Development of Government-to-Employee Portals: A Developing Country Case Study

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Abstract

The purpose of this study is to understand how social structures shape the development of e-government portals and vice versa. E-Government portal research has focused on adoption, service delivery, accessibility, challenges, failures, evaluation and less on the co-shaping relationship between structure and interaction. Therefore, a knowledge gap exists on how social structure and interactions co-shape each other. This study focusses on the experiences of how the social structures shaped the development of a government-to-employee portal and vice versa in a developing country. It uses interpretive case study approach as methodology and the structuration theory (ST) as analytical lens to understand the how structure and interaction co-shaped each other. The findings show ST can explain the co-shaping relationship between structure and interaction from a developing country perspective. This study contributes to research, practice and policy by offering rich insights into how social structures and interactions co-shape each other.

Keywords


Introduction

The purpose of this study is to understand how social structures shape the development of e-government portals and vice versa. To address this gap, findings from the case of development of a government-to-employee portal (called, e-workspace) in a developing country public sector is studied. The use of information technology to provide government services to its citizens, employees, businesses and other stakeholders is termed e-government (Cupido & Ophoff, 2014). Governments improve their workflows through the use of e-government portals. An internet-based application which provides users the opportunity to access all resources through the use of a single sign-on is described as a portal (Gmelch & Pernul, 2011).

Literature on e-government portals largely discuss the challenges, failures, problems of accessibility, service delivery, service quality, improvement of service techniques, behavior toward use, and lack of political will among others (EL-Haddadeh et al., 2010; Mohammad & Lan, 2012; Nawaz & Thelijjagoda, 2015). Therefore, not much is known about how social structure shapes e-government portal
Development of G2E Portals: A DC Case Study

development. Indeed, even among developing countries, diverse difficulties require distinctive ways to
deal with e-government activities (Heeks, 2005). Subsequently, there is the need for various developing
nations to identify and understand their major e-government development initiatives (Zarei et al., 2008)
and how such development processes are shaped by social structure so that they can contextualize these
development strategies (Luna-Reyes & Gil-Garcia, 2011) to meet their particular relevant needs.

The research question motivating this study is to understand how social structures shape development of
e-government portals vice versa. The study employs an interpretive case study approach (Walsham, 2006)
and structuration theory as theoretical lens to address this question. Developing countries such as Ghana
are faced with complex socio-cultural, political and governance challenges which lead to change
processes that occur over long periods (Walsham & Sahay, 2006) making context-based approaches
most appropriate (Schuppan, 2009). Therefore, studies on social structure-agency interaction during
the development of government-to-employee portals in Ghana will help to: 1) improve understanding of
the Ghanaian 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. Also, this study is novel due to the fact that it is the first paper to
discuss significantly how social structures shape the development of government-to-employee portals in
Ghana given its numerous socio-technical challenges.

The rest of the study is structured as follows. The next section reviews literature on information systems
(IS) and of e-government portals from developing country perspective. The sections following that explain
the structuration theory as the analytical lens for the study, followed by the methodology and then the
research findings. The discussion of the findings is presented followed by conclusion which outlines the
study's contribution, implications and suggestions for further research.

IS and E-Government Portals in Developing Countries

E-Government portal development has been described as dynamic and multi-dimensional with
unpredictable development outcomes from complex and reciprocal interactions between people and
technology within an institution (Meled & Doolin, 2012). Evidence suggests that there is increasing
introduction of e-government initiatives, however, literature has focused largely on adoption,
implementation, evaluation, interoperability of e-government portals (Murad, 2015) and challenges,
failures, service delivery, service quality, improvement of service techniques (Mohammad & Lan, 2012;
Nawaz & Thelijjagoda, 2015). Therefore, not much attention has been given to how structure and
interactions shape each other. E-Government goes past simply the presentation of innovation (Cottrill,
2001) into coordination and sharing of data (Choi et al., 2014) as well as the complicated task of requiring
changes in the business processes, the mindsets of system users and the function (Bigdelia et al., 2013).

E-Government portals are characterized by mostly highly heterogeneous environments and scattered over
large geographical areas and are ordinarily through complex collaborations and correspondence
framework among various government divisions (Sun & Li, 2014). Developing countries face issues such
as restricted web network and large amounts of PC absence (Nkohkwo & Islam, 2013). The complexities
are in terms of the organizational size, the change procedure and its comparing resistance by people etc.,
novelty, the impact on end users as well as the politics involved (Anthopoulos et al., 2016). Accordingly,
the development of such applications requires understanding the joint progression of a lot of administrations
conveyed over the system, which regularly communicate with each other (Sun & Li, 2014).

