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DEVELOPMENT OF E-GOVERNMENT PAYMENT PORTAL: A CASE STUDY FROM A DEVELOPING COUNTRY

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Abstract

The purpose of this study is to understand how interactions between structure and agency shape e-government portal development in developing countries and how these are managed to arrive at an outcome. The need for the research emerged from growing concerns that there are few studies addressing the pre-adoption stages of e-government portals. The research used the development of an e-government payment portal in Ghana as a case study. The structuration theory was adopted as the analytical lens. The findings show that technical and political interactions such as testing, expert reporting, design, and blurry as well as overlapping authority shaped expert validation, expert reporting, payment workflow, security and privacy structures. Although the case is based on the experience of Ghana, the findings can be applied to other developing countries with similar experiences. The study offers implication for research, practice and policy makers as well as future recommendations.

Keywords: e-government development, e-payment, structuration theory, interpretive study, developing country, Ghana

1.0 Introduction

The purpose of this study is to understand how interactions between structure and agency shape e-government portal development in developing countries and how these interactions are managed to arrive at an outcome. Earlier on, e-government started from websites, but then websites became disparate. Therefore, the idea of e-government portals was to bring disparate websites into a one-stop e-government solution (Melin & Axelsson, 2009). The study focuses on the experiences of an e-government payment portal development in Ghana to understand how structure and agency shape each other from a developing country perspective.

E-Government is defined as the use of information and communications technology to aid in interaction and delivery of information and services from governments to all relevant stakeholders (Cupido & Ophoff, 2014). Portals are web-based applications that provide users benefits such as personalization, single-sign-on to all applications, and improved content management ability from different sources (Gmelch & Pernul, 2011). An e-government payment portal can be in the form of a web portal which refers to all the automated processes in the exchange and transmission of monetary values over the information and communication technology networks among various stakeholders which include governments, citizens and businesses in a business transaction (Ayo & Ukpere, 2010). Structures are rules and resources organized as properties of social systems (Giddens, 1986) existing as memory traces in the minds of agents (Walsham, 2002). Agency refers to people's capability of doing things (Giddens, 1984). Interactions refer to the actions which knowledgeable agents carry out to achieve their goals which could be in the form of communication, power (control) and sanctions (justify) (Giddens, 1984).

For the most part, e-government literature has concentrated more on adoption, implementation, evaluation and interoperability of e-government portals (Murad, 2015). Therefore, not much is known about e-government portal development process and how the interactions between structure and agency (Giddens, 1984) shape such developments. Besides, very little is known concerning how the development of e-payment portals are shaped by interactions between structures and agency. For instance, studies on e-government growth stage models (Lee, 2010; Sahraoui, 2007; Siau & Long, 2005; Tripathi & Gupta, 2014) suggest where payments applications should be introduced thereby viewing them as logical continuation of e-government services. However, there is no discussion on the development of such public-sector payment applications from the portal viewpoint and how interactions between structure and agency shape such developments.

Also, the large number of public-sector stakeholders with many different rules and policies governing their payment processes make such portal development complex. Furthermore, developing countries are faced with complex socio-cultural, political, educational, governance challenges which lead to change processes that occur over long periods (Walsham & Sahay, 2006) making context-based approaches most appropriate (Schuppan, 2009). Studies on context-based challenges during the development of e-government payment portals would help to: 1) improve understanding of the context in which the portals are being developed and 2) provide best management practices of how structure-agency (Giddens, 1984) interactions could be managed to ensure success in e-government portals development.

The research question motivating this study is to understand how interactions between structure and agency shape the development of e-government payment portals in developing countries. Ghana as a developing country is the focus because over the years, e-government portals are being developed. One of such portals is the e-government payment portal. Aside that, this study is a response to the call by Walsham & Sahay (2006) to provide more emphasis on the meaning of development and the role of information and communication technology in the development agenda of developing countries such as Ghana. In order to provide answers to this question, the study uses the interpretive case study (Walsham, 2006) as the methodology and the structuration theory as a sensitizing device (Giddens, 1984) to

analyse the case. This study is novel due to the fact that it is the first paper to discuss significantly the interaction between structure and agency and its management in government e-payment portal in a developing country.

