Digital government transformation and internet portals: The co-evolution of technology, organizations, and institutions

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ABSTRACT

Researchers and practitioners around the world recognize the potential of information technologies to promote government transformation. This transformation has been understood in at least two different ways: (1) as a transformation of internal processes and (2) as a transformation of the relationships between governments and other social and political actors (institutional transformation). Unfortunately, there is little or no evidence of such transformation, and current studies reveal that for this transformation to happen, a better understanding of the complex relationships between information technologies, organizations, and institutions is still required. This paper presents a theory of the co-evolution of technology, organizational networks, and institutional arrangements in the transformation of government. The theory uses the grammars of system dynamics and builds upon institutional approaches to understand interactions among all these variables in the development of information and communication technologies in government. Although the theory suggests the relevance of some specific reinforcing processes in this transformation, the endogenous view used in the theory empowers all stakeholders by illustrating how transformation could be promoted from any individual position involved in the process of developing digital government applications.

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1. Introduction

Access to government portals via the internet has contributed to an information revolution around the world and improved the services that governments offer to their citizens via the Web. Similar to other countries, state governments in Mexico have a government portal on the internet with specific and unique characteristics. The levels of functionality of state portals in Mexico have been measured for several years now (Luna, Duarte, Gil-Garcia, Luna-Reyes, & Sandoval Almazan, 2012). While these studies showed the dynamics and development of new content and functionality in portals, they tell little about the history, structures, and processes that have made the development of such content and functionality possible. Although technological developments, such as the internet, the World Wide Web (WWW), and Web 2.0 tools, have played an important role in facilitating the development of new functionality in portals, they are not the only significant component that drives portal performance and evolution. Indeed, the development of functionality and content of state government portals as well as other digital government applications occurs over time because of complex interactions among organizational practices, inter-organizational networks, and institutional arrangements. Despite the fact that such relationships have already been demonstrated in the literature (Cordella & Iannacci, 2010; Fountain, 2001; Luna-Reyes & Gil-Garcia, 2011), a greater understanding of the specific way in which they operate and influence each other is still required, particularly in relationship to their capacity to generate transformation in government settings. In this way, the following question guides the research presented in this paper: what are the key variables and processes that facilitate government transformation through information technologies, such as government portals?

Accordingly, building on quantitative explorations of Mexican state government portals (Luna et al., 2012), this paper presents the case of one of the leading state portals in Mexico, the state of Puebla, its development since its creation in 2000, and its evolution to its status in 2012. Using the Technology Enactment Framework (Fountain, 2001) as a focus, the case offers an interesting illustration of the co-evolution and transformation of organizational, institutional, contextual, and technological components in order to generate instances or enactments of specific technologies.

The paper includes a conceptualization of this process of transformation using the grammars of system dynamics, which constitutes a preliminary theory underlying the government transformation using information technologies. The theory shows the existence of a series of reinforcing processes at the heart of the transformation process.

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These processes provide a feasible explanation for the perceived difficulties and problems in the implementation of information technologies in the public sector, given that reinforcing processes constitute potential traps preventing change. However, the endogenous view that we use to represent the evolution of internet government portals actually empowers stakeholders in different positions (development, legislation, etc.) to promote not only a successful implementation, but also government transformation and value creation. The theory also provides qualitative information that contributes to the existing research aimed at understanding success factors in the development of government portals and uncovering some of the dynamics behind transformational government. More specifically, the theory presented in this paper contributes to the existing literature by linking, in an operational way, the macro processes of transformation with the local activities of some of the main stakeholders in the development of digital government (Luna-Reyes & Gil-Garcia, 2011).

The paper is organized into six sections, including the foregoing introduction. The second section reviews relevant literature, particularly studies that apply institutional theory and other integrative models to government transformation using information technologies. The third section describes the research strategy and methods used to undertake this study. The fourth and fifth sections comprise a description of the portal's evolution and an analysis of several of its most important dynamics, respectively. Finally, the last section provides some final comments and suggests areas for future research about this topic.

2. Literature review

Information technologies have the potential to significantly transform the way in which governments perform their functions and relate to citizens, businesses, and other governments (Fountain, 2001, 2004; Jaeger & Bertot, 2010; Kraemer & King, 2006; Luna-Reyes & Gil-Garcia, 2011). The process of ICT-enabled government transformation had not begun 10 or 15 years ago when researchers and public administrators alike started to refer to the use of ICTs in government as electronic or digital government. Instead, the roots of this process lie in the introduction of ICTs to the government in the 50s and 60s, when government agencies began to automate repetitive and intensive tasks using large central servers or mainframes (Andersen & Dawes, 1991). The introduction of personal computers in the 80s significantly reduced the size and cost of processing and encouraged a widespread use of computers in public agencies. In the 90s, the internet and computer networks had brought new opportunities and challenges to public servants (Gil-Garcia & Luna-Reyes, 2008). More recently, the evolution of social media applications and tools continues to promote organizational and institutional transformations in the government (Bertot, Jaeger, & Hansen, 2012; Criado, Sandoval-Almazan, & Gil-Garcia, 2013; Picazo-Vela, Gutiérrez-Martínez, & Luna-Reyes, 2012).

