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KNOWLEDGE MANAGEMENT IN E-GOVERNMENT

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Abstract

The article reviews the role of knowledge management (KM) in e-government. It finds that knowledge management is needed to facilitate information exchange and transaction processing with citizens, as well as to enable inter-government knowledge sharing and integration. It also finds that knowledge management solutions frequently employ the same methods and technologies, such as portal, virtual community, document management, and knowledge discovery solutions. The article further identifies that challenges to successful knowledge management exist in the lack of motivation to share, lack of task orientation of KM solutions, information overload, and insufficient inter-operability. The article's findings are intended to suggest targets for future in-depth analysis of e-government knowledge management.

Keywords: Knowledge management, e-Government, community of practice, knowledge harvesting, portal

Introduction

Leading e-Governments are increasingly looking towards the use of knowledge management (KM) services to augment their capabilities (e.g., UN/ASPA 2001). This strategic objective is driven by the need for more efficiency and by the availability of new technologies (e.g., Wilson 2002).

This article is intended to explore the relationship between e-government, knowledge management, and the factors that underlie successful knowledge management. It first explores the role of KM in e-Government, then explains several visions of KM in e-Government, and finally identifies the challenges faced by current KM solutions.

The article is directed at applied researchers who wish to explore the role of KM in e-government and to assess potential success and failure factors for KM in government. It is based on the author's interactions with members of the local government IT services unit as well as recent e-government studies.

E-Government and the Role of Knowledge

E-Government Evolution

Tapscott (1998) identified an evolution sequence for e-Commerce providers, which sees organizations mature from having a web presence to offering transaction services as part of their first wave of development. Evidence suggests that e-governments mature along a similar growth curve, beginning with broadcasting, then interaction, then transaction, and finally integration (UN/ASPA 2001). In *broadcasting* mode, the government's presence consists of static web pages and one-way communication. In *interaction* mode, websites are able to exchange information or services with citizens, where citizens can obtain some resources from database backed websites underlying a portal. At the *transaction* stage, citizens can carry out financial transactions. This requires more processing capability, plus payment gateways and security implementation. Finally, e-governments reach *integration* when departments collaborate in significant ways to avoid duplication of efforts and enable "one-stop" interaction with citizens.

Role of Knowledge Management

Knowledge management can be defined as “the organizational process for acquiring, organizing, and communicating both tacit and explicit knowledge so that others may use the knowledge to be more effective and productive” (Gray 2000). Its goal is to capture, store, organize and distribute intellectual property, so as to allow its reuse, avoid duplication, enable sharing of best practices, and promote learning (e.g., Malhotra 2000). Knowledge management can target “transaction processing” efficiency, or decision making effectiveness. For example, an organization that needs to process e-mail inquiries (transactions) could benefit from a knowledge-driven “automated” method to answer e-mail messages. Similarly, a government department can benefit from decision rules that help detect fraud. Such applications will require both IT, and organizational management efforts to achieve results, as much of the necessary knowledge needs to be transferred from people into software.

Public sector KM needs arise in several areas: in relationship to the *public*, within government departments, and between government departments. In relationship to the public, KM is particularly needed handle inquiries. Once the government invites interaction, or transactions, citizens and businesses will begin to ask questions and will want to have their problems solved. For example, a citizen purchasing a business license on-line may have questions about such a license, which not covered in FAQs. Such inquiries then need to be handled by knowledgeable people, or a knowledge management system.

Within departments, knowledge management can improve the efficiency of operations. For example, in Hong Kong’s Civil Service, leave applications are guided by more than 200 rules, concerning the type of leave that applies (e.g., annual, staff development), length of leave, timing of the leave, and so on. These could reside in a knowledge management system and be provided to the administrator as applicable.

Knowledge applications *between departments* seek to avoid duplication of effort through knowledge reuse. For example, Canadian government managers frequently post discussion board questions to seek advice from others working on similar problems (<http://leadership.gc.ca/virtualnetworks/>).

KM Approaches in E-Government

KM Visions

Overview

Numerous visions for knowledge management within e-government exist today. Several of them are briefly described below (e.g., Forman 2001; Hodgkinson 2002). The descriptions are not intended to be comprehensive but to identify the salient elements. The descriptions target the activities of general government units (not education, research, or scientific exploration).

Knowledge Worker and Intelligent Portal (US Government)

A knowledge management solution put forward by the US Federal Government is described as *Intelligent Portal + Knowledge Worker*. The approach appears to focus both on internal efficiency, and on inter-departmental practice sharing (Frank 2001).

The emphasis in this solution is on the broad access to a wide variety of data sources, which previously were kept in individual departments’ information “silos”. Much of the emphasis here is on information management. Nevertheless, the ability to easily draw on multiple information resources can lead knowledgeable people to become more knowledgeable.

The intelligent portal in the US Government vision extends the basic portal concept through the use of several intelligent tools, such as OLAP or data categorization. The portal would access a large number of governmental information systems, such as ERP, legacy applications, or existing databases.

