greek Parliament. Users can request access to the system in order to:

▪ *Get informed about the latest payroll software system updates.*

▪ *Access a complete archive with manuals and publications concerning the payroll system.*

▪ *Be able to access a helpful list of FAQs as well as the knowledge base of the system.*

The Ticket Support subsystem, which is deployed on the helpdesk portal, consists of three different types of users with different access privileges. The direct user types supported are:

▪ One Super Administrator: Responsible for submitted tickets management and assignment.

- Five responsible users: Each one of them is responsible for handling tickets from a specific category or department.

- Simple registered users: This user type is used for each education operator who has been registered on the system. Simple registered users can search the portal's content as well as submit their tickets on more than one category or department.

Registered users are always informed about their ticket status with automatic system messages, since the system supports different levels of ticket accomplishment. Furthermore, the ticketing system supports file exchange among responsible and simple registered users.

- *Massive import of administrative data.* Manual data entry is time consuming and error-prone. Thus, the system supports massive importing processes of administrative data, accompanied with automatic validation methods, improving its operational effectiveness.

- *Calculations.* The DIAS payroll system enables automatic calculation of payroll. The calculation can be done either massively, for all the employees of a Local office or for a set of such employees or for a single employee. The user can calculate: regular payroll for a particular month, overtimes, severance payments (in the case of replacer employees) and retroactive payments.

In the calculation of any payroll the system calculates the following:

- the employee's salary,

- contributions to the pension funds,

- the tax ratio,

- other debts, e.g. the monthly payment for a loan that the employee has.

Also enables users to make automatic calculation for retrospective payrolls. The system automatically finds employees who should have a pay increase, due to completion of the required service time and then proceed to mass calculation of retroactive payrolls in order to give this money to the beneficiaries.

- *Reporting services.* Paper forms and documents are slow to fill out and process and often are incomplete with erroneous information. One of the aims of the system is to eliminate manual tasks, redundant processes and paperwork. So, our system enables users to export a wide range of official documents, reports and forms needed. Sending these reports via email service is provided.

- *Statistics.* The main objective of this e-government project is to enable the Ministry of Education to have an overview of teachers' payrolls in Greece. One of the most important functionalities of the system is the provision of statistics to the higher levels, the Ministry of Education, the Regions and the Local offices. Every authenticated user can have access and export information relevant to the data and the payments of supervised employees, schools and other units. Central administration authorized users can have access to statistical reports concerning the employees of the ministry in the whole Greece. Moreover, with the filters used, the user can select a specific region or type of school-unit or status of work of the employees to extract only the data or payments needed eliminating the work load for the server and taking a more readable format of information.

The system, also, gives the ability to monitor the status of every employee in the ministry. That is to view the amount of data that was stored about the employees, their working hours, the absences, the loans and other relative data. Moreover, the Central Administration level can monitor the data that is stored for every employee too. This is an option that was given only to the uppermost level avoiding the use of this option for any goal irrelevant to the better administration.

The Ministry uses this system for information and decision making. The Regional and Local offices fill in information about the type of employee (category, specialty, years of service, type, additional studies, working status), insurance information, information about special characteristics, working hours etc.

The Ministry, that is the highest level of the Educational System and therefore the highest level of our system, uses the statistics as a consulting tool. The Ministry has the opportunity to see aggregated data of its employees (e.g. how many teachers have been employed by each specialty), the data of payments (e.g. what is the average salary of teachers in the country, how much money has been allocated for insurance contributions, what is the total cost of salaries of all teachers per month or year) and absences of employees per year. Through these

statistics the Ministry is given the opportunity to make decisions about the number of teachers that should be hired for the next academic year and see if it has reached or exceeded the objectives of the annual budget.

Apart from the statistics about the current school year, the higher levels can extract statistics about the previous years. Through these statistics the Ministry can make comparisons and make useful conclusions about the total annual budget for each year.

▪ *Interconnection with other e-governments systems*. DIAS Payroll System supports interoperability between other disparate e-government systems based on the exchange of XML data. XML files containing data for payments can be produced and exported from the presented system and be sent to the e-government system which is responsible for the payouts.

4. Technologies applied

The discussion in this section refers to the technical references about the system implemented and represented in this paper. The description of the technical characteristics is structured into paragraphs giving the most important points of the organizational and architectural model while avoiding technical details.

The section of security, describes the IP Security, Secure Sockets Layer, Authentication and Authorization methods used in our system. The next section refers to the design architecture of the system and the third section of this paragraph describes the DIAS Technical Solution implemented.

