The Integration of Metadata and Information Techonology in Promoting Innovation in the Public Organization:A Study in Thailand.

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Abstract. The public organization have recently evolved as a new paradigm in pursuit of competitive advantages and in response to people's satisfaction. The integration of Information Technology (IT) and Metadata is the essential foundation for the formation and management in promoting innovation. We conducted a study to examine the successful public organizations in Thailand. Our analysis based on four taxonomy of IT's benefit namely capabilities, interactions, orientations and value distribution. The findings could be of strategic value to government and community service organizations initiating IT and Metadata programmes aimed at using collective useful information to support innovation. The terms in the metadata were generated from the principal database using the essential indexing procedures together with the associated information will be facilitated systematic management instrument for the public organization in promoting innovation.

Keywords: Public Organization, IT, Metadata, Innovation.

1. Introduction

Many of the new management instruments have been utilized in the public organization to promote productivity, quality, effectiveness and innovation. One popular management approach used today is the model of Total Quality management (TQM). [1], [2], [3] and [4] support a positive relationship between TQM and innovation, suggesting that organizations should embrace TQM in their system and culture because TQM embodies principles that are congruent with innovation so it can help provide a growth for innovation.

The study cases are selected from the organizations that won the Quality Award from The Office of the Public Development Committee (OPDC) in Thailand. OPDC has presented The Quality Award for the best practice in public organizations since 2007, based on TQM applied model. The consideration is based on multiple criteria, including overall engagement practices and evidence of engagement impact on social and public value which serve people's satisfaction.

[11], [12] and [13] are empirical studies on the relation between innovation and performance providing evidences which shows that this relation is positive. A focus on the organizational aspect of innovation speed also reinforces governmental efforts to develop better data management and network among organizations. Some author suggests that the power of IT enabled organizations to produce new product or process innovation [21]. For example, one type of IT-enabled inter-organizational by sharing and integrating of expertise within a team through real-time, interconnected IT.

However, the literature on public organization suggests that its introduction is complicated by a lack of fundamental technical resources, and by the IT and bureaucratic nature of governmental bodies. Thus, our

study adopts the Danziger and Andersen (2002) typology integrated with the Metadata approach in order to clearly identify the main results achieved by the winner's organizations.

2. Literature review

2.1. Productivity effectiveness and innovation relevant to IT.

Productivity and performance are crucial in the public organization. The services need to be effective in delivering the level of performance that meets customer or citizen expectations.   A service is effective when its outcomes or accomplishments are of value to its customers and provide services to all citizens or equal access to those who require the specific services provided. The important thing to recognize the public services may be various, with some providing a greater challenge to productivity and performance enhancement efforts.

The services in the public organization is largely an information-processing activity and the IT can play a major role in information dissemination and information acquisition. The organizational usage of the IT, together with numerous applications, provides important research opportunities [5]. We mostly see use of IT for support of working processes in the form of infrastructure functions. They include local area networks (LANs), use of intranet, internet and the World-Wide-Web (WWW), e-mail, rudimentary groupware applications, and corporate memory data bases.

2.2. IT in Public Organization

Since the purpose of this article is to analyze how IT driven the whole innovation activity of the public organization which are often criticized for choosing the easy route to transformation [8]. Nevertheless, with increasing political pressure from interest groups and constituents, IT has become a major factor in the process changing [9]. Public organizations need to modify obsolete practices [7]. Information System (IS) changes and consistent management are needed in order to enable change [6]. The most challenging issue in public organizations is the attitude of users towards new technologies in adopting the new systems and new experience [10]. Although IT offers competitive strategic advantage in an increasing productivity and profit within the private sector, it may well offer the only solution to operational issues and citizens' complaints in some public organization applications. While the number and types of stakeholders for government activities may be larger and more varied, the service delivery solutions remain the same as those available to most information intensive service companies. Therefore, the most important difference is simply the increased difficulty in translating strategic or stakeholder objectives into operational terms since the constraints may be more varied and unforgiving.

2.3. IT promotes innovation

Our review about the IT literature leads us to the conclusion that the role of IT in promoting innovation is very underrepresented in the literature because of the focus on its efficiency enhancing properties. For example, in the literature [14], [15] and [16] IT moderates many aspects of the process of bringing new solution, given that it determines the way information is stored, transmitted, communicated, and processed, and facilitated innovation by improving the initial base of knowledge to draw from when employees engage in problem solving and decision making. This creates a larger pool of codified knowledge for any given employee to draw from, reducing the cost of information search. IT provides management with the real-time capability to monitor project progress and supporting mechanism to utilize knowledge in its optimal location within the organization.

