G2G Interaction among Local Agencies in Developing Countries based on Diffusion of Innovations Theory

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Abstract—*Technological advancement has allowed governments to meet the demands of its citizens electronically. Electronic government (e-Government) facilitates accurate and fast transactions and delivery of services and information to businesses, citizens, and government agencies. Moreover, e-Government helps enhance democracy. Agencies interact with one another electronically through the e-Government, which enhances efficiency. e-Government utilizes information and communication technology to provide the public access to various services. Leaders and information technology executives in the public sector have recognized the importance of sharing inter-organizational information to improve the efficiency of government agencies. Therefore, this study takes the diffusion of innovations theory as context to identify the most important factor affecting the electronic interaction between local agencies in developing countries.*

Keywords—**E-government, electronic interactions, diffusion of innovations theory, G2G, government agencies, developing countries**

I. INTRODUCTION

Information and communication technology (ICT) has become one of the basic building blocks of modern society [1]. ICT plays a key role in the social, economic, cultural, and political growth of a nation. ICT has revolutionized the way we live, think, and perform and helps in realizing the vision of good governance. Amidst the attempts of governments in developing countries to provide services to citizens through ICT [2], numerous changes in government services have been engendered, including online voter registration, online election, and driver's license renewal through the Internet, among others[3] [4].

Technological advancement has allowed governments to meet the demands of its citizens electronically. Electronic government (e-Government) facilitates accurate and responsive transactions and delivery of services and information to businesses, citizens, and government agencies. Moreover, e-Government helps enhance democracy. Agencies interact with each other electronically through the e-Government to improve efficiency [5]. More important, e-Government utilizes ICT to provide the public access to various services.

The e-Government field (also known as digital government and electronic governance) emerged in the late 1990s [6] [7]. However, research on e-Government is a relatively new endeavor [8].

The shift from traditional government to e-Government is an important public policy issue for technologically advanced countries. However, the shift does not mean the end of work [9] because under e-Government, the agencies utilize technologies (e.g., wide area networks, the Internet, and mobile computing) to transform relationships with citizens, businesses, and other branches of the government [10]. Technologies can provide citizens with better governmental services, improve the interactions with businesses and industries, empower citizens through information access, and increase the efficiency of governmental management [11].

e-Government has been modified, corrected, and improved since it was introduced [6], but its rapid development in the 21st century is unavoidable [12] because almost every country and government around the world, in one way or another has implemented e-Government. Nevertheless, governments have their own visions, roadmaps, and objectives in relation to e-Government strategy [13] [14]. Thus, while governments have commonalities in their functions, structures, and processes, the implementations of e-Government differ [15].

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Therefore, governments must explore new relationships among their agencies and partnerships with the private sector to ensure quality and accessibility of e-Government activities [11]. In addition, government agencies need to share information and link their administrative processes to fulfill their strategic objectives [16].

II. MOTIVATIONS OF THE STUDY

Generally, government agencies rely on information services provided by other government agencies [17]. Thus, government-to-government (G2G) electronic interactions are crucial to the effective inter-organizational business management. G2G interaction strengthens the availability and sharing of information in all government levels and improves the efficiency [15]. G2G interaction allows governments to create new channels for interactions with different government agencies and business organizations, and such interactions lead to increased government performance and efficiency [18]. Unfortunately, sharing information through G2G remains a considerable challenge worldwide despite its importance [19].

Leaders and information technology (IT) executives in the public sector have recognized the importance of sharing inter-organizational information to improve the efficiency of government agencies [20]. However, sharing information involves complex interactions between government agencies, as *"information-sharing projects are complex, involve several organizations, and result in new roles and responsibilities that take time to learn and execute"* [21].

Information sharing and e-Government are actively studied and widely practiced; however, these fields lack the comprehensive framework through which the factors that affect the exchange of electronic information among government agencies at the local level can be examined [22].