4.1 Security

Although a functional description of the system has already been mentioned in previous paragraphs, it is crucial to describe some further characteristics in order to clarify the way the system is organized. The system is organized in levels of security starting from the IP security level using the "IP Address & Domain Restrictions" method. "The ip Security element defines a list of IP-based security restrictions in the web server. These restrictions can be based on the IP version 4 address, a range of IP version 4 addresses, or a DNS domain name" (iis.net, IP Security <ipSecurity>).

The next level of security has to do with Secure Sockets Layer (SSL) Certificate Requirement Protocol. The SSL protocol of the system uses cryptographic protocols designed to provide communication security over the Internet. "SSL uses X.509 certificates and hence asymmetric cryptography to authenticate the counterparty with which they are communicating" (wikipedia.org, Transport Layer Security).

The system is implemented with Authentication Techniques that are described here. Authentication is the process of obtaining identification credentials such as name and password from a user and validating those credentials against some authority. If the credentials are valid, the entity that submitted the credentials is considered an authenticated identity. Once an identity has been authenticated, the authorization process determines whether that identity has access to a given resource. In this way authentication is implemented. The Authorization model consists of specific roles attached to users, so that they have specific rights mainly used on menus, function calls etc.

Authentication is implemented through authentication providers (i.e. the code modules that contain the code necessary to authenticate the requestor's credentials). The authentication provider used by the system, is the Forms Authentication that provides the necessary information needed to create our own login form and perform authentication on our code. In this way, the development team is enabled to validate and manage user information for a Web application. It is also provided with functionality for validating user credentials, creating and modifying membership users, and managing user settings such as passwords and e-mail addresses. In this way the team is enabled to manage user authentication while keeping the user information in the data source of our choice. Since it uses providers to the membership data source, it does not require extensive code to read and write membership information. Finally, it consists of providers, which communicate with the data source, and the static Membership class that exposes the functionality of the membership providers. The Membership class is called from the system's code in order to perform user validation and management.

4.2 Application design

DIAS Payroll System is developed as an n-tier architecture web application so as to be scalable, extensible, secure and maintainable over time (wikipedia.org, Multitier architecture). The system application schema is partitioned in terms of logic into three-tiers or layers (Chen Z, 1999) as shown in Figure 2. Each layer has a different responsibility in the overall deployment. The bottom most layer is the Data Access Layer (DAL) which is responsible for handling Database related tasks and uses Object-relational mapping (ORM) techniques for better application design and development process. On top of DAL, is the Business Logic Layer (BLL). BLL contains all the calculations and Business Rule validations that are required in the application. Finally on top of BLL we have the Presentation Layer of the system. The Presentation layer is all the several application's forms, pages and user controls and it is responsible for taking the user input, showing the data to the user and mainly performing input data validation.
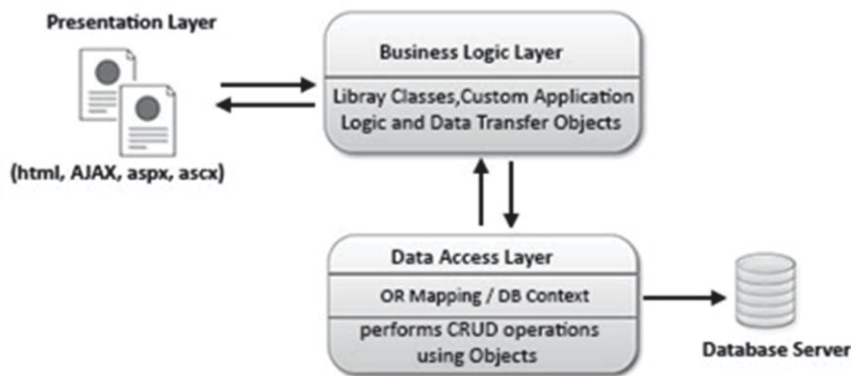

Figure 2: DIAS payroll system 3-tier application architecture

4.3 Technical characteristics

At this point we will refer to the technical characteristics of the DIAS Payroll System and the technologies that have been applied for the implementation of the project. The architecture of the technical solution applied, is represented in Figure 3.

Enrolled Clients are entitled to access the DIAS Payroll System, through IP Security and Authentication security system, simply by using any web browser.

Load Balancer aims to optimize resource use, maximize throughput, minimize response time, and avoid overload of any single resource.

Application Servers in our Farm, serve all enrolled users, according to authorization rights and .net membership. The Web Farm architecture uses multiple servers to host the application and divide the traffic between them.

A Database Server is used for holding the Entity Model of the system and for storing the data.