Public services have largely been made of paper-based structures which (Davison et al., 2005) which
create inefficiencies (Beynon-Davies, 2007) leading to information asymmetry and other related problems
such as inaccurate and less transparent decisions (Wiredu, 2012). E-government portals have the
tendency to eliminate such challenges (Venkatesh et al., 2010) by streamlining both horizontal and
vertical work processes (Janowski, 2015). Challenges such as the urge to fight improvements in business
processes (Fountain, 2003) and divisions in operation and politics (Irani, Love, & Montazemi, 2007) have
to be managed well in order to succeed.

E-Government project goes through five stages namely, project assessment, analysis of current reality,
design of new system, system construction as well as implementation and beyond (Heeks, 2006). Be that

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as it may, Tsai et al., (2009) suggest that with the exception of the planning stage which differs in terms of system objectives, constraints and scope, governments use the traditional systems development lifecycle.

**Structuration Theory**

This paper draws on the structuration theory (Giddens, 1984), as its theoretical lens. Giddens treats social structure and agency as a duality rather than dualism (Rose, 1998) implying structure and human agents shape each other (Giddens, 1984, 1986). Duality of structure is the heart of structuration theory (Walsham, 2002). Giddens defines structure as rules and resources existing as memory traces which are continuously drawn on in the production and reproduction of social systems (Giddens, 1984) and are separated into three namely, signification, domination and legitimation, domination. Signification refers to frameworks of implications, domination, the use of facilities divided into allocative (i.e. access to materials) and authoritative (i.e. command over agents) and legitimation as standards of conduct (Giddens, 1984) all of which are inseparably interlinked. A Social system is an organized and regular set of reproduced social practices between actors across time and space (Giddens, 1984) and constitute structures that enable or constrain human actions. In this study, structure is defined as the procedures, policies, conventions and standards that agents draw on their daily activities. Giddens further characterizes agency as the flow or pattern of people’s actions (Giddens, 1986) and made up of each of the memory traces listed above. Agents are divided into developers and employees in this study.

Structures have their corresponding dimensions of interactions as communication, power (i.e. capabilities of agents) and sanctions (i.e. to justify) respectively (Halperin, 2016) and these are linked through modalities, conceptualized as the specific knowledge drawn upon by an agent in their interactions (Orlikowski, 1992). These structures are closely knit in reality yet separate for the sake of analysis. Social systems either maintain a particular structure due to repetitions of the same rules and resources or change the current structure leading to unintended consequences through repudiating interactions (Walsham, 2002). Figure 1 shows a diagrammatic view of the theory.

![Figure 1 Structuration Theory](Image)

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. During interactions, humans draw on interpretive schemes which is in the form of stocks of knowledge to make sense of either their own actions or that of other agents leading to the production or reproduction of structures of signification. Power is utilized by agents in their interactions by drawing on facilities such as mobilization of resources and authority to produce and reproduce structures of domination. Finally, agents sanction (i.e. justify) the behavior through the norms of what is right or wrong in the interactions thereby producing and reproducing structures of legitimation. All these actions and inactions could lead to unintended consequences.

**Research Setting and Methodology**

The study was conducted at the National Information Technology Agency (NITA), the software development company which developed the portal and some selected Ministries, Departments and
Agencies (MDAs). NITA is the government agency in charge of the development of e-government portals in Ghana. Employee work and collaboration in the public-sector of Ghana has largely been manual with challenges such as misplacement of document, spending long days in meetings, delays in document processing, errors in content among others. Hence, the government through NITA decided to automate such workflows in order to curb these problems. This study sought to understand how social structures shaped the development of the e-government portal.

The qualitative interpretive case study (Walsham, 2006) approach was used. In order to provide not just rich insights into the phenomenon but also information in context sensitive areas (Conboy et al., 2012) like in this study, qualitative research was chosen. The interpretive paradigm was used because it followed the researchers mentality that both the research phenomenon and the resultant knowledge are socially constructed between the researcher and the participants (Klein & Myers, 1999; Walsham, 2006). Case study approach is better suited for this study because it provides empirical evidence (Myers, 2013).