The rest of the study is structured as follows. Sections 2 and 3 review and discuss literature on portal development and public sector e-payment respectively. Section 4 discusses the structuration theory as the analytical lens. Section 5 discusses the research methodology, data collection and data analysis. Section 6 presents the research setting and case study findings followed by analysis and discussion of the findings in the Sections 7 and 8. Finally, Section 9 concludes the paper, outlines its contribution, implications and suggestions for further research.

2.0 Web Portal Development

Web portal development is defined as a ‘dynamic, multi-dimensional process, in which a development outcome emerges unpredictably from complex and reciprocal interactions between people and technology within an organisational context’ (Meleod & Doolin, 2012).

While there is a general consensus that web portals have changed the way institutions operate (Banday & Sheihk, 2010), the arguments rise from the methodologies to use (Vidgen, 2002) in their development. For instance, Vidgen (2002) calls for web-based methodologies due to the direct impact on business strategy, incorporation of sales and marketing skills to address customer needs, and the unique combination of traditional Information Systems Development (ISD) skills and graphic design abilities. Kumar & Sangwan (2011) proposed the Web-based Development Lifecycle (WDLC) with planning, modeling, construction, deployment and communication phases. While the System Development Lifecycle (SDLC) has the analysis and design at separate phases (Hizazi et al., 2014), the WDLC combines them into one phase called modeling with the introduction of aesthetics and navigation at the design level (Kumar & Sangwan, 2011). This methodology emerged out of the many critiques that suggest that the Web-based applications have different needs which cannot be better developed using the traditional Systems Development Lifecycle (Kumar & Sangwan, 2011; Vidgen, 2002). Generally, methodologies proposed range from a minimum of four (Howcroft & Carrol, 2000) to a maximum of ten phases (Huang et al., 2010). To streamline these, Abdul-aziz et al. (2012) proposed a refined WDLC which combined the publishing and maintenance phases into web systems operations.

Web portals need to meet the expectations of many stakeholders such as maintenance team, users and funding partners (Sajjad & Hanif, 2010) thereby making it more complex. Two schools of thought namely aesthetic and functionalist schools (Banday & Sheihk, 2010) prevail. The Aesthetic school of thought promotes graphical features while functionalist school argues for quality functional areas to the detriment of aesthetic. These ideologies inform how requirements are gathered. Communication barriers and increased tacit knowledge (Sajjad & Hanif, 2010) as well as mishandling of structure-agency interaction could lead to failure of portal development especially in the public-sector.

3.0 Public Sector E-Payment

For public sector electronic reforms to be successful, there is the need for the government to introduce well-laid mechanisms and payment processes (Wittmann et al., 2007). Public-sector e-payment systems ensure speed and accuracy of transactions (Singh, 2002) and also, its ubiquitous feature provide a more convenient means for citizens and other stakeholders to transact with the government (Deakins & Dillon, 2002). While this is true, the introduction of unreliable electronic payment systems due to various challenges from the technology itself, the people and the management of such payment services could also lead to total loss of trust by the same groups of citizens and other stakeholders. Therefore, the development of e-payment systems requires full participation from all stakeholders so as to ensure its maximum benefits.

Electronic payment systems could be categorized into online credit card payments, electronic cash, electronic cheques and small payments (Yu et al., 2002); direct debits from bank accounts (Treiblmaier et al., 2004); and mobile payment systems (Kushchu & Kuscu, 2003). Each of these have their advantages and disadvantages. For instance, credit and debit cards allow users to purchase items either on credit or based on the amounts they have in their accounts, however, the frequent news of hacking and subsequent purchase with other peoples' credit/ debit cards serves as a source of worry for users.

