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How is information shared across the boundaries of government agencies? An e-Government case study

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ABSTRACT

This paper explores how information is shared across the vertical and horizontal boundaries of government agencies. Different types of information sharing are identified and discussed in terms of their strengths and encountered challenges. Centralized types of information sharing are found as a primary strategy adopted to facilitate interagency information sharing in the two dimensions. Particularly, influential determinants from type comparisons and government agencies are identified and discussed regarding what agencies may take into considerations when selecting certain types of information sharing. While there is no single type of information sharing that can satisfy all the needs and concerns of government agencies, most agencies still simultaneously employ several types of information sharing in different circumstances. A competition-and-cooperation relationship exists among the different types of information sharing in both dimensions. The paper suggests that a balance between centralized and decentralized types of information sharing should be achieved to obtain advantages and diminish disadvantages. The similarities and differences between the types in the two dimensions are also compared and discussed. Lastly, the conclusion outlines the contribution and limitation of the current research and suggests future studies of the current work.

1. Introduction

With the development of information and communication technologies, e-Government has been an important strategy for attaining effectiveness and efficiency in government programs and public services (Dawes, 1996; Gil-Garcia, Chengalur-Smith, & Duchessi, 2007; Pardo & Tayi, 2007; Zhang & Dawes, 2006). According to U.S. Government Accountability Office (McClure, 2000), e-Government refers to government's use of technology to enhance the access and delivery of government information and service to citizens and government entities. Similarly, researchers define e-Government as the delivery of government services through the use of information and communication technologies to improve daily operations, reduce costs, and increase the quality of services (Bekkers, 2007; Moon, 2002).

Particularly, information sharing across the boundary of government agencies has become increasingly important in the public sector (Gil-Garcia, Chengalur-Smith, et al., 2007). Researchers have indicated the critical role that cross-boundary information sharing plays in the stages of e-Government development (Klievink & Janssen, 2008, 2009; Layne & Lee, 2001; Siau & Long, 2005). Under the rise of intricate inter-organizational services, government programs become increasingly interrelated. Government agencies not only face the job of managing their own programs but also have to connect seamlessly with closely related programs of other agencies (Kettl, 2006). Landsbergen and Wolken (2001) point out that interoperability across government agencies actually represents cross-boundary information sharing. With cross-boundary information sharing, more complex problems are able to be solved by effective actions (Canestraro, Pardo, Raup-Kounovsky, & Taratus, 2009; Landsbergen & Wolken, 2001).

However, cross-boundary information sharing in the public sector is a complex task. Related projects can be viewed as IT initiatives, which involve building systems, instituting standards, and changing business processes to enable government agencies to share information with other agencies and public organizations (Gil-Garcia & Pardo, 2005). While much of current information sharing literature in e-Government focuses on exploring the influential factors that raise the complexity of interagency information sharing (Gil-Garcia, Chengalur-Smith, et al., 2007; Gil-Garcia & Pardo, 2005; Pardo & Tayi, 2007; Yang & Maxwell, 2011; Zhang & Dawes, 2006), the objective of this study is to explore how information is shared across the boundaries of government agencies. Specifically, this paper investigates the adopted approaches for interagency information sharing, and in particular, the determinants that influence agencies' approach selection.

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The following section presents a review of literature in cross-boundary information sharing. The importance of cross-boundary information sharing in e-Government is first reviewed, and the definition and the complexity of cross-boundary information sharing are presented. In addition, different types of information systems interoperation are discussed and the proposed research follows. Next, the paper describes the research design and method detailing the case study, data collection, and data analysis. Then, the paper presents the results and findings of the empirical data analyses. The implications of the findings are also discussed. Finally, the paper ends with the conclusion by discussing the contributions, limitations, and directions for future research.

2. Literature review

2.1. e-Government development and cross-boundary information sharing

More and more researchers have recognized the importance of cross-boundary information sharing, especially in the e-Government research area (Cresswell, Pardo, Canestrato, Dawes, & Juraga, 2005; Dawes, 1996; Gil-Garcia, Schneider, Pardo, & Cresswell, 2005; Pardo, Cresswell, Thompson, & Zhang, 2006; Pardo & Tayi, 2007; Scholl & Klischewski, 2007; Schooley & Horan, 2007). No single organization has all the resources necessary to run its activities without inputs from other organizations (Pardo & Tayi, 2007). As a result, it is indicated that there is an urgent need to improve inter-organizational information sharing to facilitate the progress of e-Government development (Schooley & Horan, 2007). Particularly, several stage-models in e-Government development are proposed by researchers, and the critical role of cross-boundary information sharing is highlighted. Layne and Lee (2001) observe that during the developing stage of e-Government, most government information systems are separate and fragmented. Progress to integrate scattered systems across different levels and functions of government service is necessary if requested services from citizens rely on the retrieval of information from several agencies. Such need in cross-boundary information sharing exists both across different levels of government agencies (the vertical dimension) and among government agencies, even those with quite different functions (the horizontal dimension).