Scholars and practitioners have argued that the most important interactions occur at the local level, but recognize that studies on local e-Government practices are rare, particularly in developing countries; thus, these interactions should be studied further [23] [24]. Additionally, the interaction between government agencies requires systematic investigation, particularly those in developing countries [25] because of the challenges confronting the e-Government of these countries. Therefore, this paper identifies the factors that affect electronic interaction based on the diffusion of innovations (DOI) theory.

III. TYPES OF INTERACTIONS IN E-GOVERNMENT

e-Government facilitates interaction between different governing stakeholders. Four main types of interactions in e-Government are G2G, government-to-citizens (G2C), government-to-business (G2B), and government-to-employees (G2E). These interactions are described by a number of scholars [26] [27] [28].

A. Government-to-Government Interactions

In G2G interactions, ICT is used not only to restructure governmental processes concerning the functioning of government entities, but also to enhance the flow of information services within and between various entities. G2G interactions are limited to the sphere of government, which can be both horizontal and vertical. Horizontal G2G interactions are interactions between various government agencies and between various functional areas within an organization. By contrast, vertical G2G interactions are those between national, provincial, and local government agencies and between various levels within an organization. G2G interactions aim to increase efficiency, performance, and output. In this study, G2G interactions are those between agencies within the local government and hence, horizontal [29].

B. Government-to-Citizens Interactions

The interface between the government and citizens created through G2C interactions allows the citizens to benefit from the efficient delivery of public services. Public services are not only accessible and available, but their quality is also improved.

In this type of interaction, the citizens are provided options. The citizens can interact with the government 24 hours a day or 7 days a week. Furthermore, the citizens are given more choices with regard to venue of interaction (service center or at home), and means of interaction (Internet, telephone, and face to face). Thus, G2C interactions mainly aim to build the citizen-friendly image of the government [26].

C. Government-to-Business Interactions

In G2B interactions, e-Government tools are used to help the business community experience a seamless interaction with the government to cut red tape, save time, reduce operational costs, and provide a transparent environment for business with the government.

Moreover, G2B initiatives can be transactional, including licensing, releasing permits, and revenue collection, or promotional and facilitative in such areas as trade, tourism, and investment. These measures help create a friendly environment for businesses and motivate them to perform efficiently [28].

D. Government-to-Employees Interactions

The government is a large employer. Similar to any organization, the government has to interact with its employees regularly. The interaction is a two-way process, which can be fast and efficient because of ICT tools. Fast and efficient G2E interactions increase the level of satisfaction of employees [27].

The G2G sector, which involves data sharing and electronic exchanges between governmental actors, is the backbone of e-Government [33]. At the same time, G2G interactions involve both intra- and inter-agency exchanges at the federal level and exchanges between and among the federal, state, and local government agencies. It has been

suggested that for the electronic transactions of federal, state, and local governments with their citizens and businesses to be successful, governments should improve and update their respective internal systems and procedures first.

IV. G2G INTERACTION

e-Government allows interaction without the constraints of time and location [30]. Moreover, the establishment of e-Government is an attempt to provide citizens, business organizations, and government agencies with a convenient access to government information and services [31]. In addition, e-Government is an important tool for the public sector not only in providing electronic services to citizens, but also in interacting with businesses, other organizations, and government agencies [32]. Interactions between two or more public agencies in the traditional government consistently yield low efficiency and effectiveness, which results in costs higher than those of similar services in the private sector [34].

One of the main concerns is that a G2G interaction in the public sector increases evaluation or criticism because it makes government organizations more transparent. Reduced cost, increased productivity, accurate information, completed information for decision making, and improved networked collaboration among government organizations are some perceived benefits of exchange of electronic information [35]. In addition, G2G interactions help government improve and accelerate interactions between government agencies [18]. Moreover, G2G interactions enhance government transitions and ensure that tasks are completed consistently [36]. Additionally, G2G interactions speed up and facilitate networked information among different government agencies. G2G interactions also allow information to flow easily and smoothly resulting in time and cost reduction for employees.