Knowledge Harvesting and Team Knowledge Transfer (DOD)

Another US Government solution is put forward by the Department of Defense. This vision targets the valuable expertise of people retiring from the DOD in the foreseeable future. Hence, the DOD has identified solutions to extract scarce knowledge from experts, via “knowledge harvesters” and team learning approaches. This vision focuses on internal efficiency and effectiveness.

Knowledge harvesting is akin to knowledge engineering methods from the 1980s, which resulted in the development of expert systems (e.g., Waterman 1986). The DOD solution seeks to formalize the extracted knowledge as well, but not necessarily in expert system form.

Team learning seeks to transfer knowledge between teams, through formalized methods of knowledge sharing prior, during and after task completion, as described by Evans (2001). The result is a direct knowledge transfer, as well as the development of a community, and the creation of a portal that captures much of the teams' "knowledge assets".

Community of Practice (Victoria Government)

The Victoria government has built into its vision the use of communities of practice. Emphasis is on experience sharing and avoidance of duplication (see Knowledge Management 2001). In addition, the Victoria Government has set up an information portal, which contains government documents accessed via a smart search engine. However, little emphasis is placed on technology ("technology comes second, if anywhere").

Community of Practice, Training, and Common Interface to the Public (Canada)

Canada has launched several knowledge management initiatives. The underlying vision identifies technology-push (technology maturity) and demand-pull (need for thinking, democratization of information and technology, and increasing stakeholder expectations) as key motivating factors (Wilson 2002). Government administrators can be part of a "National Managers' Community" which has its own (personalizable) portal (<http://leadership.gc.ca>), offers training programs, and promotes a "virtual network". Communities, training of management personnel, and on the ease of access to government documents are emphasized. The vision also recognizes the importance of technology, and the importance of standardized infrastructures to promote information and knowledge exchange.

Content Management, Knowledge Management Tools, Information/ Knowledge Portal, and Communication (Hong Kong)

Hong Kong's approach to knowledge management arose from three strategic goals:

- to use IT more for the benefit of citizens, instead of improving internal operations;
- to decentralize IT; and
- to "do more with less".

As a result, knowledge management was to provide additional government services, foster knowledge sharing within departments, and especially between departments, and result in re-engineering benefits. Citizens can now access government services via the "ESDlife" portal, which enables information transfer, transaction processing, and even provides some advice. The portal's "Wedding Channel" offers advice on wedding planning. The government has also invested in data mining (SAS) and CRM (Siebel) solutions, to enable for instance better patient profiling by the hospital authority, or to better respond to citizen inquiries. Inter-departmental knowledge exchange is sought through a number of portals, which enable civil servants to access knowledge from diverse sources. Furthermore, on-line discussion forums have been created to further enhance dialog.

Summary

Overall, the outlined management visions show a considerable degree of overlap, but also some variation, especially in the role of technology. The US and Canadian approaches emphasize information management, architecture standardization, and broad access, with some emphasis on collaboration. The Australian approach focuses even more on collaboration, while de-emphasizing the importance of technology. Hong Kong's approach combines all aspects, with added emphasis on knowledge provision to the public.

Knowledge Management Process

An analysis of the KM process provides further insight into possible knowledge uses and KM challenges. Several basic knowledge management processes exist at this time, yet most will follow a common structure, as depicted in Figure 1.

APQC, 1995	Delphi (Tacit Knowledge), 2001	Beckman, 1997	Unknown	NASA, 2000
	Focus			
Create			Develop	Create
Identify	Find	Identify		Develop
Collect	Elicit	Collect		Capture
Organize	Organize	Select	Transform	Organize
	Package	Store	Preserve	
Share	Share	Share	Transfer	Distribute
Use	Apply	Apply	Apply	Use
Adapt	Adapt Evaluate	“Create”	Update	
				Assess
		Sell		

Figure 1. KM Process Variations

The KM process will typically begin with knowledge creation, then identification, collection, organization, storing and packaging, sharing, and finally use and adaptation. The choice of process differs by government and by task. Hong Kong’s Government has adopted the APQC process, while the US Department of Defense follows the Delphi Group process for knowledge harvesting.

Knowledge management activities, however, depend not just on the process, but also on the type of knowledge collected. Figure 2 illustrates the knowledge management activities associated with the management of four different types of knowledge, expert knowledge, virtual community knowledge, knowledge derived from documents, and knowledge extracted from data mining.

Different knowledge sources require different management activities and create different challenges for the knowledge manager whose task it is to generate value from the knowledge (compare Donoghue et al. 1999).

Challenges and Solution Suggestions

Incentive to Share Knowledge

Knowledge sharing is most essential to knowledge management. It is also very difficult to achieve. For example, communities are considered as highly effective for knowledge sharing (e.g., KPMG 2003), but creating communities is difficult. Most linger with little participation or access. In Asian environments, information exchanges contend with additional cultural pressures, which—for different reasons—discourage both junior and senior employees from sharing their knowledge (Chan and Ng 2003). Among Hong Kong’s civil service, discussion forums are formal, and individuals who offer suggestions that might result in negative outcomes would be concerned about their responsibility for the outcome. Other regions without these pressures still face the difficulty to motivate employees to freely give away what has been obtained through hard learning and possible financial investment. An innovative approach considered by the Canadian Government is the creation of a knowledge auction (Hasulo 2001). The auction is a knowledge exchange, where those with tokens can bid for knowledge. Tokens can be obtained through the prior creation of knowledge.