Moreover, a web-based report engine is used for building, configuring and running reports.

There are a few more servers used by the system such as mail server, FTP Server, Ticketing Server and Backup Server.

Finally, a Developer Server is used in a way that provides source code management, reporting, requirements management, project management (for both software development and waterfall teams), automated builds, lab management, testing and release management capabilities. It covers the entire Application Lifecycle Management, therefore its use was considered necessary.
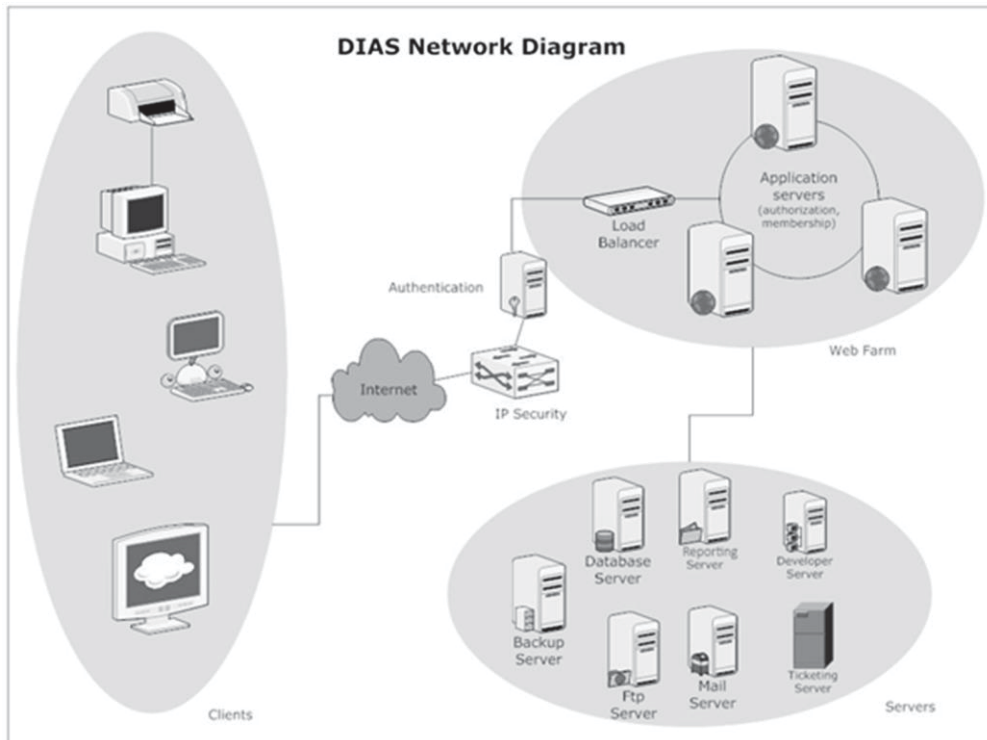
Figure 3: Technical solution of the system

5. Results from its use

In this paper, the web-based integrated Dias Payroll System is introduced. Dias Payroll System is able to store huge data of the employees and generate statistics and reports according to the need. Its design is sufficiently flexible to cope with future requirements.

The current version of the Dias Payroll System which is presented in this document was applied for the first time 1 year ago. It is used from 160 governmental units and the payroll of 150000 employees is calculated and exported each month from it eliminating bureaucracy costs and providing administration with a constant view/reporting on salaries costs and specialized reporting (e.g. social security payments, costs for overtime).

This e-government system was designed and applied under the aegis of the Greek Ministry of Education as a supportive tool for the payroll management. The use of this system has become a means for the Ministry to have an integrated view of its payroll management and it is considered to act as a powerful tool for the payroll administration of the Ministry:

▪ *Simplifies administrative processes* by providing automatic calculations, fast data retrieval and automated reporting capabilities, printing/ exporting options for official documents and reports.

Previous situation

Several reports and needed documents were prepared on hand or from ad-hoc work from the technical team managing the pay-roll system(s).

Improvement

All important reports and documents are automatically and easily generated by the user through the system user interface. A service for exporting and sending these reports via email is available too whenever the user needs it.

▪ *Makes services more transparent and accountable*. Central administration authorized users can have access to integrated statistical reports concerning the employees of the ministry in the whole Greece.

Previous situation

No hierarchical reports with statistics and integrated information were used for financial monitoring on regional and Ministry level.

Improvement

The regional offices and, more importantly, the Ministry can automatically and easily create various useful statistic reports (e.g. payroll cost per month, cost for social security services). Through such statistics the Ministry can make comparisons and reach useful conclusions about the total annual budget for each year.