V. DIGITAL GOVERNMENT IN DEVELOPING COUNTRIES

The way business is performed and how organizations compete have been revolutionized by the boom of digital connectivity, major developments in communication and information technologies, and the enforced global competition [37]. The on-going prosperity of the "e-" trend particularly in such aspects as e-Business, e-Government, and e-Learning fosters an increasing demand for interactions across organizational boundaries [28]. e-Government pertains to the use of ICT, specifically the Internet, as a means to establish a better government [39]. ICTs have been introduced to the government sector 20 years ago to attain increased operational efficiency and effectiveness [40].

e-Government has often been the new way forward for the public sector in both developed and developing countries. However, the failure rate remains high despite the developments in e-Government. Only a few studies have addressed e-Government in developing countries [41]. One of these few studies reported that only 15% of the applications of e-Government in developing countries are successful [42].

VI. LOCAL AND E-GOVERNMENT

Local government is a city, county, parish, township, municipality, borough, ward, board, district, sub-district, or a general-purpose political subdivision of a state or country. In other words, a local government is a county, municipality, city, town, township, local public authority, school district, special district, intrastate district, council of governments, regional or interstate government entity, agency or instrumentality of a local government, tribe or authorized tribal organization, native village or organization, rural community, unincorporated town or village, or any public entity, where an application for assistance is made by the state or a political subdivision of the state [43]. Moreover, "a *local government is often portrayed as representing the highest form of decentralization"* [44].

Countries must strengthen e-Government initiatives to accommodate the new model of the use of the Internet, telephone (traditional public or private), fax, palm pilot, computer, and mobile digital interactions in domestic and international governmental interactions [45]. Besides, local governments have direct contact with citizens through which they provide citizens with typical national government services, including registrations, customs, taxation, and elections. Specific e-Government services offered at the local level are increasing [46]. G2G interactions are the channels for the delivery of public services from a government agency to another at local, regional, national or international level [47]. Researchers have stated that initiatives and frameworks exist for central e-Government applications, but a solution suitable for local e-Government applications is yet to be established [48][49].

Research on e-Government has focused mainly on the national level, and only a few studies have focused on e-Government at the local level [50]. Moreover, theories and models for e-Government at the local level are few. Thus, further research must focus on local e-Government [22]. As mentioned in the literature review, a few studies have focused on factors that affect electronic interaction among local agencies and most of these have focused on G2B and G2C, rather than G2G. The present research could serve as basis for future studies that will investigate the factors affecting electronic interaction among agencies in an actual sample.

VII. DIFFUSION OF INNOVATIONS THEORY

DOI theory has been used by many IS researchers to explain the adoption and diffusion of information technologies. An innovation is an idea, practice, or object perceived as new by an individual or another unit of adoption [51]. Organizational innovation is *"the adoption of an idea or behavior that is new to the organization adopting it"* [52]. Therefore, an innovation does not necessarily pertain to a technology [53]. An innovation may also pertain to a renewal in terms of thought and action. The limitations of an innovation may not be distinct [51]. Potential adopters may

perceive an innovation being highly related to another new idea or a bundle of new ideas. Potential adopters may view an innovation to be highly related to another new idea or a set of ideas. Hence, factors influencing G2G interactions within local agencies can be investigated through the DOI theory, as participation in such initiatives typically requires the introduction of new technologies and ways of thought and action.

Innovation has five attributes that determine the adoption of innovation; these are relative advantage, compatibility, complexity, observability, and trialability [51]. These attributes have been widely used by researchers to explain the adoption and diffusion of IT innovations. Among these attributes, relative advantage, compatibility, and complexity have been consistently identified as critical [54]. Similarly, researchers have pointed out that not all attributes, specifically observability and trialability, are consistent. By contrast, relative advantage and compatibility were found to be consistently and positively correlated to the adoption of innovations. Furthermore, complexity was found to be consistently but negatively related to adoption [51]. Additionally, studies have revealed that the perception of compatibility, complexity, and relative advantage play the most significant role in the adoption of innovation across a broad range of areas [54] [55]. Different contexts must be looked into when conceptualizing the determinants of organizational innovation adoption [53]. Thus, technological innovation research has determined several variables for studying organizational adoption in addition to the suggested innovation characteristics [56]. Table 1 lists a group of researchers who provided different contexts.