Pousttchi (2008) describes mobile payment as the use of communication techniques with mobile devices for initiation, authorization or completion of payment. Mobile payment services could be in the form of sending Short Message Services (SMS) to shortcodes, using near field communication (NFC), radio-frequency identification (RFID). Mobile payment systems appear to be more convenient for most users as they only spend what they have and it is therefore not surprising when Kushchu & Kuscu (2003) suggested the use of mobile devices in the assessment and payment of government services. However, limited and frequent network coverage and downtimes, especially in the developing countries (Ahsan et al., 2012) serve as a deterrent to using such platforms for payment purposes. Therefore, Treiblmaier et al, (2006) recommend that governments provide policies that will enhance the frictionless use of e-payment services in the public sector. While this is good, mishandling of structure-agency interactions during the development of such portals may not generally promote use even with the best policies available. There is therefore the need for more studies on the proper management of interactions between structure and agency during development of such portals in order to promote use.

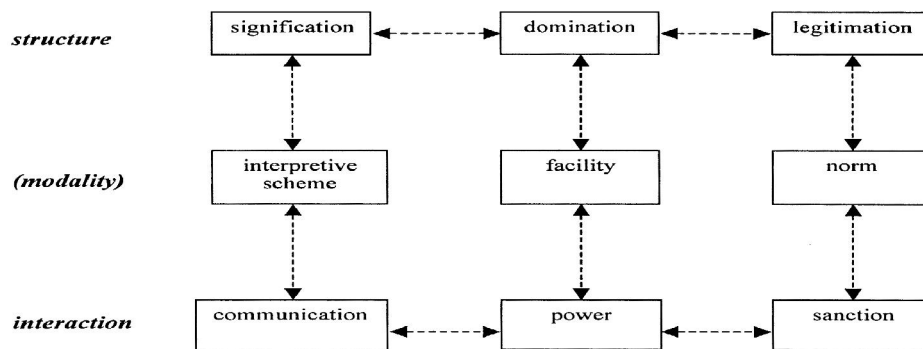
4.0 Structuration Theory

This study draws on the structuration theory (Giddens, 1984, 1986) as the analytical lens. Described by Giddens as the 'ontology of social life', the heart of this theory is the treatment of social structure and human action as duality rather than dualism. Therefore, the purpose of the theory is to emphasize continuous social structure reproduction as well as explain the tensions between social structures and human agents (Giddens, 1986) as two sides of the same coin (Chu & Smithson, 2007).

Structure are the 'rules and resources, recursively implicated in the reproduction of social systems and exists only as memory traces, the organic basis of human

knowledgeability, and as instantiated in action' (Giddens, 1984, p. 377). In this study, structure refers to the policies, rules, standards and conventions which shape and are shaped by interactions in the public sector of Ghana. Structure is produced and reproduced by enabling and constraining agent interaction. Agents perform social actions based on these memory traces of which they are knowledgeable (i.e. what they know about what they do and why they do it) leading to the production and reproduction of social structures. Agents are the developers of the e-government payment portal. The agency and other stakeholders have in their minds the reinforcement of the structure of the rules and resources (Walsham, 2002).

Structure is divided into three: Signification - systems of meanings, Domination - use of facilities divided into allocative (i.e. access to materials) and authoritative (i.e. command over agents) and legitimation - norms of behavior (Giddens, 1984) all of which are inextricably interlinked. The human mind is composed of elements of each of these memory traces which aid actors in interaction (Walsham, 2002) within and between the institutions and have three corresponding dimensions of interaction to be communication, power and sanctions (Giddens, 1984). Structure and interaction are linked through modalities such as interpretive schemes, facility and norms (Giddens, 1986; Jones & Karsten, 2008). These structures are closely knit in reality but separate for the sake of analysis, however, they may contradict each other leading to conflict when agents are not satisfied with the current structure and feel motivated to take action (Walsham, 2002). Contradictions refer to the potential for conflict while conflict is the actual struggle between agents. Diagram is shown in figure 1.