▪ *Helps to deliver services in a more efficient way* by using massive importing processes of administrative data, accompanied by automatic validation methods.

Previous situation

Multiple data entry from other systems or manual data entry was needed.

Improvement

Several data is imported automatically in the system using pre-defines excel or xml files (e.g. absences)

▪ *Facilitates the integration of services and processes*. DIAS Payroll System is an integrated system that supports all the functions required for payroll management such as data import, automatic calculations, export data, reports and statistics.

Previous situation
In several cases, different systems (not inter-connected) were used (e.g. different systems for overtime payments)

Improvement

An integrated system is provided avoiding multiple data entry and providing unified services.

▪ Reduces operating costs and human capital investment. Internal bureaucracy can be reduced and efficient management of Human Resources used for payroll administration can be succeeded.

Previous situation

The existence of different multiple systems resulted in the need of several offices to support their operation.
Improvement

In several cases it was made possible to reduce the people working on payroll operation support as the system proposed minimizes the amount of input requirements.

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Late Submission

Improving Rural Healthcare Delivery in Nigeria using Distributed Expert System Technology

Olufunke Oladipupo, Olawande Daramola, Jelili Oyelade and Ibukun Afolabi
Department of Computer Science and Information Sciences, Covenant University, Ota, Nigeria
funke.oladipupo@covenantuniversity.edu.ng
olawande.daramola@covenantuniversity.edu.ng
jelili.oyelade@covenantuniversity.edu.ng
ibukun.fatudimu@covenantuniversity.edu.ng

Abstract: Provision of adequate healthcare for the citizens is the responsibility of governments. This involves recruiting qualified medical personnel, and providing quality medical services nationwide. The ratio of medical doctors to patients in Nigeria is 1:6,800, which means the citizens are grossly underserved in terms of medical services. Hence, there is need for new strategies that will ensure that more citizens access healthcare services, particularly people in the rural areas. In this paper, a framework for an SMS-based expert system for rural healthcare delivery is proposed, which takes advantage of the wide coverage of telephony services in the rural areas in Nigeria. A preliminary evaluation of the expert system for pulmonary heart disease that was developed reveals that it emulates human expert capability at a reasonable level. This makes it suitable for deployment on a national scale to cater for the shortage of medical practitioners particularly in the rural areas.

Keywords: Medical services, healthcare delivery, expert system, mobile technology, e-governance, Fuzzy logic

1. Introduction

One of the responsibilities of the government to their citizens is the provision of adequate and reliable health care services. The prerequisite for a reliable healthcare provision is recruitment of qualified and experienced medical personnel to deliver quality healthcare for the citizens. This, however, might not be realistic in Nigeria, where currently there is a poor doctor to patient ratio. In 2012, there was doctor to patient ratio of 1:3500 as against the World Health Organisation (WHO) standard of 1:600 (Onyebuchi, 2012). Again in 2014, this ratio went down to 1:6400 (http://www.nigeriaintel.com/2013/05/03/official-one-doctor-to-6400-patients-in-nigeria/). According to the survey carried out in (Oche and Adamu, 2013) on determinants of patient waiting time in the General Outpatient Department of a Tertiary Health Institution in North Western Nigeria, Sixty-one percent (59/96) of the respondents waited for 90-180 minutes in the clinic. While 36.1% (35/96) of the patients spent less than 5 minutes with the doctor in the consulting room. The commonest reason for the long waiting time in the Nigerian healthcare centres is the large number of patients with few healthcare workers. This shortage of medical practitioners in Nigeria was not because of lack of new medical school graduates but due to economic distress in Nigeria, and this has resulted in the migration of many Nigerian doctors to other countries in recent times (Onyebuchi, 2012).

In (Emelumadu and Ndulue ,2012), the analysis from an urban centre was reported such that out of 350 patient sample, 38% of the sample sought care at General Outpatients Department (GODP) in order to receive medical attention by qualified doctors and nurses, 36% desired efficient and quality service and 14.5% went there for cheaper and affordable drugs. The patient waiting time was also analysed and it was reported that 25 % of the sample waited for up to one hour to register, while 38% spent more than an hour before being attended to by a doctor.