TABLE I.   FACTORS OF INNOVATIONS IN VARIOUS CONTEXTS

Author(s)	Year	Items
Rogers [56]	1995	Individual leader characteristics; internal characteristics of the organizational structure and external characteristics
Thong [53]	1999	Characteristics of the organizational decision makers, technological innovation, organization, and environment
Akbulut [57]	2003	Characteristics of electronic information sharing, agency, and environment
Teo, Lin, and Lai [58]	2009	Technological, organizational, and environmental contexts

The environmental context plays the most important role in the application of e-Government, followed by organization and technological factors, but it has not been used extensively to analyze e-Government [59]. To achieve success, e-Government should include more of the technological,

organizational, and environmental factors of the organization, and these should be considered at the same level of importance as those of the factors in the technical aspect of Information Technology [60]. In the same way, *"the mere implementation of Internet-Technology in public administrations cannot be considered e-Government"* [61].

Based on these ideas, this study focuses on organizational and technological contexts. One of the most consistent determinants of technology adoption is relative advantage, which encompasses several different types of benefits, such as economic gains and social prestige, and different types of costs [51]. Relative advantage is divided into two factors, namely, benefit and cost [62]. Fig.1 depicts the factors that affect interaction.
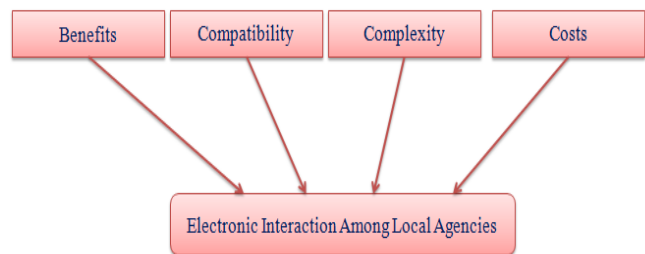

Fig. 1. Factors that affect G2G interaction based on DOI theory

A. Benefits

Benefits are the perceived potential gains of interaction between agencies. Benefits are the anticipated advantages that local agencies can obtain through electronic interaction between agencies [63]. Researchers have stated that perceived benefits play an important role in the organizational adoption of innovations [64] [65] [66].

Furthermore, the interaction between agencies helps local agencies achieve benefits, such as increased accuracy and timeliness of information, reduced paperwork, freed up resources, expedited data management, and improved decision making [67]. By contrast, non-sharing agencies perceive the initiative as detrimental or are unaware of potential benefits. Interagency information has various benefits, such as reduced costs and increased productivity, as a result of streamlined data management, improved accuracy, timeliness of information gathered, centralized source and support for current information, accurate and comprehensive data for problem solving, widened professional networks, enhanced public image, and well integration and coordination of government services [68]. Benefits affect the interaction between agencies as shown in Fig. 1.

B. Compatibility

Compatibility is the degree to which an innovation is perceived as consistent with existing technologies and past experiences of potential adopters [69]. Different types of compatibility can be identified. For example, technological compatibility is the compatibility of information technologies

required to participate in electronic information sharing with existing applications and information systems [57]. A survey was conducted among public sector managers to discover the most significant issues in IS [70]. Results have shown that the most important issue is the integration of technologies; 91% of the respondents said that data processing and office automation technologies and telecommunication networks must be integrated to stop the incompatibility of technologies. Other studies have revealed that participation in interagency information sharing is affected negatively by the incompatibility of hardware, software, and telecommunication networks [71] [72].