Source: Adapted from Giddens (1984) p. 29

Figure 1. Structuration Theory

The upper part concerns structure and the lower part agency (interaction) while modality links structure and interaction. The arrows depict the recursive nature of the duality. Structure of signification and communication draw on the interpretive schemes which is the foundation of knowledge used to interpret events, exercise of power draws on structure of domination through facility (i.e. allocative or authoritative resources). Structure of legitimation and sanction draw on norms to determine which behaviour is acceptable or not. Through this theory, we investigate how social practices contribute to the production and reproduction of social structures and vice versa.

According to Jones and Karsten (2003), leading journals in information systems had published 200 papers on structuration theory by the end of 2002. For example, Walsham (2002) used it to analyze the role of culture in the production and use of

software. In order to answer the research question which is to understand how interactions between structure and agency shape the development of e-government portals in developing countries, we refer to structurational theory in light of the fact that this theory has the potential to explain the structure-agency co-shaping relationship.

5.0 Research Setting and Methodology

This study is part of a larger research into the various factors that shape the development of e-government portals in developing countries and how these factors are managed in order to achieve success. It is believed that once these factors are managed well, the recurrent failures often associated with e-government systems (Heeks, 2003) will be reduced.

5.1 Research Setting

Ghana is a lower middle-income developing country with about 25 million citizens and situated on the West Coast of Africa. For the past 15 years, there has been a steady rise in the use of the internet. However, there is a large part of its population (61%) in the rural areas where there are general difficulties such as lack of electricity, difficulty in getting mobile phone reception to make a call let alone assess the internet, payments have generally been through face-to-face cash payments. Digital divide is still persistent as many rural folks have less access to internet as well as to computers. Therefore, Ghana still has a long way to go in terms of information and communication technologies however, successive governments have capitalized on the growth of information and communication technologies to provide transparent and convenient services to citizens, businesses and other stakeholders who can afford. One of such portals is the e-government payment portal.

In terms of payment of goods and public services, individuals may have to travel long distances to the district or regional capitals to transact. Even within the urban centres, there is a widespread phobia for making payments through online means due to reasons such as security and privacy perceptions. Citizens were therefore making payments through physical means. However, the rise of electronic payments and increase in education has changed these perceptions of many citizens. This started from the ATM cards, eZwich card, VISA and MasterCard and currently various mobile payments. The introduction of the government of Ghana's e-payment portal allows all stakeholders to pay their taxes, make general payments and even allow other businesses to use the portal for their private businesses.

5.2 Research Methodology

The study uses qualitative research methodology (Myers, 2013) and underlying assumptions of the interpretive paradigm (Walsham, 2006) to understand the challenges during the development of the government e-payment portal. The interpretive paradigm is used because it falls in line with the researchers view that what is seen as real and the knowledge thereof are both socially constructed between the researcher and the participants (Myers, 1997). Therefore, this study seeks to understand the complex context within which the development of the government e-payment portal took place and how this shaped the final outcome. To better

understand this, the case study approach (Klein & Myers, 1999; Walsham, 1995) is used. Case study methodology is particularly useful when the researcher wants to explore a phenomenon within complex real-world scenario (Myers, 2013) such as what this study seeks to achieve. This philosophy informed the way data was gathered and analysed.

5.3 Data Collection and Analysis

The data collection was done from September 2015 to April 2016 from the National Information Technology Agency (NITA) referred to as 'agency' in this paper, the government agency responsible for the deployment of e-government portals, the solution vendor and some public-sector employees. The duty of the agency is backed by the NITA Act 771 signed into law in 2008. We gained access to the organizations through our personal contacts.