With these statistics, it is obvious that Nigerian citizens are grossly underserved in terms of medical services, especially in the rural areas of Nigeria where 53%of the entire national population of more than 160 million live (http://data.worldbank.org/indicator/SP.RUR.TOTL.ZS.). In terms of accessibility to good medical care, the rural populace is far behind. The main reasons for this is that most medical practitioners are not ready to stay in the rural centres due to poor development and infrastructural facilities like bad roads, poor water, lack of good accommodation, lack of Internet facility and so on. Hence, there is need for new strategies that will ensure that more Nigerian citizens have easy access to healthcare services, particularly those in the rural areas. In this paper, a framework for distributed expert system initiative for rural healthcare delivery is proposed. The framework will enable rural dwellers to send their requests for medical care/attention via their

mobile phones using the Short Messaging Service (SMS). They will in return obtain a help response from an expert system or a remotely based medical personnel in form of diagnosis or medical advice also through their mobile phones. The proposed approach, which takes advantage of the wide coverage of telephony services in the rural areas of Nigeria will ensure that more people in the rural areas gain access to lightweight medical services via a distributed network of expert system technology. This initiative will help to minimize the effect of shortage of medical personnel in the rural areas of Nigeria.

The rest of the paper consists of the following. Section 2 presents a review of some important while Section 3 describes the proposed framework. Section 4, provides the justification for the adopted expert system architecture, while the paper is concluded in Section 5with some recommendations.

2. Rural Healthcare in Nigeria

For every citizen in Nigeria, living in the rural or urban area quality health is a fundamental right. Sound health and medical fitness is a goal of every human being (Asabere, 2012). For a large number of citizens of a country to be unhealthy will be a minus and disastrous for such a country. This is because it will adversely affect the economy and cause mass migration of experts in various fields (Asabere, 2012). The target of primary healthcare in Nigeria was to make healthcare accessible to all citizen by the year 2000 (Asabere, 2012). This goal is yet to be a reality in Nigeria and it seems it is not going to be, despite the fact that the Nigerian government had established healthcare centres in both rural and urban centres. Regardless of these provisions, about two-third of Nigerian population are still underserved for so many reasons. In (Ruxwana et. al., 2010) a survey on ICT applications as e-health solutions in rural healthcare in the Eastern Cape province of South Africa was carried out using questionnaire. From the report it was obvious that so many factors are limiting the use of ICT application in the rural areas. These factors are common to all African countries. Some of the challenges of rural healthcare in Africa include lack of Internet connection, unreliable equipments, and lack of computer skills. According to (Abdulraheem et. al., 2012)), the primary healthcare in Nigeria is currently catering for less than 20% of the potential patient. While most primary healthcare facilities provided by the government are no longer in use because of poor maintenance, and some are obsolete. More than this, as against the World Health Organisation (WHO) standard of 1:600, the ratio of doctor to patient in Nigeria is 1:3500 as of 2012 and in 2014 it went down to 1:6400 (Onyebuchi , 2012). With these factors, it is obvious that there is need for a better means of providing healthcare services for rural centres

2.1 Expert System

An expert system is an intelligent computer program that accepts input via the user interface and uses knowledge in the knowledge base to make logical conclusions through the inference mechanism, in order to solve problems that are difficult enough to require significant human expertise to solve(Turban and Aronson, 2001)(Feigenbaum, 1982).Therefore, typically a medical expert system is an intelligent system that accepts patients' complaints via the system's user interface and uses the knowledge in the knowledge base through the inference mechanism to give diagnosis, and drug prescriptions to the patient. In order to enhance the capability of medical expert system the application of fuzzy concept is very important. Medical expressions have more linguistic terms than crisp terms. For example, it is not enough to know that a patient has migraine, but it is important to know the degree of it, whether it is mild, high or severe. This kind of scenario creates the need for fuzzy logic. Also because of the quantitative nature of medical data, the application of fuzzy logic will prevent the Sharp Boundary Problem (Verlinde et. al., 2006)(Oladipupo et. al., 2010), where some values are overestimated and some underestimated, when describing a patient's condition. This will improve the overall efficiency of the expert system. The fuzzy expert system architecture is shown in Figure 1.
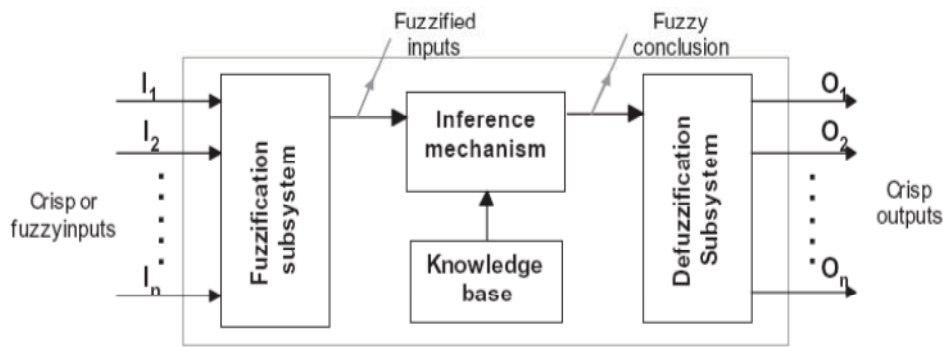
Figure 1: Standard Fuzzy expert system Architecture (Aly and Vrana, 2006)