As another example of how IT can promote innovation, [17] argues that the ability of IT to enhance a person's domain relevant skills is an important input into the innovation process. To the degree that IT enhances the knowledge base available to each employee and allows these employees to work together, innovative potential is increased.

2.4. Metadata promotes innovation.

Metadata, self-describing data about data, includes the processes of elements identification. This process is usually associated with recording of contextual knowledge pertaining to the organization. There are several important matters concerning information-acquiring quality in multi-actor of the public organization.

In addition to flows of data, information and different types of knowledge, information quality needs to be addressed in a systematic way in the organization. As a knowledge management tool, the metadata stores declarative knowledge regarding the relationships, integrity, and presentation of the geographic of the personal information. The use of metadata has expanded and the cataloging department is exploring other metadata formats and their applications to more effectively index Web pages and provide better retrieval and more accurate searching. There are three main types of metadata [22]:

- Descriptive metadata describes a resource for purposes such as discovery and identification. It can include elements such as title, abstract, author, and keywords. There are researches: [19] and [20] have shown the importance of user-created organization schemes in file management and demonstrated the ability of descriptive metadata to enhance web-search.
- Structural metadata indicates how compound objects are put together, for example, how pages are ordered to form chapters.
- Administrative metadata provides information to help manage a resource, such as when and how it was created, file type and other technical information, and who can access it.

An example for a conceptual metadatabase adapted by OPDC is presented as a framework for the acquisition and maintenance for all public organizations' structure data in Thailand. However, the access of useful data should be expanded or distributed into the international community with the standardization of database management and electronic accessibility in order to prepare for the Association of Southeast Asian Nations (ASEAN) community.

3. Methodology

Our research is based on a combination of field methods such as interviews, short surveys, secondary literature review and document analysis. Primary data collection took place on several trips to the organizations in Thailand that won the Public Service Award from OPDC in 2010 over a period of 6 months from 2010 to 2011. We chose these organizations for our analysis because they have been at the forefront of the IT and Data management movement in the public sector.

There are 106 winners in 2010. We selected only the cases that have used IT as an instrument for organization development categorized by using model of [18]. This taxonomy involves four areas, namely capabilities, interactions, orientations and value distribution. Subsequently we discuss each of the perspectives individually and then describe the Metadata that inter-relates these perspectives.

The aim of our conclusions is not to provide statistical generalizations, but to present an in-depth analysis of one IT policy. By doing so, we intend to understand the effects of IT management policies on the choice, design, and adoption of IT and their deployment better.

Table 1: The classification of typology's IT benefits.

Domains	Specific Categories	
	Information Quality	Improved (managerial) control
	Data access	Time-saving measures
Capabilities	Data quality	Effectiveness
	Efficiency	Improved decision-making
	Productivity gains	Improved products and services
	Staff reduction – substitution	Improved planning
	Improved coordination-cooperation	Citizen-to-citizen interaction
Interactions	Citizen-public sector interaction	Organization control and power
	Private-public sector interaction	
	Improve decision – making	
Orientations	Emphasis on quantitative criteria (for decision making)	
	Better structuring of problem	
	Increased discretion of decision makers	
Value distribution	Protection/improvement of the private sphere	Protection of legal rights
	Job satisfaction and enrichment	Improved standard of health, safety and well-being
	Job enlargement	

Source: Danziger and Andersen (2002).

4. Discussion

The framework for categorizing and assessing IT adoptions in public organizations are still scarce because there are different interests, specialities, and levels in public organizations which may not be defined as formal organizational systems that rely on IT. However, we chose the typology of Danziger and Andersen (2002) to classify results of IT adoption according to four types (Table 1) because the research is in the field that concerned with managerial and economic aspects.

4.1. Capabilities.

Each organization collects data and uses IT for better management, productivity and efficiency improvement purposes. All depend on their members for data collection and new requirements for data have drawn the government's attention to this resource. The example cases which can be categorized in this group are shown below:

- A new solution from Department of Livestock Development for the uncompleted report was implemented by using e-Traceability. Use of this technology meant that not only could the client reports be digitized (addressing the handwriting problems) but there was also an opportunity to capture data at source (ensuring no loss of detail)
- The LIS III Management Program in center for library resources and educational media, Walailuck University is process oriented. It is concerned with the quality and efficiency of service delivery rather than with generating new programmes. Its essence is the involvement of employees in rethinking service delivery strategies.
- Department of Lands provides services aimed at facilitating the task of customer service and enhancing the ability to communicate with customers.
- Lampang City Municipality provides interactive service system.