Fieldwork for data collection for the study occurred between August 2015 and October 2016. Sources of data was through semi-structured interviews with 8 participants from NITA, 7 from the selected MDA’s each and 3 from the software development agency, informal discussions, document and artifact analysis (Myers, 2013). These participants included directors and employees from applications, business division and development unit of the software development company. The participants for the interviews were selected through purposeful and snowball sampling (Patton, 1990) by identifying employees from the three institutions who participated in the development and/or had knowledge about the e-workspace development. Consent was sought from the participants in instances where the interview was recorded and later transcribed. Additional data was gathered through informal discussions and further clarifications through personal visits. Further data was gathered through documentary which were either through physical (minutes of meetings, reports from developers, technical documentations, manuals, brochures flyers) or electronic means (internet, institutional website).

In line with the interpretive case study principles, data collection and analysis were done concurrently (Myers, 2013). We drew on concepts of the structuration theory and followed the interpretive mode of analysis (Klein & Myers, 1999) which was done through an inductive process that involved continuously reading the data and reviewing documents on issues relating to signification, domination and legitimation as well as principles and elements of duality of structure, knowledgeability space and time, contradictions and conflicts. We individually analyzed the data separately but frequently met to discuss emerging issues and findings until an agreement was established. There were follow-up interviews in cases where necessary for further insight. Feedback from these sessions were used to improve the analysis and findings.

**Case description**

Physical workflows dominate the public sector of Ghana. Documents are shared and kept through physical means and in huge cabinets. Registries of each Ministry, Department and Agency (MDA) serve as the first and last entry points for such documents. Documents received by a MDA are identified and classified into two namely, normal and confidential. These normal or confidential documents could be circulated within the same or different MDAs. Documents were kept at a particular MDA for some time and later transferred to the Public Relations and Archives Administration Department (PRAAD) for archiving and onwards supervised burning at a later date.

In 2008, the Electronic Transactions Act backed the appropriateness and by extension the acceptance of electronic documents and digital signature as a legitimate means of correspondence. The National Information Technology Agency (NITA) set out to virtualize the physical workflows of the MDAs. Project funding was from the China Exim and the World Banks. Two high definition scanners were bought for each MDA in order to help scan all documents which were still going to be sent manually. NITA first spoke with managers of the MDAs who bought into the idea of the benefits of such a portal. Together, these groups convinced sector leaders, who finally convinced the other junior workers of the benefits. These calmed down fears of job loss through redundancy. Most employees were therefore motivated to reduce the inefficiencies and challenges with their work and therefore, provided their support for the development of the portal. Development of the portal went through stages of requirement gathering, analysis, design and testing.
At the requirements specification stage, developers sought to understand how documents were created, shared and approved as well as how confidential documents were identified and classified. “A document is created when we have put together all the information needed either from one or multiple sources”, an officer said. According to another officer, “Documents are shared when copies of it are made to employees who have to either see to its preparation or when they have access to the final copy because they need to. An employees’ role determines what kind of document to create”. Finally, this stage demonstrated that documents were only considered approved when they had signatures of all the required stakeholders. “This meant that all proofreading had been done, cross checked and all legal basis have been analyzed”, a top manager said. The portal was named the E-Workspace and made up of three major components namely, Portal Content Management with the Meeting Management System (MMS), Document Management System (DMS) and the Intranet Portal (IP) as the sub-components; the Correspondence Management System (CMS) and the Unified Communication system (UCS). A local company won the contract and subcontracted the PCM and CMS to two offshore companies from Romania and India respectively while they developed the Unified Communications.

The two offshore companies developed the portals using different platforms. The CMS is divided into two parts, namely the document and capturing models. An enterprise content management platform was used to design the workflows of how documents are managed. The Captiva software was used for the capturing model and exported to the previous platform for further processing. “The second platform is relevant because until we are fully electronic, there will be many instances where people will still send hard copy documents. Therefore, this part of the portal is to capture the paper document in an electronic format”, a steering committee member said. The Portal Content Management (PCM) was developed using a proprietary software. This is made up of a Meeting Management System (MMS) and the Intranet Portal (IP). The MMS manages all meetings, creates meetings, attendees are invited through the system, organizing persons can check for the availability of the meeting venue. Currently, such meetings are held through the Government of Ghana Intranet Portal. A ‘create a document’ functionality to promote the conversion of data into information was developed. Another functionality called ‘share with me’ which allowed employees within the same or different MDAs to upload and share created documents. An email alert was developed to prompt employees who are added to the document uploaded.