The efficiency of a Fuzzy Expert system depends upon how effectively one executes the fuzzy reasoning, using the knowledge stored in form of rules and facts (Aly and Vrana, 2006)(Song et. al., 2009). To this effect, the mode of acquiring the knowledge is very important in determining the efficiency of the system. This process is called knowledge acquisition. Since there is a shortage of experienced doctors in Nigeria versus the national population, It is crucial to seek how to maximize the available experts.

In the medical domain, expert systems have been widely used for diagnosing different type of diseases. A novel fuzzy-neural based medical diagnosis system was designed in (Moein et. al., 2008). For diagnosing the Hepatitis B intensity rate a fuzzy expert system was designed in (Neshat and Yaghobi, 2009). The authors in (Saritas et. al., 2003) described a fuzzy expert system design for diagnosis of Prostate Cancer. The study revealed that it was not quite possible to diagnose prostate cancer fully based on only ultrasonography and image processing. There is need to develop a rule-based expert system that uses laboratory and other data and simulate expert-doctors' behaviour. A diagnosis system for diabetics was developed in (Khan et. al., 2014).An expert system for first aid treatment was described in (Khan et. al.,2014). In (Allahverdi et, al., 2007) a fuzzy expert system for determination of Coronary Heart Disease was designed. All possible rules were evolved in the knowledge base using standard rule-base formulation. The experimental report shows 98% accuracy of the system compared to domain expert. In order to enhance the expert system comprehensibility, compactness and reduce rule base unwieldiness, in (Olufunke et al., 2012) a fuzzy association rule mining expert system (FARMES) for determining coronary heart disease was designed using automated fuzzy association rule mining expert-driven (FARME-D) knowledge acquisition approach. The system was evaluated and the report revealed 100% accuracy of the system with 27% rule reduction, and saves 20% of memory size utilized by standard rule base formulation in (Allahverdi et. al., 2007). With the good result of this evaluation, the expert system framework proposed in this paper is based on FARMES architecture that was proposed by the authors of this paper in (Olufunke at. al., 2012).

2.2 Mobile Technology for Rural Healthcare

For more than a decade the deployment of applications has move drastically toward mobile technology due to new innovation in mobile technology, and reasonable improvement in telecommunication service. In literature, different platforms of communication between the patient and the expert system have been used, such as web, desktop (application system interface) and Mobile platform (Asabere, 2012)(Allahverdi et. al., 2007)(Upkar, 2006) . SMS is an acronym for Short Message Services via a mobile system. SMS platform is more realistic in the rural area because of different constraints, such as lack of Internet facility and inability to use computer by the rural people. More importantly, most expert doctors are not ready to leave the urban centres for the rural areas. Therefore, in order to take advantage of the wide coverage of telephony services in the rural areas in Nigeria,it is more realistic to use the SMS platform. In (Guirong and Daoliang, 2001), a SMS-based expert system was proposed to compensate for lack of computer and the inconvenient use of web-based diagnosis. The SMS platform was used as the input and output media for the expert system. The system was developed using Java. In (Khan et. al., 2014) an SMS based first AID Treatment management system for rural area of Baltisan in Pakistan was proposed. For health institutions in Ghana a mobile expert system was proposed in (Asabere, 2012). Most of these reviewed expert systems were evaluated by the authors and were reported as working at a high level of accuracies when compared with the performance of domain experts.

Therefore, since expert system technology is well established, it has good potential to help to alleviate the challenges of shortage of doctors in the rural areas in a country like Nigeria.