C. Complexity

Complexity is the degree to which participation in electronic information sharing between organizations is perceived as relatively difficult [69]. Complexity has two levels [73]. First, electronic information sharing contains complex ideas. Second, the implementation of electronic information sharing may be complex. Research has shown that the complexity of a technology is a major factor that affects the adoption decision. One of the reasons for the failure of a G2G e-Government is the complexity of the systems to be implemented [60]. The abovementioned survey [70] pointed out that an important indicator of the success of public system information is its ease of use. Complex technologies require more skills and effort; thus, the probability of adopting such technologies is reduced.

D. Cost

Cost is the perceived potential expense of a G2G interaction within local agencies. The benefits of a G2G interaction aimed at sharing information within local agencies may be significant, but the costs of interaction might be related to the costs of acquiring the necessary technology for interaction, including setup, running, integrating/interfacing, and training costs. The skill set of the available personnel is also an important factor that constrains the introduction of innovations. When new innovations are set in place, organizations that hire experienced and highly skilled people tend to incur lower costs in terms of training and equipment [57]. Agencies often lack resources for electronic information sharing. Hence, encouraging their involvement in a system where benefits are not well-defined and costs are uncertain is a challenge [72].

VIII. CONCLUSION

Generally, government agencies depend on information services provided by other government agencies. Therefore, electronic interactions are critical to business management shared between active organizations. A G2G interaction permits governments to provide new interaction channels with different government agencies and business organizations; new interaction channels help increase both government performance and efficiency.

A few studies have identified the significant factors that affect the electronic interaction among agencies, especially local agencies in developing countries. Therefore, this paper concentrated on factors that affect the electronic interaction among local agencies. In addition, this study focused on the DOI theory, which is suitable for analyzing inter-organizational exchange relationships. The use of other theories related to environmental, organizational, and technological factors in future research to analyze G2G electronic interaction between local agencies is suggested.

REFERENCES

[1] M. M. Khasawneh and H. B. H. Ibrahim, "Toward an information and communication technology development in developing countries," *Communications of the IBIMA,* vol. 4, pp. 135-140, 2008.

[2] M. A. Salamat, S. Hassan, and M. S. Muhammad, "Electronic Participation in Malaysia," *Journal of e-Government Studies and Best Practices,* vol. 11, 2011.

[3] M. E. Cook, "What citizens want from e-government," *Center for Technology in Government,* 2000.

[4] R. I. Salimonu, W. R. Sheik-Osman, A. J. K. Shittu, and R. G. Jimoh, "E-Voting Adoption: The Influence of User participation on E-Voting Development," in *International Conference on Rural ICT Development (RICTD)*, 2013.

[5] N. J. Al-Khafaji, A. J. K. Shittu, and W. R. B. S. Osman, "Comparing between Three Studies on Information Sharing among Agencies in the U.S.A.," in *International Conference on Advances in Computing and Communication Technologies (ICACCT2013)*, 2013.

[6] Å. Grönlund and T. A. Horan, "INTRODUCING e-GOV: HISTORY, DEFINITIONS, AND ISSUES," *Communications of the Association for Information Systems,* vol. 15, 2005.

[7] S. Trimi and H. Sheng, "Emerging trends in M-government," *Communications of the ACM,* vol. 51, pp. 53-58, 2008.

[8] D. Coursey and D. F. Norris, "Models of e-government: Are they correct? An empirical assessment," *Public Administration Review,* vol. 68, pp. 523-536, 2008.

[9] S. Gilaninia, S. J. Mousavian, E. Hanifi, S. Omidi, and F. Zadbagher Seighalani, "E-Government Development Process in Iran," *J. Basic. Appl. Sci. Res,* vol. 2, pp. 2865-2871, 2012.

[10] D. Goings, M. Vanjani, and C. Goings, "Status of e-Government in Georgia," *Communications of the IIMA,* vol. 5, pp. 25-32, 2005.