IT officers and other officials of the MDAs went through the ‘trainer of trainees’ section and they went to train the other officers in their ministries. A back-end officer was appointed at NITA to handle all challenges reported by employees and were beyond these trainers. The local IT officers were therefore seen by other officers as the ‘champions’ of the portal in that they were given authority to change interfaces and add more features as and when needed.

The portal went through stress, security and quality assurance testing by a local IT Auditing firm, technical testing by PRAAD who raised some issues which were later rectified by developers and User Acceptance Testing (UAT) by employees of some selected MDAs before going live. The current state of the portal is that, one registration is needed for the e-workspace but login details are repeated in order to have access the other components of the portal.

Analysis of Findings

The case presented above is analyzed from the perspective of the three structural dimensions namely, structures of signification, domination and of legitimation. From the case, agents are divided into developers and employees. Developers are further divided into local and international programmers who participated in the development of the portal.

Structure of Signification

Structures of signification were drawn on by developers to interpret their understanding of the social structure during the requirement specification. The following are some signification structures identified: 1) User roles determine what kinds of documents to create and approve. 2) Employees collaborate by sharing documents. Firstly, a document is created when data is converted into information. Secondly, giving a copy of the created document to another employee means it has been shared. Shared documents could be in two forms: 1) documents are shared because more than one person need to work on its creation. In this case, documents are shared with all other relevant stakeholders in order for them to bring
their inputs and 2) final documents which have been created and approved are shared to the respective recipients. Thirdly, a document with the signature of all relevant stakeholders means it has been approved. Fourthly, a document with a seal and signature of the director means it is confidential.

**Interpretive Schemes**

Developers based on the explanation by employees and their knowledge of the public-sector document management workflow to understand and interpret the rules governing how documents were created, shared and approved. They also drew on the confidentiality identification and classification strategy to determine which documents were confidential or not.

**Communication**

Developers drew on the document management workflow (i.e. create, share and approve) discourse of the public-sector workflow to describe the functional and non-functional requirements of the e-government portal to be developed in the requirement specification document. To provide better understanding of the document management workflow, developers were shown two sample documents: an evaluation of tender document which had been created, shared and approved and an internal memo which had been created, yet to be approved and shared.

**Structure of Domination**

NITA drew on the authoritative resources given them by law to manage the public-sector IT to extend their authority to the local MDA IT officers to manage challenges which were within their control. At the same time, a back-end officer was appointed to manage challenges which were beyond the local IT officers. As a result of the appropriateness of digital signature policy, top directors were given the authority to use digital signatures. Also, based on the structure of managing confidential and normal documents, the portal generated specific primary keys to identify and classify confidential and normal documents. IT officers also had the authority to manage all issues arising through the use of the portal and those beyond them sent to the back-end officer at NITA.

**Facility**

Developers used a number of web development tools and resources during the development of the portal. An enterprise content management platform was used to design the workflows of how documents are managed and another content management platform was used in the development of the capturing model. Two high definition scanners to scan all manual documents into the e-government portal were provided to each MDA. The Portal Content Management (PCM) was developed using the Microsoft SharePoint 2013. Financial aid was sought from the China Exim and World banks by the government of Ghana to enable a smooth development process.

**Power**

Development of the portal went through stages of requirement gathering, analysis, design and testing. The two international developers used different platforms in their development. The e-workspace portal had sub-portals namely, Portal Content Management with the Meeting Management System (MMS), Document Management System (DMS) as the sub-components and the Correspondence Management System (CMS). A ‘create a document’ functionality to promote the conversion of data into information was developed. Another functionality called ‘share with me’ which allowed employees within the same or different MDAs to upload and share created documents. An email alert was developed to prompt employees who are added to the document uploaded. Another functionality to provide a chain of approvals and the final appending of the director's digital signature for both confidential and normal documents, letters, memos etc. was developed. Developers also programmed the portal to confirm the appropriateness or otherwise of the signature by setting a pixel range which was unique to the official signature pad. Once signature is signed, a functionality crosschecks the pixel to confirm or deny the appropriateness.
Structure of Legitimation

Two local companies, a private IT audit firm with reputation of testing software against local and international document management standards and PRAAD were given the power to evaluate the technical and logical competence of the portal. In terms of structuration theory, a legitimation structure, in the form of the reputation of these agencies, their knowledge of the requirements specification document and the Ghanaian public-sector policies on workflows, was used to sanction (justify) the appropriateness of the portal.

