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A Leadership Knowledge Management Model for E-Government: A Preliminary Empirical Test

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ABSTRACT

Although technology has greatly enhanced the ability of government to provide resources electronically, there is still a need for the development of knowledge management systems that potentially improve flexibility and provide citizens with better service. As e-government continues to grow, a key area is the advancement of leadership to increasingly provide effective knowledge resources to the public sector. Drawing from the Malcolm Baldrige National Quality Award (MBNQA) leadership triad as a research framework, the purpose of this study is to develop and test a model that identifies the relationship between leadership and knowledge management within a city government. The study, conducted over a five-week period, indicated a strong relationship between the MBNQA leadership triad and knowledge management.

Keywords

E-Government, knowledge management, leadership, Malcolm Baldrige National Quality Award.

INTRODUCTION

Technology developments have facilitated governments in achieving their goals and improving the quality of organizational offerings (Anderson and Adams, 1997). Technology is an aid because it has the potential to provide the convenience and accessibility of government services and information to citizens (Carter and Bélanger, 2005). It also can assist in decentralizing public administration and in enhancing the government's ability to oversee key activities (Ma, Jongpil and Thorson, 2005). However, many governmental agencies are realizing that technology alone is not a panacea, and that its effectiveness increases when technology is combined with the successful management of knowledge resources. In fact, the need for effective knowledge management (KM) is growing at all levels of government (Harman and Brelade, 2001). Thus, many governmental organizations are placing great importance on the development of knowledge management systems because of its promise of delivering better e-government services and improved performance.

Knowledge is a critical resource that helps organizations to sustain improved business performance (Fedor, Ghosh, Caldwell, Maurer and Singhal, 2003). Knowledge management embodies synergistic integration of information processing capacity and the creative capacity of human beings in an effort to maximize the responsiveness and flexibility of organizations (Zhang and Zhao, 2006). Information Systems (IS) implementation in the public sector is often driven by the desire to enhance productivity and efficiency (Teo, 2005). Some research indicates that KM is a business enabler (Teo, 2005).

E-government provides services to businesses, government employees, and citizens. In general, e-government requires a vast amount of information and knowledge because knowledge-focused approaches deliver more effective services and better representation (Harman and Brelade, 2001). Documenting and testing the importance of technology and knowledge in e-government is the motivation for this study that examines knowledge management as it relates to leadership. Furthermore, there is a lack of KM studies relevant to public sector e-government. In addition, although the importance of leadership is well recognized within the e-government arena, there is a paucity of quantitative assessment of leadership and KM contributions to e-government. The purpose of this study is to develop and preliminarily test a model that identifies the relationship between leadership and knowledge management in an e-government context.

BACKGROUND

E-Government Development

E-government offers the power to enhance traditional government practices by better utilizing information and communication technology to disseminate, retrieve and store information or provide services (Brueckner, 2005). Although governments around the world have different e-government initiatives, knowledge diffusion is a key e-government initiative (Andersen et al., 2004). Leaders that are champions of e-government play an important role in the development of e-government applications (Streib and Willoughby, 2005). Leadership provides guidance concerning information resources and technology management (McClure and Kearney, 2000). It has the potential to exert a positive impact because it can provide directions for e-government development and promote knowledge sharing and transfer with e-government application development.

Studies have examined several issues relevant to e-government service delivery including user satisfaction and user motivation to use online services. Carter and Bélanger (2005) examined how technology affects a citizen's intention to use e-government. They applied the Technology Acceptance Model and diffusion theory within an e-government study and find that perceived ease of use, compatibility, and trustworthiness are significant predictors of a citizens' intention to use an e-government service (2005).

Other researchers investigated the role of the local government leadership in the adoption of e-government. Moon and Norris (2005) find that adoption of municipal e-government is determined by managerial innovativeness and orientation. Moon and Norris also find that e-government outcomes are associated with the adoption of e-government, government capacity and institutional characteristics. They conclude that managerial innovativeness, managerial orientation, and city size are the most compelling determinants of municipal e-government adoption. Prior works on e-government recognized the importance of technology in delivering services and information to citizens, government employees, and businesses. However, the role that knowledge management has on e-government success remains an unexplored area.

MBNQA and the Leadership Triad

The Malcolm Baldrige National Quality Award (MBNQA) is one of the most prestigious quality improvement awards and is well recognized in industry, education, healthcare and government. It was established by the United States Congress in 1988 and was consistently updated to better reflect new theory on quality control and business process improvement. The general theory underlying the MBNQA is that leadership drives the system that creates results (Wilson and Collier, 2000). It assesses seven sets of criteria. These are leadership, strategic planning, customer and market focus, information and analysis, human resource focus, process management, and business results (NIST, 2000).