Through purposeful sampling and snowballing approach (Patton, 2002), we identified a government institution that had developed and supervised the e-payment portal development and used semi-structured interviews in collecting data from 18 participants which included directors, front and back officers, developers and other employees. These were individuals who were either directly involved with the development process and/or had knowledge of the development process. Averagely, an interview took 58 minutes. In all cases, we sought the consent of the interviewees to record and transcribe at a later time. There were some who were not comfortable with the recording. For such persons, we wrote down the answers being given. Furthermore, data were gathered through documents such as physical (minutes of meetings, reports from developers, technical documentations, manuals, brochures, flyers) or electronic means (the internet, institutional website).

In line with interpretive studies, data gathering and analysis took place concurrently (Klein & Myers, 1999; Myers, 2013; Orlikowski & Baroudi, 1991). Our aim was to understand how interaction between structure and agency shaped development of the e-government portal. We therefore drew on the concepts of signification, domination and legitimation and followed the interpretive mode of analysis (Klein & Myers, 1999) to understand this phenomenon. We did this inductively by continuously reading the data and reviewing documents on issues relating to signification, domination and legitimation. With time, we gained the trust of the employees and therefore gained further insights through informal conversations. Such data were immediately captured after the conversation to prevent us from forgetting. We separately analysed the data, but frequently met to discuss emerging issues and findings until an agreement was established. We went back to organizations for follow-up interviews whenever needed.

6.0 Case Description

6.1 Government E-Payment Portal Development

Payments such as returning taxes, paying for marriage, passport application, TV license, land document registration within public services in Ghana is characterized by frustrations such as spending the whole day outside the office for workers or not meeting individuals who offer the services because they are not around. Therefore, a company was selected through a bidding process to

develop an e-government payment system. A steering committee was formed to manage the development process. The development went through the requirements gathering, analysis, design, development and testing phases. Below are the details of each stage.

6.2 Analysis and Design Phases

The analysis phase began with the collection of requirements. The solution vendors had authority to visit any of the selected Ministries, Departments and Agencies (MDAs) to gather data. These processes were bureaucratic leading to delays. A developer said, “gathering data was a challenge. We spent many hours waiting for officers who never showed up”. Analysis revealed that, security and privacy of transactions were a major issue to be dealt with. Also, the concept of open government was to be considered as this would make transactions between Ghana and nationals of other countries in the sub-region easier.

Although having the same policy, in reality, payment processes from one ministry to the other were different. This was gathered from the various narrations given to the developers. “I collect all monies paid, issue receipt and send money to the bank weekly”, a cashier said. Another officer narrated, “Customers make payment at the bank and come to me with a banker’s draft and then I issue a receipt”. The developing company chose to automate the policies available as this would provide some standard across MDAs. The requirements gathered were communicated through the requirement specification document.

Different groups intentionally delayed information needed, some gave information which was unverifiable while others decided not to cooperate with the development team. The requirement gathering stage took longer than anticipated. A developer said “We believe we didn’t get all the information we needed. We had series of meetings with all stakeholders but were mostly not fruitful. We were behind the project schedule and therefore we decided to observe the actual payment processes to gather our own information. It was at this stage we decided to use waterfall model. This methodology was used since most of the payment processes were not streamlined”.

At the design stage, developers used the requirement specifications document to draw technical diagrams such as context-level diagrams, flowcharts, data flow diagrams, use case and entity relationship diagrams. These diagrams made it easier for them to explain to all the stakeholders concerning how the portal was going to work.

NITA is an agency supervised by the Ministry of Communication (MoC). Therefore, major decisions need approval from MoC. Although backed by law, there were instances where the agency’s directives were not adhered to, rather that of the Ministry of Communication was obeyed leading to various conflicts. A developer narrated, “we gave agencies a deadline to provide us with some specific data. We were however told on the submission day that the parent ministry had extended the deadline without making us aware.” The requirement specification document to develop a payment portal which stores transactions for a period was developed, signed and the design stage began. Once the issues at the analysis stage were somehow resolved, the design of the logical and physical models was smooth, however, the project was behind schedule.