[11] H. Wang and J. Hou, "An integrated approach to developing a successful one-stop portal e-government," in *Computer Science and Information Technology (ICCSIT), 2010 3rd IEEE International Conference on*, 2010, pp. 511-514.

[12] L. Chiang and T.-C. Hsieh, "Information Integration to Create an Infrastructure: Facilitating Public Service Provisioning in Taiwan," *Electronic Journal of E-government,* vol. 5, 2007.

[13] M. Datar, A. Panikar, and J. Farooqui, "Emerging Trends in E-Government," *J. Bhattacharya, Critical Thinking in E-Governance,* pp. 37-46, 2008.

[14] U. Nations, *United Nations e-government survey 2012:e-Government for the People* vol. 4: United Nations Publications, 2012.

[15] H. Wang and J. Hou, "The external and internal barriers to e-government implementation," in *Management and Service Science (MASS), 2010 International Conference on*, 2010, pp. 1-4.

[16] R. Klischewski and R. Abubakr, "Can e-government adopters benefit from a technology-first approach? The case of Egypt embarking on service-oriented architecture," in *System Sciences (HICSS), 2010 43rd Hawaii International Conference on*, 2010, pp. 1-10.

[17] B. Zarei and M. Safdari, "Measuring the performance of G2G services in Iran," in *Integration and Innovation Orient to E-Society Volume 2*, ed: Springer, 2007, pp. 1-8.

[18] A. I. Alzahrani, "Web-based e-Government services acceptance for G2C: A structural equation modelling approach," 2011.

[19] F. Jing and Z. Pengzhu, "A field study of G2G information sharing in Chinese context based on the layered behavioral model," in *System Sciences, 2009. HICSS'09. 42nd Hawaii International Conference on*, 2009, pp. 1-13.

[20] T. A. Pardo, A. M. Cresswell, S. S. Dawes, and G. B. Burke, "Modeling the social & technical processes of interorganizational information integration," in *System Sciences, 2004. Proceedings of the 37th Annual Hawaii International Conference on*, 2004, p. 8 pp.

[21] J. R. Gil-Garcia, I. Chengalur-Smith, and P. Duchessi, "Collaborative e-Government: impediments and benefits of information-sharing projects in the public sector," *European Journal of Information Systems,* vol. 16, pp. 121-133, 2007.

[22] Z. Bigdeli, M. Kamal, and S. deCesare, "Inter-organisational electronic information sharing in local G2G settings: a socio-technical issue," 2011.

[23] R. A. Rodríguez, L. Welicki, D. A. Giulianelli, and P. M. Vera, "Measurement framework for evaluating e-governance on municipalities websites," in *Proceedings of the 2nd international conference on Theory and practice of electronic governance*, 2008, pp. 381-387.

[24] R. Sandoval-Almazan and J. R. Gil-Garcia, "Are government internet portals evolving towards more interaction, participation, and collaboration? Revisiting the rhetoric of e-government among municipalities," *Government Information Quarterly,* vol. 29, pp. S72-S81, 2012.

[25] W. O. Yimbo, "Analyzing E-Government in Developing Countries using a Stages Model Approach: A Case Study," UNIVERSITY OF MINNESOTA, 2011.

[26] S. M. Mutula, "A Model for Building Trust in E-Government," *Frameworks for ICT Policy: Government, Social and Legal Issues,* p. 15, 2010.

[27] M. Ramaswamy, "On the Dimension of E-government Interactions," *Issues In Information Systems,* vol. 8, 2007.

[28] J. Ziemann, T. Kahl, and T. Matheis, "Cross-organizational processes in Public Administrations: Conceptual modeling and implementation with Web Service Protocols," in *Wirtschaftsinformatik (1)*, 2007, pp. 181.

[29] N. J. Al-Khafaji, A. J. K. Shittuline, and W. R. B. S. Osman, "The effect of resistance to change in the application of e-Government in Iraq," in *ICT and Knowledge Engineering (ICT & Knowledge Engineering), 2012 10th International Conference on*, 2012, pp. 99-103.