Several prior studies examine the validity of MBNQA. Wilson and Collier (2000) find that information and analysis is critical to the effective management of an organization and to improve performance and competitiveness for an organization. Curkovic, Melnyk, Calantone, and Handfield (2000) examine the MBNQA and their findings show that IS is an important component of quality management, along with strategic systems, operational systems, and results. Prajogo (2005) cross-validated the validity of the MBNQA in the manufacturing and service sectors and find that the only difference between these two sectors is that the service sector has significantly higher scores in people management than the manufacturing sector. Zhao, Yeung, and Lee (2004) use the MBNQA criteria to perform cluster analysis on data consisting of organization within trading, wholesaling and retailing industries. Zhao et al. (2004) find that the type of quality system adopted by an organization is highly associated with organizational factors.

Prybutok and Spink's (1999) and Douglas and Fredenall's (2004) studies in the healthcare industry provide additional evidence of the effect that leadership has on every variable in MBNQA model. Their analyses further emphasize the philosophy in quality management – leadership drives systems that improve the results. Their works support the contention that proactive leadership enhances the success of an organization. Wilson and Collier (2000) find that the 1995 MBNQA model contains consistent predictors for organizational performance. Leadership results in impacting outcomes via the other categories: process management, human resources, strategic planning and information analysis. They also show that information and analysis are the second most influential factors in MBNQA model.

The MBNQA has evolved over the years and most published studies tested the MBNQA model published before 2000. The most recent version of MBNQA consists of a leadership triad, results triad, and information analysis and knowledge management dimensions. The leadership, strategic planning, and customer/market focus dimensions form the Leadership triad, and the human resource focus, process management, and business results dimensions form the Results triad. The Leadership triad emphasizes the importance of a leadership focus on strategy and customers. The changes in the underlying

MBNQA model are consistent with the philosophical change in quality management theory. The emergence of knowledge management in the MBNQA criteria signifies the importance of knowledge and information in an organization. Adamson (2005) suggests that KM has the potential to embody continuous improvement and the Total Quality Management (TQM) effort such that, in the future, they will not require separate delineation. Information and analysis and KM serve as a foundation for the performance management system.

Knowledge Management

Various definitions of knowledge as applied to business are provided. Some define knowledge as actionable information or data (O'Dell et al., 2003) whereas others define knowledge as authenticated information (Dretske, 1981) and a justified belief to increase one's capacity for effective action (Huber, 1991; Nonaka, 1994). Knowledge has different perspectives: a state of mind, object, a process, a condition of accessing to information, and a capability (Alavi and Leidner, 2001). Knowledge consists of two categories: tacit and explicit. Tacit knowledge includes intuitions, hunches. Explicit knowledge is facts, numbers, and symbols.

Knowledge management (KM) refers to identifying and leveraging the collective organizational knowledge to enhance competitive position (von Krogh and Kleine, 1998). An organization's knowledge management framework consists of the creation, storage, transfer, and application processes. Common applications of knowledge management fall into three areas: coding and sharing organization's best practices, the creation of knowledge directories, and the creation of knowledge networks (Alavi and Leidner, 2001).

The knowledge-based theory (Conner and Prahalad, 1996) of an organization posits that organizations improve their efficiency by economizing on knowledge exchange. The existing hierarchies in an organization facilitate knowledge transfer (Nahapiet and Ghoshal, 1996). Organizations gain advantages from cooperative social contexts that are conducive to the creation, coordination, transfer, and integration of knowledge distributed among its employees, business units, and business partners (Ghoshal and Moran, 1996). Nickerson and Zenger (2004) contend that leadership has a functional role in supporting the generation of knowledge. They propose that an organization should structure itself in a manner that enhances knowledge generation and handling. This was an essential motivation for the City of Denton to evaluate its current structure via the MBNQA survey and pursue any necessary changes to enhance its e-government capabilities.