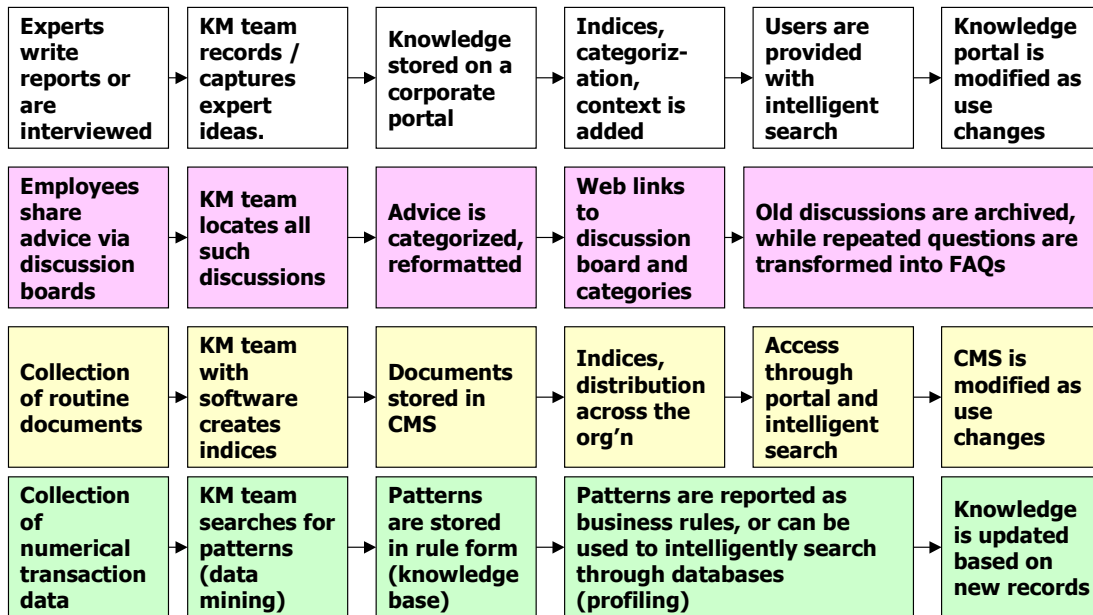


Figure 2. Knowledge Management Activities Depending on Type of Knowledge

Portal Without Push or Personalization

Building portals has become a first step towards KM for many e-Governments. However, many portals appear to become “information graveyards” with too little access and lack of focus on the needs of users. Faced with a multiplicity of portals and ancillary services (e.g., discussion boards), employees now need to remember where particular knowledge can be found, where to check for updates, and where they posted a message.

A remedy lies in the integration of these portals, through the development of a “hyper-portal” with feeds from the other portals, and personalization capability. Employees (and citizens) should then be able to select knowledge sources, and possibly even use a common discussion board (which would route messages to the board they are in fact replying to).

Information Overload and Lack of Knowledge

A frequent shortcoming of e-government “knowledge management” is the large amount of existing, but inaccessible information (e.g., Wilson 2002). Millions of documents in existence may not be categorized, or not be susceptible to meaningful search. Furthermore, search engines may not be intelligent enough, or users may not understand their advanced search commands.

A suggested solution to this problem is better indexing and categorization. This can be a tedious task and a further disincentive to sharing. Smart search engines can provide increased search capability, but they also depend on the use of tags and hyperlinks in documents, which often do not exist. Ontologies (or taxonomies) offer the promise to interpret the meaning of a document. Finally, personalization tools that monitor past searches by a person and use that profile to help in future searches may also be helpful—but require learning.

Inter-Departmental Collaboration and Sharing

Lack of “institutionalized” sharing between government units, is another concern. Knowledge that already exists in one department, may not be accessible elsewhere. The achievement of inter-departmental sharing requires several factors, namely willingness to share, suitable technology, and a common knowledge model. All these issues have previously been recognized in private sector organizations, but are now increasingly voiced in relationship to e-Government (e.g., Dignan 2001; Ho 2003).

To address this difficulty, governments have to define strategic IT policies, standardize their IT architectures, audit and possibly redesign their information architectures, and invest significantly into information technology. For example, Hong Kong’s IT

Services Department has created an “interoperability platform” document to advise all other government units in the implementation of IT solutions (ITSD 2002). Governments are also increasing funding levels for IT in general and e-government spending in particular.

Conclusions

For many governments, the ingredients to achieving their KM vision are relatively similar, and involve the use of a knowledge management process and a variety of knowledge management methodologies and tools.

Success in knowledge management will require implementation of the technologies, as well as organizational changes. Governments have the opportunity to apply private sector lessons, such as the provision of incentives for knowledge sharing (e.g., Tristam 1998) or the alignment of organizational and IT infrastructures with organizational and IT visions (e.g., Henderson and Venkatraman 1993). Nevertheless, governments will have to find their own unique solutions, based on regional and cultural characteristics, funding levels, levels of e-government, and IT use.

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