



Improving the process of E-Government initiative: An in-depth case study of web-based GIS implementation

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ABSTRACT

Research on E-Government has largely focused on understanding the “outcomes and outputs of the E-Government project” [Yildiz, M. (2007). E-Government research: Reviewing the literature, limitations, and ways forward. *Government Information Quarterly*, 24(3), 646–665.]. It is argued that the existing research on E-Government tends to oversimplify the phenomenon. To address the call, the current study focuses on the process of an E-Government initiative by loosely drawing on the ‘technology enactment framework,’ in conjunction with the ‘systems development life cycle’ approach. Using a case study orientation, this study describes in detail how a geographic information systems implementation project is conducted at a local government in the United States. Insights into E-Government initiatives are presented and discussed.

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1. Introduction

E-Government is a special type of electronic business with particular objectives and characteristics (Garson, 2004). It utilizes the internet and web-based technologies to provide government services online to citizens, businesses, and other government agencies so as to bring about economic benefits (Andersen & Henriksen, 2006; Layne & Lee, 2001; Sprecher, 2000; Stratford & Stratford, 2000). There have been many E-Government initiatives for the sake of obtaining benefits in recent years. As E-Government becomes mature, the expectations for more interactive and responsive E-Government have also been growing (Norris & Moon, 2005). Implementing E-Government however requires careful planning as it is concerned with many issues ranging from managerial, organizational, and societal matters to technological, legal, and regulatory matters (Borins, 2002; Jaeger, 2002). Some of the issues may be concerned about the uniformity and accuracy of information and data, the compatibility between the legacy and new information technology (IT), the regulation and procedure placed by different level of government, etc. These challenges need to be carefully dealt with in order to achieve the intended goal of E-Government initiatives.

Much research in the field of E-Government has investigated the outcomes of E-Government and the factors that influence the effectiveness of E-Government. While it is important, such research provides little insights into the complex nuances of E-Government initiatives. Understanding of the process of E-Government implementation is still limited and largely remains as ‘black box’ (Yildiz, 2007).

Recently, there has been a call for researchers to pay more attention to the process of E-Government. Yildiz (2007, p. 647) claims, “E-Government research up to date for the most part limited itself to the study of the outcomes and outputs of the E-Government project. Thus, understanding the political process behind E-Government development is vital for overcoming both definitional and analytical limitation,” and also argues, “such an effort requires a historical understanding of the relationship between technology and administration”.

To respond to this call, the current study conducts an in-depth analysis of an E-Government initiative in order to gain a deeper understanding of the realities. We draw on the data from a Geographic Information System (GIS) development project conducted by a local government in the United States over several years, and conduct a case study analysis of employing observation, document review, and unstructured interviews, which allow us to study E-Government processes and the context of the phenomenon (Kaplan & Maxwell, 1994; Yin, 1994).

To provide detailed views of the case, we follow the systems development life cycle (SDLC) to highlight the activities and decisions made along the process of the GIS implementation. While analyzing the process, we loosely draw on concepts from the “technology enactment framework (TEF)” (Fountain, 2001). TEF is an approach to capture the complexity of the interaction between cognitive, cultural, institutional structures and the individual player’s assessment regarding every stage of adopting IT process. It stresses three issues that include (1) each instance of technology enactment is contingent on the organizational and institutional context, (2) how the IT is perceived, and (3) who attempts to shape the use of IT (Danzieger, 2004). This explanatory framework suggests that E-Government difficulties may lie rather in overcoming organizational and managerial challenges in creating new skills, new work rules, and new

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organizational structures to deal with new technology, but not just in achieving the technical capability of E-Government.

The purpose of this study is to provide insights for researchers and practitioners conducting E-Government initiatives, and to improve the process used for conducting E-Government initiatives. This study presents an approach that highlights the importance of IT governance in E-Government initiatives to effectively deal with external environments, as well as the internal environments confronting various challenges. This study contributes to both research and practice in two-folds. First, this study is one of few research articles in the E-Government literature that employs a process-based perspective on E-Government initiatives. Second, this study provides theoretically grounded understanding of the dynamics of planning, producing, implementing and managing of E-Government initiatives. It utilizes the technology enactment framework and the traditional SDLC process in order to formulate an approach for properly handling challenges and constraints in government organizations and enhancing the coordination in the E-Government initiative environment.

The rest of this paper is organized as follows. The next section provides a brief overview of the technology enactment framework, the challenges and constraints for E-Government initiatives, and the information systems development process. The research method is then presented followed by an in-depth description of the case. After that, we discuss the implications of this study with respect to TEF and propose an approach that addresses challenges and constraints faced by the E-Government initiative. The possible merits of the approach to overcome some challenges of the future E-Government initiatives are discussed. Finally this study concludes with a discussion of possible future research directions.