E-government relies on technologies to enhance delivery of information and services, and technology is an enabler for that process (Teo, 2005). Irani, Sharif, and Love (2005) show that mapping and identifying knowledge is useful in the IS evaluation and implementation lifecycle. KM allows acquiring, organizing, and communicating both tacit and explicit knowledge of employees in a systematic manner to improve productivity and effectiveness (Alavi and Leidner, 2001). In the e-government context, managing knowledge can add value, not only internally, but externally to business partners or constituents. Koh, Prybutok, and Ryan (2005) describe this as an evolutionary path on which government agencies embark as they manage knowledge and provide e-government services to their citizenry. The path is delineated into five stages: 1) informational - the main function of e-government is to distribute information to citizens and employees using uncomplicated Web sites; 2) interactional - e-government begins to interact with citizens and employees through e-mail and online forms; 3) transactional – citizens can perform transactions such as paying their water bill via e-government websites; 4) integrated - characterized by a seamless interface that integrates all aspects of e-government processes; and 5) collaborative- knowledge is captured from both internal and external sources. Some research has suggested that user-centric marketing approaches are keys to moving down this evolutionary path which involves engaging citizens in knowledge creation and collaboration (Kolsaker, 2007).These prior works recognize the knowledge and information technology requirements for e-government. Organizations are turning to knowledge management (KM) initiatives and technologies to leverage their knowledge resources. Because of the importance of technology and knowledge in e-government, in this study, we examine knowledge management as it relates to the leadership triad within the MBNQA model. In figure 1, the Leadership Triad is a second order construct that consists of three reflective first-order constructs: leadership, strategic planning and customer and market focus. Figure 1 below shows our research model.

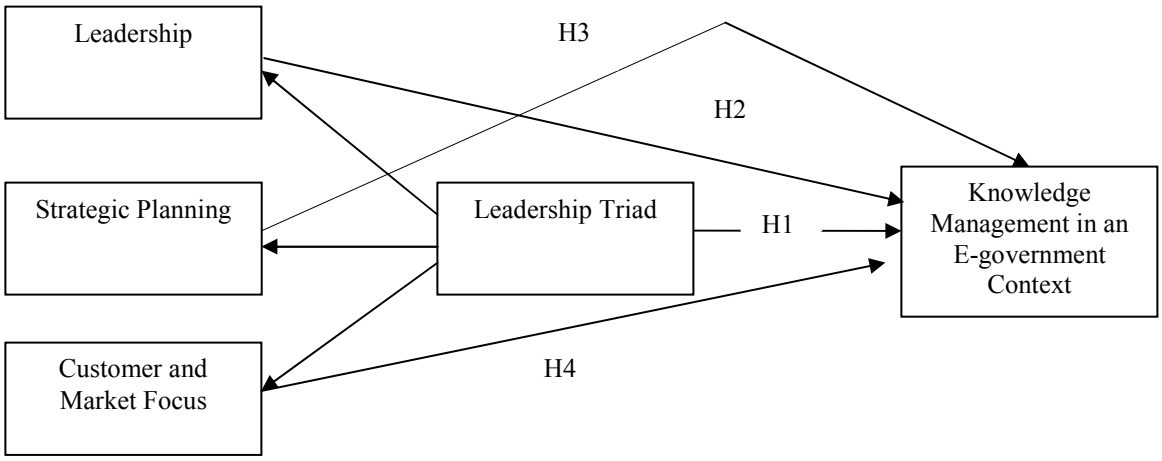

Figure 1. Research Model

The MBNQA model shows that leadership, strategic planning and customer and market focus are correlated. Theoretical grounds justify the existence of reflective second order construct – leadership triad. The most recent MBNQA model posits that the leadership triad is correlated with knowledge management.

Hypothesis 1: Leadership triad leads to KM.

In examining knowledge portal development within the public sector, Teo (2005) finds that top management support and commitment promotes knowledge sharing. Organizations depend on their leadership to drive the continuous improvement and constant innovation that is required to prosper. Leadership, knowledge generation, and dissemination are key drivers of member performance-related ratings (Fedor et al., 2003). Leadership consistently emerges as associated with good practice and provides focus, direction, vision, coherence, and the ideas that are required to interact with KM systems to deliver better results (Capshaw and Koulopoulos, 1999).

Hypothesis 2: Leadership is a precursor to KM.

The concept that knowledge management (KM) provides a competitive advantage is emphasized within the strategic management literature. Developing strategic plans requires extensive knowledge of the relevant customers, markets, suppliers, competitors, etc. The strategic management literature suggests that strategy leads to organizing capital and resource allocations that result in superior competitive advantages (Chandler 1962). Knowledge is a critical source of resource developed within an organization (Connor and Prahalad, 1996). KM helps organizations to obtain and sustain a strategic advantage in competitive environments (Kankanhalli, Tan and Wei, 2005). KM's direction is usually dictated by strategy and it is advantageous to align that KM in a manner that is consistent with an organization's strategy (McElroy, 2005). KM is strategic in nature and during this process new competencies are developed for organizations to sustain and compete in a dynamic environment (Nielsen 2005). Consistent with this theory we posit the following hypothesis.