3. The Proposed Framework

In this paper, a Short Message Services (SMS) based expert system Framework is proposed to enhance rural healthcare delivery in Nigeria. The framework has three major actors. The patient, the expert system and the remote doctors. The patients are the people that need medical assistance in the rural area. The expert system is the server-based computer that stands in the place of a doctor to diagnose and prescribe for the patient. The third in the chain are the remote medical practitioners in the cities. The proposed framework adopted a Fuzzy Association Rule Mining Expert System model (Olufunke et. al., 2012) with distributed knowledge base. The knowledge is acquired by an automated FARME-D approach (See section 4) and from remote doctors in order to maximize available experts, by making use of experiences of experts that are stored a priori. The typical deployment architecture of the proposed system framework is shown in Figure 2.
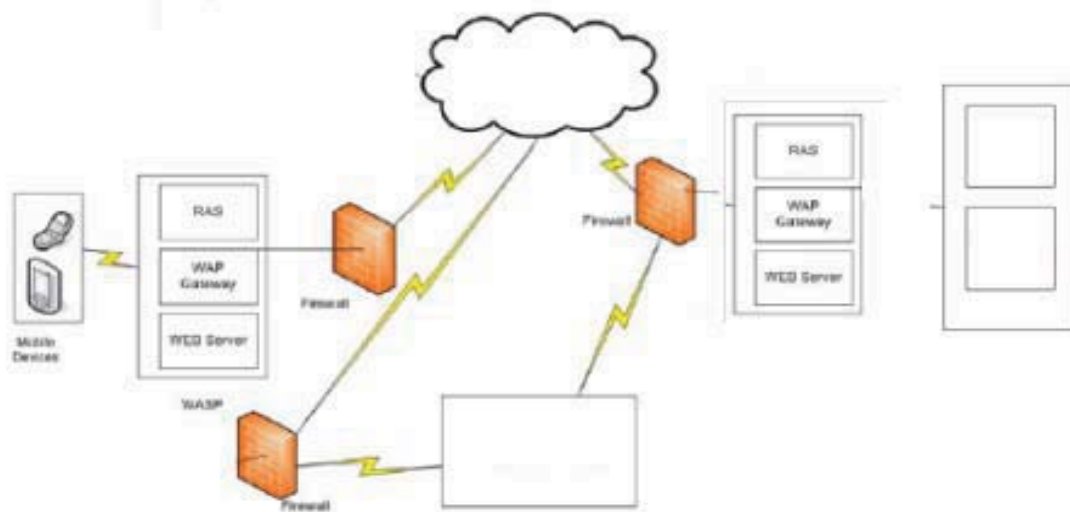

Figure 2: The proposed Framework for SMS based Expert System

The Framework is about constructing a system that can allow patients to register and send their symptoms or complaints via SMS to the expert system. The expert system will extract the SMS message and also send it to the remote doctors (registered doctors) to submit their diagnoses to the knowledge base as facts if there is any one available. The system will then reason through the knowledge base in order to send the diagnoses, and prescribe appropriate drugs for patients via SMS. In case the patient still has further complaints or the message is unclear, the patient can communicate via SMS with the Expert system. The patient will only have to travel to see the physical doctor if there is an emergency, and this will be sent to the patient via SMS. The expert system server could be placed in a central location such as the Local Government Healthcare centre, where the network and Internet services have been provided, which is uninterruptedly for 24 hours, and probably, where there are medical practitioners.

The deployment architecture shown in Figure 3 consists of SMS gateway to facilitate communication between patient and expert system server, and doctor and expert system server and vice-versa when text messages are sent. GSM coverage is a key component and security firewalls to ensure protection of system resources. FARME-D is an important component of this architecture. It accepts the input symptoms from the patient, as well the doctors' suggestion based on the symptoms and give appropriate diagnosis and prescription as an SMS response to the patient.

4. Justification of the FARMES Architecture

FARMES is an expert system based on automated knowledge acquisition approach called FARME-D. Figure 3 shows the FARMES architecture. FARME-D was able to evolve a comprehensible,compact and unwieldy