Klievink and Janssen's (2008, 2009) stage model conceptualizes e-Government collaboration from a single organization level to a nation-wide level. They claim that although many government agencies have integrated services within respective agencies, citizens and businesses still have to interact with several different agencies to acquire desired services. They assert an urgent need for effective information-sharing for both vertical and horizontal integration of information systems operated by government agencies. Similarly, in a five-stage model of e-Government development, Siau and Long (2005) link the success of e-Government to provide integrated and seamless services among government agencies in different levels and functionalities. They suggest that information sharing among government databases and systems is necessary to improve internal organizational management and to provide better public services.

Groznik and Trkman (2009) indicate that it is easier to achieve the early stage of e-Government, where information services are introduced. However, when entering the later stages of e-Government development, changes become more complex because there are needs to renovate administrative operation and business process, to synthesize different public databases, to alter current legislation, or to develop new organizational regulations (Groznik & Trkman, 2009). Similarly, Gil-Garcia and Pardo (2005) say that cross-boundary information sharing ranges from problem solving in specific programs to the need for enterprise capacity building in participating organizations. Likewise, the complexity of cross-boundary information sharing increases from the organizational level, the inter-organizational level, to the inter-governmental level (Gil-Garcia & Pardo, 2005).

2.2. Define cross-boundary information sharing

Despite the widespread interest regarding the topic, Barki and Pinsonneault (2005) claim that cross-boundary information sharing continues to be poorly conceptualized. They assert that cross-boundary information sharing is the collaboration or interconnection of different information systems or telecommunication technologies to share data between entities such as groups, departments, and organizations. Landsbergen and Wolken (2001) also indicate that cross-boundary information sharing represents interoperability across different organizations. Dawes, Cresswell, and Pardo (2009) explain that when there are public needs that no single organization or jurisdiction can handle alone, cross-boundary information sharing helps organizations move from a "need to know" default option to a "need to share" network culture, and it acts as a core element of the creation of public sector knowledge networks.

Furthermore, Gil-Garcia, Pardo, and Burke (2010) indicate that cross-boundary information sharing is a complex socio-technical phenomenon. They offer a preliminary definition of cross-boundary information sharing, and thus offer a foundation for discussions about the phenomenon. They propose that cross-boundary information sharing consists of four components: a) trusted social networks; b) shared information; c) integrated data; and d) interoperable technical infrastructure, which cover both technical and social aspects. Trusted social networks mean networks of social actors who know each other and trust each other. Shared information represents the sharing of tacit and explicit knowledge in the form of formal documents, informal talks, e-mail messages, faxes, etc. Integrated data is the integration of data at the level of data element standards. Interoperable technical infrastructure means systems that can communicate with each other at the hardware and operating system level.

By employing Gil-Garcia, et al.'s (2010) definition, the cross-boundary shared information can be referred to data, information, and knowledge. Similarly, other researchers suggest that information sharing not only confines explicit artifacts and codifiable information such as electronic records, but also includes tacit knowledge (Klischewski & Scholl, 2008; Scholl, 1999). Particularly, the two core components of Gil-Garcia, et al.'s (2010) definition, shared information and integrated data, are further extended into five types (Yang & Wu, 2013). The five types are: collected raw data, value-added information, administration-oriented information, administration-oriented knowledge, and domain-oriented knowledge respectively. The collected raw data means the data collected directly or indirectly from the public and private enterprises by government agencies. The value-added information is the collected raw data that are further analyzed and refined with the domain knowledge of an agency before sharing to others. The administration-oriented information flows from one agency to another and is defined as the administrative information regarding governmental documents, meeting, activities, etc. The administration-oriented knowledge represents the general knowledge that can be commonly applied to government agencies' daily administrative operations. Lastly, the domain-oriented knowledge is the core-business knowledge of a government agency.

In addition, others build on Gil-Garcia, et al.'s (2010) work by proposing a framework to discuss different boundaries of information sharing in the public sector. A boundary is defined as a line to cross in information-sharing initiatives. The difficulty of crossing a specific boundary is determined by the existence of certain political, organizational and technological factors surrounding it, and boundaries tend to exist for a long period of time unless significant institutional changes occur (Zheng, Yang, Pardo, & Jiang, 2009). Two dimensions of boundaries are identified. Vertical dimension involves information flows between central government agencies and local government agencies. Horizontal dimension concerns information flows among parallel government agencies at the same