Hypothesis 3: Strategic planning is a precursor to KM.

Many organizations strive to enhance their customer relations via knowledge management instruments. To make knowledge-based customer relationship management initiatives successful, organizations need to consider strategy, processes, systems and change management (Salomann, Dous, Kolbe and Brenner, 2005). KM systems capture customer knowledge that allows the development of innovative products or services as well as business process transformation. In addition, building knowledge based effective practices when interacting with customers or markets can effectively leverage relationships with important stakeholders. Fundamentally, KM allows organizations to improve their relationships with customers by constantly

monitoring the customers' behavioral and internal processes (Sin, Tse and Yim, 2005). Therefore, organizations with a customer and market focus emphasize KM and we posit hypothesis 4 below.

Hypothesis 4: Customer and Market Focus is a precursor to KM.

RESEARCH FRAMEWORK

The survey instrument was developed by updating and revising the Prybutok and Spink (1999) MBNQA instrument. Revisions included modifying their healthcare industry application to fit the government sector context of this study and revising questions to fit the model and criteria in the 2000 MBNQA, rather than the earlier version used in the Prybutok and Spink study. Because we were applying the MBNQA criteria within the public sector, we changed the wording to better fit the context of the City of Denton, where the final survey was to be administered. To ensure the appropriate modification and content validity of our instrument, we first asked a group of experts with extensive experience in both survey research and quality management to review the revised instrument. These experts are five faculty and five Ph.D. students from MIS, Management Science, and Psychology. During the instrument development and finalization, the research team had many interactions and discussions with city managers and employees address any issues relevant to the meaning and wording of each item on the instrument, as well as the layout and mechanics of survey delivery. In addition, we conducted a pilot test of the instrument at a meeting of the Dallas chapter of the American Society for Quality. An additional refinement of the instrument was made in accordance with the comments received and the analysis of the pilot study data.

Measures

A comprehensive survey was developed to capture the MBNQA 2000 framework criteria. Our KM measures capture the characteristics of the knowledge management process: knowledge creation, storage, and utilization. Specifically, we use timely update of explicit knowledge to measure the knowledge creation process; consistency of and review of explicit knowledge to measure the knowledge storage process; and three items capturing benchmarking, systematic analysis of performance data internally and externally to measure the knowledge utilization process. The development of these KM items are consistent with O'Dell et al.'s (2003), and Holsapple and Joshi's (2001) notion of KM. For example, O'Dell et al. (2003) emphasized that the focus of KM should be on getting the right information to the right people at the right time. Holsapple and Joshi (2001) state that the particular form and nature of knowledge affect the way it is identified, captured, indexed, stored, disseminated, updated, and dealt with when it becomes obsolete.

Methodology

Data was collected within a city government that successfully implemented e-government applications. In order to evaluate KM enabled e-government effectiveness, it is important to survey government employees. Our model examines leadership, strategic planning, and knowledge management and employees have better understanding about the government operations, knowledge creation, knowledge storage, and knowledge utilization processes because these employees are the ones that screen complaints and maintain the systems. Therefore, employees provide useful and relevant judgments about these issues as they relate to e-government effectiveness. Furthermore, the purpose and context of this study suggest that it is not appropriate to use citizens because citizens are not familiar with the internal government organizations, operations, and knowledge creation cycle. We emailed 1100 City of Denton employees asking them to participate in the on-line survey regarding e-government initiatives. A total of 339 responses were stored in the database over a period of five weeks representing a response rate of 30.82%. However, 20% of those responses contain incomplete data. Nonresponse bias was examined by comparing the demographics of respondents with those of the population. No significant differences were found on the demographics variables: age, gender, educational level, and years of experience.

PRELIMINARY RESULTS

Assessing the Measurement Model

After deleting respondents with a large portion of missing values (more than 20%) and "not applicable" responses, only 178 useful responses were available for data analysis. Partial Least Square (PLS) is an appropriate methodology for testing the proposed model because of the minimal demands on measurement scales, sample size, and residual distributions (Gopal, Bostrom and Chin, 1993; Chin, 1998). Although the MBNQA model was validated by some studies, the revised version with a KM component is new, and was not tested in prior works. Consistent with the exploratory nature of the KM in the MBNQA model, it is appropriate to use PLS. We first evaluate the measurement model and then proceed to validate the structural model.