knowledge base with 27% rule reduction while 100% accuracy is maintained, and saves 20% of memory size utilized by standard rule base formulation (Verlinde et. al., 2006). FARME-D knowledge acquisition uses machine learning approach to evolve knowledge from existing past experience on the field, stored in a medical repository and allows for instance update of the knowledge base as new experience is acquired by the domain experts. The knowledge acquisition approach was able to breach the gap of medical expert scarcity and make room for dynamic knowledge base (Olufunke et. al., 2012). From the expert system point of view (FARMES) in (Olufunke et. al., 2012) a preliminary evaluation of the expert system performance for Coronary Heart disease risk determination was reported. The report reveals that it emulates human expert capability at a reasonable level, which makes it suitable for deployment on a national scale to cater for the shortage of medical practitioners, particularly in the rural areas. The system also make the best use of past expert experience in the domain so that even when the trusted hands in the field are dead their knowledge can still be speaking after them. The reliable results obtained from the evaluation of FARMES make it suitable for application in the context of supporting rural healthcare initiative in Nigeria.
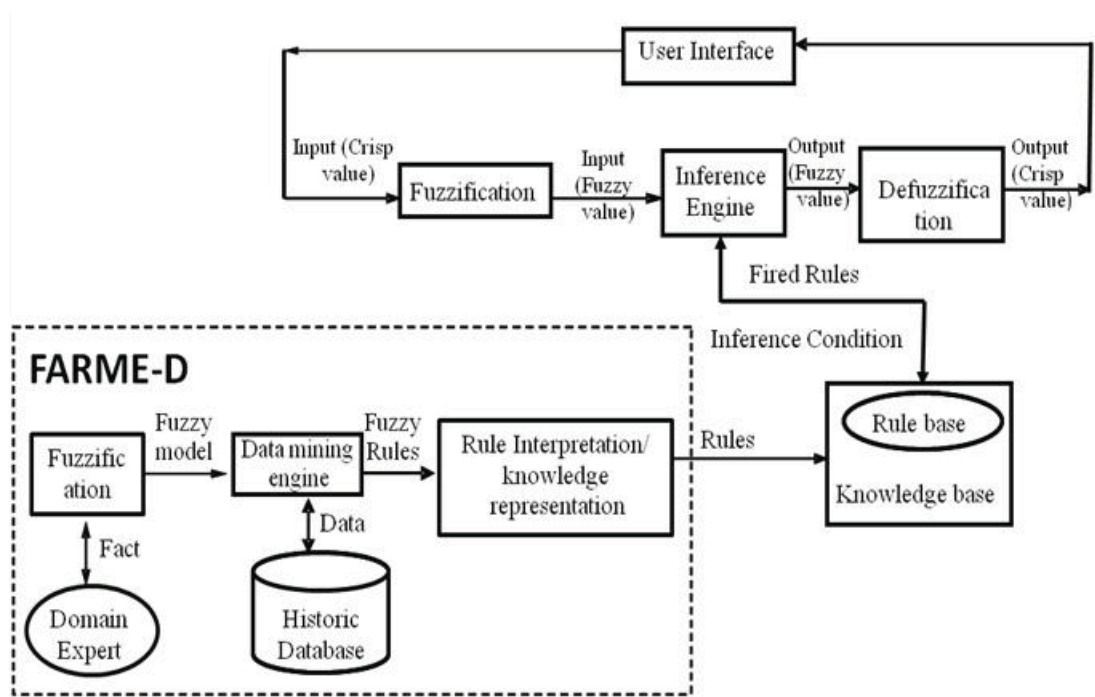

Figure 3: Fuzzy Association Rule Mining Expert system (FARMES) architecture

5. Implementation of the Framework and Benefits

In order to implement this framework in such a way as to enhance the health delivery in Nigeria, the Government has to make provision for the following: IT infrastructure in all local governments, computers with preloaded expert system application,power backup units, computer network equipments, Internet (optional), GSM coverage in all rural areas, a good management and supportive policy, and medical personnel to monitor the servers. There should also be provision of alternative power supply, since the serve must be on at all times. A free-to-send-SMS messages to and from the Expert system line from prominent mobile service providers. Above all, proper awareness should be created within the rural community about the healthcare provision, how to use it, the advantage and disadvantage of using the system.

In terms of benefits, the proposed distributed expert system framework offers the following:

- It will provide a potentially efficient and efficient way to tackle the problem of shortage of medical doctors in the rural areas in Nigeria.
- It offers a convenient way for rural people to access healthcare services.
- The platform makes it possible to share the expertise of the few available medical doctors for the benefits of many people in the remote areas.

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- It creates a relatively cheaper way out of the national problem of poor ration of doctor to patient. The unreached rural community will have access to several medical experts at little or no cost, and within reasonable time.

6. Conclusion

In this paper, a framework for improved rural healthcare delivery has been proposed. The framework is SMS-based and uses the expert system technology to cater for the shortage of experienced medical practitioners in the rural areas of Nigeria. The proposed framework relies on a tested expert system architecture called FARMES, which is a product of a previous research effort that have been adjudged efficient in the diagnosis of coronary heart disease risk. Therefore, the FARMES can be adapted to generate diagnosis for other diseases. In conceiving the framework, critical issues such as insecurity, lack of regular power supply, Internet and the like were considered in order to evolve a robust framework that combines human expertise and credible expert system capability to support the administration of rural healthcare in Nigeria. If this framework is adopted there will be a great relieve in time wastage by the patient in the hospital in order to do registration and to see the doctor. Also it will enhance the rural settlement citizens' accessibility to heath care facilities made available by the government. This concept can also be extended to other developing countries.

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For further information contact
info@academic-conferences.org
or telephone
+44-(0)-118-972-4148