6.3 Development and Testing Phases

Generally, Ghana is touted as the gateway to Africa due to its good democratic credentials and the fact that it's a coastal nation make it easier for individuals and groups as well as other governments from landlocked countries to use our Ports for imports and export businesses. Therefore, developers encouraged payment platform that will promote an Open Government so as to make transactions easier. Therefore, developers believed that the use of open source platforms will promote ease of transactions which will lead to open governments and finally make Ghana really the gateway to Africa. The development tool used for the payment portal was the enterprise edition of Magento (an e-commerce open source platform) which came with extra features and support. MySQL database and Apache web server were used. The selection of the development platform was based on: 1) evidence of security and reliability provided by solution vendor, 2) procurement issues involved. The systems development methodology used was the waterfall model.

The Magento community provided some resource specifications such as the operating system, the type and version of web server, the scripting language, database, a valid security certificate and either the Mail Transfer Agent (MTA) of SMTP as the mail server which had to be acquired. A pilot data centre was created in order to make the development and configuration processes smooth. "We had to work around the clock to get these done. We already had enough resources such as funding.", a director said. The permanent consultant who was employed by the supervisory agency made sure that the development of the portal met standards that the stakeholder team had agreed upon.

The portal was built to integrate other e-services portals as well as other systems and payment gateways from stakeholders such as Ghana Revenue Authority (GRA), VISA, MasterCard, Payall (cash and cheque), MTN and Airtel Mobile Money Transfers, the various Bank Transfers and eTranzact. This was done through the installation of an Application Programming Interface (API) on the e- payment portal which was supposed to link to the other payment gateways. "The waterfall approach worked best to our amazement. Even though the project delayed, we realized that without that approach, we may not have completed by now" a developer narrated.

The e-government payment portal was developed to keep only the addresses of individuals or businesses for shipment or courier purposes. All other details such as the card details, and transaction details are kept on the payment platforms of the other stakeholders. Hence, the e-payment portal serves as a link to these other platforms by bringing the different gateways together through the portal. The next phase was testing.

This phase involved three major stages. 1) technical test to correct syntax and logical errors was done by the agency. All errors identified were communicated to the solution vendor at a stakeholder meeting. An officer said, "We found quite a number of logical errors". 2) A third-party company was contracted to test for security flaws. 3) user test was done by the various MDAs. Most of the users refused to test the system for various reasons: 1) their views were not accommodated, 2) computer illiterates and 3) as a form of protest. However, a directive from higher authorities forced these agents to use the portal. "I didn't have any option but vowed to resist any pressure to declare my colleagues, especially the cashiers redundant", an employee

said. The whole project ended with a formal meeting which handed over the work to government.

7.0 Analysis of Findings

The section uses the concepts and principles of structuration theory namely, structure of signification, domination and legitimation to analyse the case presented above.

7.1 Structure of Signification

Two structures of signification namely, open government as well as security and privacy influenced the requirement specification document. With the open government, developers argued that open source platforms would promote a portal where other portals could be easily connected to in the future. Developers also argued that the use of open source would encourage future connections and expansion of the e-payment portal to other countries within the sub-region in order to promote transactions among these countries.

On the part of security and privacy, users raised questions regarding how secured open source application were, who to communicate with in situations where they had issues and how payment details of citizens and other stakeholders could be kept safe from intruders. This was in sharp contrast to the developers believe who argued that open source applications were much more secured due to the fact that they have been improved by many developers over the time. Employees drew upon their knowledge of what the policies on secured payment systems and privacy of individual transactions meant to disapprove of development through open source platforms. On the other hand, Ghana is touted as the gateway to Africa. The developers believed that using open source platforms for the development of the government e-payment portal was a way of promoting an open government payment system which allowed for direct transactions across the sub-region thereby making Ghana truly the gateway to Africa.