2. Theoretical background

2.1. Technology enactment framework (TEF)

The “technology enactment framework” (Fountain, 2001) provides a model for analyzing and understanding the underlying process of information and communication technologies implementation and adoption by governments. Drawing from literature on various theories including institutional theory, governance and bureaucracy, Fountain offers the powerful framework that helps explain about the relationship between the IT elements and the influence of the surrounding organizational environment on the use of such technologies.

According to the framework, both organizational environment (e.g., structure) and behavior of key actors determine the technology being enacted and its outcomes. The “objective IT” represents the hardware and software elements of IT. The “organizational forms” (e.g., bureaucracy or networks) refers to the context of IT use that affects how IT is enacted. The “enacted technology” captures the actor’s perception, design, implementation and use of IT, where the actor’s perception is influenced by “institutional arrangements” that may include cognitive, cultural, legal factors, etc. The “outcome”, which can be direct or indirect, is for actors to recognize the impact of enacted technology that in turn affects the organizational forms, institutional arrangements and enacted technology. The framework has been applied to case studies of E-Government implementation mostly at the federal level using both inter-agency and intra-agency aspects. It proves to be useful for investigating the context of E-Government, as well as for generating the strategies, due to the innovation of information and communication technologies in the organization (Fountain, 2001; Danzieger, 2004).

2.2. E-Government initiative: challenges and constraints

The traditional government computer based information systems were built on the basis of the closed and proprietary IT infrastructure (Chengalur-Smith & Duchessi, 1999). The capacity, function and

communication of these systems were mainly aimed to service the internal end users for increasing their productivity. The emergence of the internet and web-based technologies has made the government services more accessible, and organizations in the public sector are in fact facing increasing demand from the public, businesses and government agencies for E-Government. A successful implementation of E-Government requires careful planning in many regards. The integration between the new E-Government information systems and the existing internal systems has to be redefined in terms of IT elements and business processes (Fletcher, 2004). The rapidly emerging open and standardized IT environment has generated additional requirements such as security and privacy protection (Abie et al., 2004; Deakins & Dillon, 2002). Moreover, the characteristics of demand for E-Government services from the public are often uncertain and the client computing environment is largely unknown. These issues have posed a great amount of challenges for IT managers in the public sector who are charged for satisfying the service demand around the clock with acceptable performance level (Richardson, 2004).

Successful E-Government initiatives become possible only when managers in government agencies realize and deal with these challenges in an effective manner. The existing research suggests strategies to overcome the challenges for E-Government initiatives in terms of information and data, information technology, organizational and managerial, legal and regulatory, institutional and environmental categories (Gil-Garcia & Pardo, 2005). The challenges associated with information and data are inaccuracies, inconsistencies, incompleteness of data (Redman, 1998) and lack of appropriate data (Tayi & Ballou, 1998). To deal with these challenges, managers are advised to develop an overall plan that ensures the creation and sharing of high-quality data definition and structure through a consensus among appropriate partners (Wang, 1998; Keil, 1995; Orr, 1998).

The challenges associated with information technology category include security, technology incompatibility (Brown, 2001), the complexity and newness of E-Government projects (Barki, Rivard, & Talbot, 1993), the lack of relevant technical skills and/or the shortage of qualified technical personnel in the project team (Banerjee & Chau, 2004; Heeks & Davis, 1999; Jutla et al., 2002; Seneviratne, 1999), and the conversion of legacy information systems into a newer environment (Chengalur-Smith & Duchessi, 1999). The existing research suggests a variety of solutions that include building awareness of the technologies (Dawes & Pardo, 2002), staffing the project with IT professionals having the necessary technical expertise (Jiang & Klein, 2000), employing an appropriate systems development approach (Brown, 2000), and integrating governmental and non-governmental data, information and business processes. Suffering from limited resources, the government often adopts a mixed development approach that combines outsourcing, off-the-shelf software package, and in-house development (Franzel & Coursey, 2004) and hires external consulting firm(s) to work with its internal staff to develop and/or purchase ready made commercial software for the implementation of E-Government.

The organizational and managerial challenges range from the project’s size and diversity (Davis, 1982), the lack of alignment between organizational goals, and the multiple, or conflicting, goals for E-Government initiatives (Dawes & Pardo, 2002) to organizational resistance (Jiang & Klein, 2000; Edmiston, 2003). These challenges may be dealt with user involvement, providing appropriate financial and human resources (Regan & O’Connor, 2001; Barret & Green, 2001) and implementation of good strategic planning techniques (Dawes & Nelson, 1995).

Finally, government agencies are subject to laws, regulations and formal rules (legal and regulatory constraints), and they operate within the institutional and environmental constraints. These challenges may hinder the success of E-Government initiatives (Harris, 2000). Collective efforts or a coalition with other agencies may be used

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