There is a strong need for these organizations to share data in order to form the big picture so that the data may be analyzed and effective decisions be made. However, different technological and institutional environments may respond diversely to similar objectives. Consequently, replication of policies tends to be

ineffective. Yet, the governor can play a major role in supporting the diffusion of innovations and renewal of capabilities among organizations.

4.2. Interaction.

IT plays in promoting and synthesizing collaboration and information sharing both inside and across organizational boundaries in order to face difficulties in transferring public – private. IT have in fact become one of the most common solutions implemented to standardize work procedures and smoothen information and interaction flows. The consultation among the producers and customers through lateral channels improves employees' ability to keep up with changes in techniques and new knowledge, helping them to understand and adopt innovations. The example cases that are analyzed into this group:

- National Office for Empowerment of Persons with Disability (NEP) uses E-Card for the disabilities.
- Office of the Transport and Traffic Policy and Planning creates Real time traffic alerts and traffic reports to view online interactive traffic maps for traffic jam, traffic school and local road conditions.
- Sakaeo Psychiatric Rajanakarindra Hospital creates the community psychiatric care through internet network.

The success of organizational interaction cannot be measured simply by successful information and knowledge transfer across different organizations or government agencies. Once information and knowledge is successfully transferred among organizations, it is also important to know whether the current situation of information and knowledge is circulated and shared effectively and efficiently. In this sense, Metadata can classified information sharing problem. Intra-organizational information sharing exists among individuals, groups, or departments in an organization. Two non-technical issues that have been identified as critical to the success of such innovative knowledge system are:

- the motivation of government agencies or citizen to continue to enter content throughout the interaction system, and
- the meaningfulness of data, information and knowledge that can be extracted from the contents of the system.

4.3. Orientation.

To emphasize on the quantitative criteria with thousands of rules and gigabytes of facts for decision making, presents complex research problems that are crossroads of expert systems and databases and which come to surface nothing more clearly than by using the Metadata. Decision support technologies such as decision support systems (DSS) and managerial expert systems, are being used increasingly by organizations in business to cope up with the turbulent environment and remain competitive. However, our analysis for the study cases in Thailand shows that the decision support technology used in government and public organizations revealed limited as compared with that in business and industry. As in many decision making contexts, the management team or policy-maker as a user must determine which of many themes is relevant to the problem at hand. In many ways, this situation corresponds to that facing a decision maker using a data warehouse or engaged in data mining operations. The user is concerned with including all relevant data and with excluding irrelevant data from the analysis.

4.4. Value Distribution

Sometimes an implemented innovation can improve work flexibility, increase control over data, labor savings, enhance prestige or increase legitimacy. Moreover, the ultimate goal from changes in technology of public organizations is the use of the term technology-based tool shifting the focus from traditional management to the provision of space that enables people to act and apply their sense making, toward greater collective understanding and where people make decisions together to achieve genuine outcomes. The example winners of this group can be seen below:

- King Narai Hospital, Lopburi Province developed the health standard improvement service.
- Khuan Khanun Hospital, Pattalung Province created the disability people registration service.

The success or failure of an implemented innovation could be measured holistically based on social benefits that increase from changes in technology and relate the value of these benefits to the cost of the investments in research that produced the changes of interest. This is important because there needs to be a

way of comparing these to ensure that the value distribution finally deliver high social value to the people which may be expensive but the opposite is not necessarily true. High investment does not guarantee high social value, as has been seen in recent government initiatives.

5. Conclusion

For innovation in the public organizations, the role of IT is critical in creating the competitive advantage. IT can serve "to increase flexibility, to improve communication, to integrate different functions and organizations and to increase value distribution". This study clearly indicates that a further expansion of technological utilization in the public organizations in Thailand can be anticipated by using the Metadata as the knowledge management tool. And the rapid advances in networking technology will give the expansion of data exploration and information exploitation. Officials in the responding organizations will be using more IT applications to try to achieve the benefits this technology can offer.

Ongoing analysis of IT and Metadata utilization in the public organization in Thailand is justified. The analysis should be supplemented in the future by a detailed analysis of what can be anticipated to be a rapid expansion of network and interactions usage. In addition, more attention is needed in the collection of statistics relating to IT technology and Metadata use in the country as a whole. The results of more comprehensive data, future analysis should be expanded to include IT utilization in other sectors, such   as agriculture sector. Only through such ongoing analysis can Thailand's IT utilization be more closely aligned with the country's overarching economic goals.

6. Acknowledgement

7. Reference

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