NITA and management of the MDAs had to explain the benefits behind the development of the portal. They were made aware of how it was going to make work easier, reduce the burden of workers, especially the registry workers and other officers who frequently attended meetings within and outside of their Ministry thereby promoting new organizational norms of enhancing correspondence. As a result, most workers sanctioned such a development, gave their support and also promoted the need for such a development.

Norms

Requirement specification document generated out of the requirements gathering stage served as the basis of evaluating the legitimacy of the e-government portal. Also, policies from the Public Relations and Archives Administration Department (PRAAD) and the Electronic Transactions Act 2008 were used to test whether the e-government portal met other public policy documents critical for the daily use.

Sanction

The e-workspace portal was sanctioned (justified) through stress, quality, security, logical and user acceptance testing by an independent local IT firm, PRAAD, and employees of some MDAs. Issues raised by both institutions were rectified by developers.

Summary of Analysis

Structures of signification were communicated by the developers through the requirements specification document. Structures of domination were represented through the development of the e-workspace portal. The base document for the development of the e-workspace portal was the requirement specification document. Finally, structure of legitimation was sanctioned by the evaluation of the portal by comparing the technical and logical flow of the developed e-workspace portal to the requirement specification document. In the end, the e-workspace portal had different components which required the same login details but different sign-in requests. Figure 2 below summarizes the how structure shaped interaction during the development of the portal.
Discussion of Findings

Based on the research question of how development and use of e-government portals shape social structure and vice versa and the reviewed literature, the following is discussed:

**Effect of Tactful Management of Contradictions on Social Structure**

Findings show that the tactful management of interactions during the e-government portal development could curb the challenge arising from public official's insistence on maintaining the current status quo (Anthopoulos et al., 2016) leading to unintended consequences (Giddens, 1984). This is evident in the case when some top management employees challenged the use of manual signatures and seal during use as well as the validity of the signing device leading to the introduction of specific digital signature pads at the final stage. Therefore, in the cause of providing e-government innovation (Cottrill, 2001), there is the need for diplomacy in coordination (Choi et al., 2014) and the tactful handling of the mindsets of agents (Bigdelia et al., 2013). Furthermore, while agents’ interpretation of initial structures could produce unintended consequences by shaping e-government portal development, continuous use combined with tactful management of contradictions that arise may lead to a cycle of co-shaping relationships leading from one unintended consequence to the other until the portal is found obsolete.

From this discussion, e-government portals could have multiple duality of structures. According to Giddens (1984), structures are not physical but are in the form of memory traces in the minds of agents (Walsham, 2002). However, currently, structures are inscribed in automated systems which recursively perform specific tasks. Agents (Orlikowski, 1992) could therefore be extended to automated software of which e-government portals are included.

**Challenges from Different Development Platforms**

The use of different development platforms could defeat the ‘single sign-on’ (Gmelch & Pernul, 2011) aim of portals as well as pose challenges to integration and sharing of information. Findings from the study show that while both horizontal and vertical communication (Janowski, 2015) as well as and sharing of information were key to the success of the portal, the different development platforms could not encourage a single sign-on. E-Government goes beyond just the introduction of technology (Cottrill, 2001) into integration and sharing of information (Choi et al., 2014). Therefore, findings show that in
instances where different platforms are used to develop a portal, an aim such as single sign-on may not be achieved.

**Conclusion and Future Research**

The study aimed at understanding how development and use of e-government portals shape public sector structure and vice versa. In addressing such a research gap on how structure and human actions shape e-government portal development, the research findings demonstrate that the effective and tactful handling of contradictions that arise as a result of portal development and use could curb the challenge arising from public official's insistence on maintaining the current status quo leading to unintended consequences. Based on the findings, the study has implications for information systems research, practice and policy. In terms of research, the study extends literature on information systems development and use by employing structuration theory and suggest the following: 1) e-government portals shape use; 2) use shapes re-development of portals; 3) use also shapes initial or original structures and 4) agents can be extended beyond human actions into systems. With respect to practice, the findings of the study offer government institutions on how public-sector developments and use of such portals shape interactions. For policy makers, findings of this study reveal the need to continuously review policies to take advantage of current practices.

The limitation of this study comes from its usage of the development of one portal however, based on the principles of interpretive study, findings are applicable to contexts with common characteristics. Therefore, being part of a larger study which captures how interaction and structure shape e-government portal development and use, future studies may have to consider a cross analysis of different developments and use of such portals.

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