7.2 Structure of Domination

Structures of domination (authority and resources) in the form of power to shaped the development of the government e-payment portal. This was done through the use of facilities such as MySQL, enterprise edition of Magento and Application Programming Interfaces (APIs) which served as connection interfaces between other stakeholders such as the GRA, VISA, MasterCard, eTransact and Telco's who operate the mobile money services and the government e-payment portal. Also, pilot data centre with server, network, software and security requirements were setup by NITA for the portal to be tested.

Through technical interactions, developers drew on their understanding of the structure of public-sector payment workflow to develop technical reports such as context-level diagrams, flowcharts, entity-relationship diagrams and use case diagrams. These technical interactions took place between NITA and the development company. These technical interactions in the form of diagrams made it easier for developers to explain to other stakeholders the logical workflow of the e-payment portal.

In terms of allocative resources, authorities sought enough funding from external sources. They installed the hardware and software required for the development of the portal alongside the development. Though given the authority to manage the process, the agency's activities were constrained and enabled by the Ministry of Communication (MoC). Political interactions influenced the structure of expert project reporting. In that, decisions appeared not to be based on technicality, but how it appealed to the politician. Political machinery may want to act in a way that will lead them to gain political support from the electorate during elections hence their frequent interferences with the decisions of the mandated technical agency. The back and forth movement between the agency and the MoC affected the development schedule. Some technical decisions were repealed and new ones made without officers of the agency being made aware of. By operating this way, the structure of expert project reporting was maintained as this has been the case over the years. However, the employment of an experienced IT specialist as a permanent consultant changed this structure of expert project reporting. In that, authority was vested in the consultant who took decisions and presented to the parent ministry. However, another new challenge that erupted was the delay in giving consent for such decisions taken by the consultant leading to delay in the project completion.

The decision to either use open source platforms or proprietary development platforms led to a standstill which eventually led to a delay in the general project. At a meeting organized by the NITA between the developers and the steering committee, a decision was taken to use the enterprise edition of Magento as this comes with extra features that are supported. Therefore, the combined their knowledge of the Magento platform and their understanding of the structures of web interface and public sector payment form design to develop the interfaces of the e-payment portal. Also, to ensure security and privacy of transactions details, it was decided by the steering committee that the portal was not going to store transactional data but only shipping address of users.

7.3 Structure of Legitimation

Structures of independent expert evaluation were used to sanction (justify) whether the portal met the portal requirements in the requirement specification document. Testing interactions occurred place between NITA, employees of some selected MDAs and local expert company. Three different testing groups evaluated the portal. Technical testing to confirm that the portal was free off logical and syntax errors, security and stress testing to make sure the government e-payment portal met the security standards mentioned in the requirement specification document and user acceptance testing to promote user friendly interfaces.

The interactions of the three structures and their corresponding actions led to the current e-government payment portal which only stores shipping addresses thereby serving as an intermediary between the government services portal and other payment gateways.

8.0 Discussion of Findings

Based on the research question: how does the interaction between structure and agency shape the development of e-government payment portals in developing countries and the literature reviewed, this section discusses the findings. Two broad

types of interactions that emerged out of the analysis are technical and political interactions.

8.1 Effect of Technical Interactions

Findings from the study show that technical interactions such as open government (Ruijter & Huff, 2016) could promote an unofficial agenda which could shape the structural properties of an e-government portal leading to unintended consequences (Yeo & Marquardt, 2015). Also, these could shape which tools to use for the development such as open source (Björgvinsson & Thorbergsson, 2007) in this case as well as the methodology employed. Therefore, structures (Chu & Smithson, 2007) within the portal emerge unpredictably from these complex technical interactions (McLeod & Doolin, 2012).