Organizational transformation involving information technologies is a widely explored phenomenon in the literature. Three main views dominate the research in the area (Doherty, Coombs, & Loan-Clarke, 2006; Fountain, 2001; Gil-Garcia, 2012; Luna-Reyes, Zhang, Gil-Garcia, & Cresswell, 2005; Orlikowski, 2000): (1) technological determinism, (2) social determinism, and (3) a unified view.

Technological determinism considers technology as a powerful tool that can transform social structures (Fountain, 2001; Leavitt & Whisler, 1958; Orlikowski, 1992; Smith & Marx, 1994). From this point of view, technology is the main actor in the transformation process. This view, when applied to digital government, implies that IT applications, such as government portals, will have an effect on creating new forms of interaction between citizens and government or changing work practices or organizational structures.

From the point of view of social determinism, social groups assign specific meanings to technology (Bijker, Hughes, Pinch, & Douglas, 2012; Jackson, Poole, & Kuhn, 2002). In this way, each group and organization decides how to use any given technology based on their needs or

strategic changes responding to perceived changes in the environment (Eden et al., 2009; Gil-Garcia, 2012; Luna-Reyes, Hernández-García, & Gil-Garcia, 2009). In this way, different organizations may use a specific technology in different ways. Moreover, from this perspective, success of the implementation of the same technology could vary from one organization to another, depending on organizational characteristics, such as leadership or management practices. From this perspective, digital government applications, such as government portals and the specific functionality included in the system, will result from contextual, institutional, and organizational characteristics from each locality (Fountain, 2001; Gil-Garcia, 2012; Luna-Reyes et al., 2009).

Finally, the unified view suggests the existence of a two-way interaction between technology and social factors. Orlikowski (1992) identified several variants of this unified or "ensemble" view, which considers complex interactions between people and technology. In this unified view, technology implementations may result in changes in the social structures, which may result in technology changes (Baxter & Sommerville, 2011; DeSanctis & Poole, 1994; Luna-Reyes et al., 2005; Orlikowski, 1992). Some examples of theories that involve this unified view include the adaptive structuration theory, social informatics, the technology structuration model, socio-technical views, and institutional approaches, such as the Technology Enactment Framework (Gil-Garcia, 2012).

Institutional approaches provide a comprehensive reference framework for understanding government transformation through digital government applications, such as state government portals, considering not only technology, but also the context, forms of organization, and the institutional arrangements in which they are embedded (Cordella & Iannacci, 2010; Hassan & Gil-Garcia, 2008; Luna-Reyes et al., 2009). According to North (1999), "Institutions are the rules of the game in a society or, more formally, are the human devised constraints that shape human interaction" (p. 3). Institutions have also been understood as the collection of integrated rules, mechanisms for their application, and the organizations that support them (Scheela & Van Dinh, 2004). Institutions represent constraints created by options available to both groups and individuals, except that these constraints are subject to change over time (Barley & Tolbert, 1997). Institutions thus impose shared and typified rules that identify categories of social actors as well as their relationships. More broadly, institutions may also be understood as guides for action created by society and the individuals that form it (Giddens, 1984). Contemporary institutional approaches recognize the interactions between social structures (macro) and the actions and interactions among individual actors (micro). Therefore, the basic principle of institutional theory is that the actions of individuals and organizations are guided by institutions, which are at the same time replicated or modified through the collective action of individuals and organizations (Brinton & Nee, 1998; Giddens, 1984; Luna-Reyes & Gil-Garcia, 2011; Scott, 2001).

Many researchers have used institutional approaches to understand various phenomena in disciplines such as economics (North, 1999; Rutherford, 1999), political science (Peters, 2001), sociology (Brinton & Nee, 1998), and organizational research (Bansal, 2005; Powell & DiMaggio, 1991; Scott, 2001). Institutional theory has been useful in understanding organizational change and identifying the relevant aspects of the context in which information technologies are designed, implemented, and used (Bennett, Bouma, & Ciccozzi, 2004; Cordella & Iannacci, 2010; Fountain, 2008; Hassan & Gil-Garcia, 2008; Schellong, 2007). Following the institutional tradition, and in an attempt to explicitly include the role of technology from a comprehensive viewpoint, Fountain (1995, 2001) developed the Technology Enactment Framework (see Fig. 1). This theory explains the effects of the organizational forms and institutional arrangements on the technology used by the government agencies (Fountain, 1995, 2001).

Fountain (2004) stated that "two of the most important influences on technology enactments are organizations and networks" (p. 6) and gave examples of information technology enactments in comparable organizational contexts, but with very different results. She proposed that