[30] W. R. Rose and G. G. Grant, "Critical issues pertaining to the planning and implementation of e-government initiatives," *Government Information Quarterly,* vol. 27, pp. 26-33, 2010.

[31] U. Lfstedt, "E-Government services in local governments a study of development in Swedish municipalities," *Journal of Organisational Transformation & Social Change,* vol. 4, pp. 157-176, 2007.

[32] S. Alshomrani, "A Comparative Study on United Nations E-Government Indicators between Saudi Arabia and USA," *Journal of Emerging Trends in Computing and Information Sciences,* vol. 3, pp. 411-420, 2012.

[33] A. Al-Khouri and J. Bal, "Electronic government in the GCC countries," *International Journal of Social Sciences,* vol. 1, pp. 83-98, 2007.

[34] L. A. Joia, "The impact of government-to-government endeavors on the intellectual capital of public organizations," *Government Information Quarterly,* vol. 25, pp. 256-277, 2008.

[35] J. Fan and P. Zhang, "A conceptual model for G2G information sharing in E-government environment," in *6th Wuhan International Conference on E-Business*, 2007.

[36] P. T. Jaeger, "The endless wire: E-government as global phenomenon," *Government Information Quarterly,* vol. 20, pp. 323-331, 2003.

[37] V. Ndou, "E-government for developing countries: opportunities and challenges," *The Electronic Journal of Information Systems in Developing Countries,* vol. 18, 2004.

[38] H. K. Lee and H. Luedemann, "lightweight decentralized authorization model for inter-domain collaborations," in *Proceedings of the 2007 ACM workshop on Secure web services*, 2007, pp. 83-89.

[39] T. Field, *OECD E-Government Studies The E-Government Imperative*: OECD Publishing, 2003.

[40] R. R. O'Neill, "E-Government: Transformation of Public Governance in New Zealand?," 2009.

[41] T. Schuppan, "E-Government in developing countries: Experiences from sub-Saharan Africa," *Government Information Quarterly,* vol. 26, pp. 118-127, 2009.

[42] R. Heeks, *Implementing and managing eGovernment: an international text*: Sage, 2005.

[43] H. Rahman, "Framework of e-governance at the local government level," in *Proceedings of the 3rd international conference on Theory and practice of electronic governance*, 2009, pp. 372-374.

[44] K. Miller, "Advantages and Disadvantages of Local Government Decentralization," in *Presentation to the Caribbean conference on 'Local Government and Decentralization', Ocean International Hotel, Georgetown Guyana*, 2002, pp. 25-28.

[45] C. L. Brown, "G-8 collaborative initiatives and the digital divide: readiness for e-government," in *System Sciences, 2002. HICSS. Proceedings of the 35th Annual Hawaii International Conference on*, 2002, p. 10 pp.

[46] B. Lanvin and A. Lewin, "The next frontier of E-government: Local governments may hold the keys to global competition," *Global Information Technology Report,* vol. 2007, pp. 51-63, 2006.

[47] N. Barnickel, "Interoperability in egovernment through cross-ontology semantic web service composition," 2006.

[48] R. Klischewski and S. Ukena, "Designing semantic e-Government services driven by user requirements," in *Proceedings of ongoing research, project contributions and workshops, 6th International EGOV Conference*, 2007, pp. 3-6.

[49] S. Koussouris, Y. Charalabidis, G. Gionis, T. Tsitsanis, and J. Psarras, "Building a local administration services portal for citizens and businesses: service composition, architecture and back-office interoperability issues," in *Electronic Government*, ed: Springer, 2007, pp. 80-91.

[50] U. Lfstedt, "E-Government services in local governments a study of development in Swedish municipalities," *Journal of Organisational Transformation & Social Change,* vol. 4, pp. 157-176, 2007.