Findings from this study show that context plays a major role in deciding the appropriate lifecycle crucial to the success in the development (Gordon & Bieman, 1995) of such complex portals. From the case study, the use of the waterfall model which has been touted mostly as having major challenges was used to successfully develop the portal. Knowledgeability which is one of the principles of the structuration theory (Giddens, 1984; Jones & Karsten, 2008) suggests that people have knowledge of their day-to-day activities. The developer's knowledge of the complexities in the context and how the waterfall model works led them to choose this development approach. This finding shows that the most touted disadvantage of the waterfall model could become one of its greatest advantages (Saxena & Upadhyay, 2016) in situations where there are frequent changes.

Findings further show that, in the event where the development team is from the private sector, the involvement of an intermediary technical agent who knows and understands how both the private and public sectors work and is also committed to the ideals of the government is crucial to success of the e-government portal. One major contribution to the development of the e-government payment portal was the employment of a permanent and skilled IT personnel who once worked in the private sector as a consultant on the project. This consultant was employed and paid an equivalent rate of what pertains in the private sector with other benefits. There was, therefore, a thorough scrutiny of the system whenever deliverables were made to ascertain whether they met local and international standards or not. Serving as the project coordinator, the consultant provided direction to the development. This took away the perennial challenge where third party private organizations who won bids to develop systems for governments did not undergo proper scrutiny from government.

8.2 Effects of Political Interactions

The study shows that the lack of clear boundaries of power between political and technical entities could lead to contradictions and conflicts during the development of e-government portals. From the case study, the development of the payment portal was made up of different and overlapping levels of power which to a large extent stifled its actual objective. For the purposes of this paper, authority is divided into upstream (between the supervising agency and managing agency) and downstream (between the supervising agency and development team). While the recurring downstream domination was good for the development and achievement of the actual outcome, the constant usurping of power from the supervising agency led to various

degrees of conflict. For instance, on the part of power due to allocative resources, there were developing partners who insisted on how the project should be carried out leading to what we term 'diplomatic conflicts' in instances where there were disagreements.

The development of e-government portals with complexities in terms of institutional size and change procedures (Anthopoulos et al., 2016) requires understanding of the joint progression of a lot of administrations conveyed over the system, which regularly communicate with each other (Sun & Li, 2014). The lack of clear boundaries of authority inhibited regular communication leading to poor collaboration between the two-supervising agencies and the final delay in the project. While the exchange of power between the agencies was saddled with various contradictions, that of the agency and development team was cordial. This is because both groups were technically oriented and therefore drew on their collaboration to get the job done.

9.0 Conclusion

This aim of the study was to understand how the interactions between structure and agency shape e-government portal development. The study highlights the desire to meet certain unofficial agenda could shape the structural properties of e-government portals leading to unintended consequences; the choice of a lifecycle is dependent on the developer's knowledge of the development context; technical intermediaries with fair knowledge of both private and public-sector practices and standards positively shape the development of e-government portals and finally, the presence of unclear and overlapping power boundaries hinders collaboration leading to contradictions, conflicts and delays in the development of e-government portals.

The study comes as a first attempt to investigate and provide rich insights on how the interaction between structure and agency in developing country environments shape development of e-government portals. The originality of the paper, stems from its application of the structuration theory to investigate the phenomenon. In terms of research, the paper demonstrates the applicability of the structuration theory to the domain of e-government portal development. With respect to practice, the implication is that outcome of e-government portal development is subject to how interactions between structure and agency are managed. Furthermore, the study suggests that e-government practitioners go beyond the technical and place equal attention on socio-political issues as they inform success or failure of such portals. For policy implications, the study implies policies that encourage the employment of technically savvy personnel in the public-sector of developing countries, enhance communication, promote clear separation of powers between agencies that interact for project success as well as provide clear guidelines to enforce policies.

In terms of limitation, this study focusses on one country which may have different contextual issues from other developing countries. Nonetheless, the study can be generalized to other countries that have similar contextual issues as this is in line with interpretive studies. What will be interesting to know will be how the various contextual issues between structure and agency specific to other developing countries shape e-government portal development. With regards to future studies, this paper calls for research into context-based web portal development approaches which consider specific sociotechnical issues so as to lead to success in development.

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