Convergent and Discriminant Validity

In general, factor loadings greater than 0.7 are considered consistent with good convergent validity. The factor loadings for all constructs are greater than 0.7 and statistically significant. Table 1 shows that all of the composite reliability are greater than 0.9, higher than the recommended value of 0.7. We examined the square root of variance extracted for each construct and found that, in each case, it was greater than 0.7, higher than the recommended value of 0.5 (Fornell and Larker, 1981; Chin, 1998).To establish discriminant validity we compared the survey items with the constructs in the model and found that they correlated higher to their theoretical assigned constructs than to the other constructs, thus supporting discriminant validity.

	Mean	Std. Deviation	Composite Reliability
Leadership	4.92	1.24	0.94
Strategic Planning	4.58	1.20	0.93
Customer and Market Focus	4.63	1.21	0.92
Knowledge Management	4.33	1.33	0.92
Leadership Triad			0.96

Table 1. Descriptive Statistics

	LT	KM
LT	1	
KM	0.73	1
Square Root of AVE	0.71	0.80

Table 2. Correlations, and Square Root of AVE

Assessing the Structural Model

We also used PLS to assess the structural model. The R^2 for the model was 45%, meaning that 45% of the variance in knowledge management is explained by the leadership triad. The loadings of the three first order constructs, Leadership, Strategic Planning, and Customer/Market Focus are 0.92, 0.90, and 0.94, respectively. All are significant at 0.001 level and are greater than the 0.70 recommended by Chin (1998), providing evidence that the leadership triad is an appropriate second-order construct. The coefficient from the leadership triad to knowledge management is 0.7, significant at 0.001 level.

DISCUSSION AND CONCLUSION

Our model makes a pioneering effort in testing the role that leadership plays in knowledge management within an e-government context. Knowledge is a competitive tool for e-government and effective knowledge management can produce knowledgeable informed leadership, sound strategic planning, and a better understanding of customers' needs. E-government that succeeds in the digital environment is likely to value knowledge and knowledge management and, as a result, to treat knowledge as an asset. Accordingly, developing organizational norms and values can support the creation and sharing of knowledge.

The statistical significance of our model supports the relationship between knowledge management and the leadership triad. In addition, our model shows that the leadership triad is a logical grouping of three important components of the MBNQA in a manner relevant to e-government. This is rational because the leadership triad contains three important elements of e-government: the leadership, strategic planning, and a customer / market focus. The coefficient of 0.7 from the leadership triad to knowledge management is evidence of a strong relationship between these constructs.

E-government initiatives put heavy emphasis on the information technology that enables effective KM. In this study we evaluate how a city government provides leadership through utilizing technologies to manage knowledge in the delivery of electronic public services. This work provides initial empirical support for our proposed model that addresses the importance

of knowledge management in e-government and how various aspects of leadership support KM in that environment.

Government organizations are increasingly looking for ways to create more value for their citizens and businesses through better public service delivery. The results of our survey were provided via a report and presentation to the City's leadership. In the presentation we provided the City of Denton with insight into the tangible results produced by leadership, strategic planning, and a customer and market focus approach. We believe that the e-government applications that the City introduced to capture or disseminate knowledge are significantly influenced by these three factors. The City of Denton demonstrated strong leadership by establishing good communication channels by which top management's direction, values and expectations regarding e-government initiatives were clearly delivered. In terms of strategic planning, the City had both a well-defined short term (1-2 years) plan, and a clearly articulated long term (3-5 years) plan to achieve e-government goals and objectives. Formal methods were used to determine current and future requirements and expectations from its customers - the citizenry.

Examples of the City of Denton's e-government activities include applications that disseminate knowledge about various city services and knowledge directories that describe who to go to and how to contact expertise in a variety of areas. Transaction-based customer service applications for performing city business, such as paying court fines or utility bills, are available over the web. The City of Denton also has an interactive mapping system that locates restaurants and other attractions using a geographical information system (GIS). It is plausible that the presentation and the associated analysis increased the confidence of the city government in their e-government initiatives. Furthermore, based on feedback from the City leadership, as a result of this increased confidence, the city became more proactive in managing its knowledge processes relevant to electronic interaction with its customers, employees, and businesses. The local government we surveyed in this study won many awards for its e-government presence and this success partially supports the contention that leadership impacts knowledge management functions. Furthermore, the fact that many of the City of Denton's awards were won after this survey was conducted supports the contention that recognizing the relative importance of the knowledge management – leadership relationship is important toward achieving e-government goals.

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