[51] E. M. Rogers, *Diffusion of innovations*: Simon and Schuster, 2010.

[52] R. L. Daft, "A dual-core model of organizational innovation," *Academy of management journal,* vol. 21, pp. 193-210, 1978.

[53] J. Y. Thong, "An integrated model of information systems adoption in small businesses," *Journal of management information systems,* vol. 15, pp. 187-214, 1999.

[54] T. H. Kwon and R. W. Zmud, "Unifying the fragmented models of information systems implementation," in *Critical issues in information systems research*, 1987, pp. 227-251.

[55] M. V. Karahannas and M. Jones, "Interorganizational systems and trust in strategic alliances," in *Proceedings of the 20th international conference on Information Systems*, 1999, pp. 346-357.

[56] M. Rogers Everett, "Diffusion of innovations," *New York,* 1995.

[57] A. Y. Akbulut, "An investigation of the factors that influence electronic information sharing between state and local agencies," Louisiana State University, 2003.

[58] T. S. Teo, S. Lin, and K.-h. Lai, "Adopters and non-adopters of e-procurement in Singapore: An empirical study," *Omega,* vol. 37, pp. 972-987, 2009.

[59] B. Pudjianto and Z. Hangjung, "Factors affecting e-government assimilation in developing countries," in *4th Communication Policy Research, South Conference, Negombo, Sri Lanka*, 2009.

[60] A. F. Realini and R. Riedl, "G2G e-government: the big challenge for Europe," *Unpublished master's Thesis. University of Zurich,* 2004.

[61] A. W. Scheer, H. Kruppke, and R. Heib, "E-Government: Prozessoptimierung in der öffentlichen Verwaltung," *Springer Verlag,* 2003.

[62]   Y.-B. Joo and Y.-G. Kim, "Determinants of corporate adoption of e-marketplace: an innovation theory perspective," *Journal of Purchasing and Supply Management,* vol. 10, pp. 89-101, 2004.

[63]   P. Chwelos, I. Benbasat, and A. S. Dexter, "Research report: empirical test of an EDI adoption model," *Information systems research,* vol. 12, pp. 304-321, 2001.

[64]   W. T. Robinson, "Product innovation and start-up business market share performance," *Management Science,* vol. 36, pp. 1279-1289, 1990.

[65]   E. Mansfield, "The diffusion of flexible manufacturing systems in Japan, Europe and the United States," *Management Science,* vol. 39, pp. 149-159, 1993.

[66]   R. T. Frambach and N. Schillewaert, "Organizational innovation adoption: A multi-level framework of determinants and opportunities for future research," *Journal of Business Research,* vol. 55, pp. 163-176, 2002.

[67]   A. Y. Akbulut, P. Kelle, S. D. Pawlowski, and H. Schneider, "To share or not to share? Examining the factors influencing local agency electronic information sharing," *International Journal of Business Information Systems,* vol. 4, pp. 143-172, 2009.

[68]   K. Gengeswari, A. Hamid, and A. Bakar, "Integration of electronic data interchange: a review," *Jurnal Kemanusiaan,* pp. 63-69, 2010.

[69]   D. Ray, "Adoption of Interoperable e-Government Systems: A Research Perspective," *the National Informatics Centre,* 2010.

[70]   S. L. Caudle, W. L. Gorr, and K. E. Newcomer, "Key Information Management Issues for the Public Sector," *MIS Quarterly,* pp. 171-188, 2010.

[71]   S. S. Dawes, "Interagency information sharing: Expected benefits, manageable risks," *Journal of Policy Analysis and Management,* vol. 15, pp. 377-394, 1996.

[72]   D. Landsbergen Jr and G. Wolken Jr, "Realizing the promise: Government information systems and the fourth generation of information technology," *Public Administration Review,* vol. 61, pp. 206-220, 2001.

[73]   G. Zaltman, R. Duncan, and J. Holbek, "Innovations and organizations," 1973.