NLM Knowledge Bank: A Framework of Managing Knowledge in the National Library of Malaysia

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Abstract

Knowledge Management (KM) refers to a range of practices used by organizations to identify, create, represent, and distribute knowledge for reuse, awareness, and learning across the organizations. KM is fast emerging in applications involving large repositories of data and information. Realizing the benefits and potential of KM, organizations are beginning to explore the possibilities of adopting this technology. The next imperative question that comes to mind will be; what information architecture will be the most suitable for a library. Since, a library is regarded as a bank of knowledge, ensuring security is essential. In this paper we present a plausible conceptual framework of managing knowledge for a library. In our case, we have developed an information architecture for the National Library of Malaysia (NLM). The research starts with an examination of three models of KM framework in organizations. From our analysis of these frameworks and the findings of our survey, we developed a conceptual framework for managing knowledge at NLM. This framework has some security features incorporated to meet the requirements of the NLM's stakeholders. The results of this research work can be used by other libraries and similar organizations which are considering KM adoption and implementation.

Keywords: Libraries; Knowledge bank; Knowledge management (KM); Knowledge organization; National Library of Malaysia (NLM)

1. Introduction

Knowledge management (KM) is the name of a concept in which an enterprise consciously and comprehensively gathers, organizes, shares, and analyzes its knowledge in terms of resources, documents, and people skills. In the knowledge economy, knowledge is used to produce economic benefits. Therefore, knowledge is considered as the driving force for economic development and this further accelerates the demand for information and knowledge by the society. As information and knowledge become an important productive factor for the present economic system, an efficient and effective management of these assets is a necessity. Libraries, which have always been serving as information and knowledge banks, need to evolve so as to be capable of supporting the requirements of a knowledge environment. KM in libraries will be focusing on the research and development of knowledge, creation of knowledge bases, exchange and sharing of knowledge bases. When knowledge innovation becomes the core of the knowledge society, libraries will then be an indispensable link in the scientific system chain. They act as bridges for turning the results of knowledge innovation into realistic productive forces. KM in libraries will promote relationship in and between libraries, between libraries and end-users, strengthen knowledge inter-networking and quicken knowledge flow (Lee, 2006).

Realising the importance and potentials of implementing KM, we studied the status of KM awareness in the National Library of Malaysia (NLM). The NLM is a suitable candidate organization to adopt the concept. It has evolved from a humble beginning as

the National Library Board in 1956 to what it is today. The NLM aspires to be a world class library in the provision of excellent information services towards the realization of Malaysia's vision of becoming an industrialized and developed nation by the year 2020 - Vision 2020. With its multifarious functions and services, supported by high-tech facilities and a well-qualified team committed to excellence, the NLM is poised to lead the nation in its pursuit of knowledge. The philosophy of the NLM is to develop culturally advanced individuals imbued with a love for knowledge, acquired through lifelong reading and thereby to cultivate the minds of Malaysian towards excellence and innovations which can enhance the tradition of knowledge of this nation (Perpustakaan Negara Malaysia, 2007).

The NLM has all the pre-requisites of KM implementation. Before this can materialize, the question that arises is: Which KM implementation model will best suit the NLM? Every organization has its own policies, culture, infrastructure and constraints. In this paper, we will compare and contrast existing KM models and frameworks and design one especially for the NLM.

2. Existing KM Models and Frameworks

KM is a complex area, and one that spans boundaries – learning and development, information technology, human resources etc. Having a model that describes the scope of activity that KM efforts cover can be a powerful way to both monitor and communicate what the approach encompasses. A few models and approaches that have been used by previous researchers are summarized in the following subsections.

(a) KM Building Blocks (Wiig, 1993)

Wiig (1993) introduced a complicated but well-structured model of how to introduce and sustain KM practice in an organization. The model represents a systematic consultant's perspective on KM, and it is particularly interesting because it points out the variety in what practicing consultants include in KM. He suggested that the organization builds a system of blocks, interconnected activities for KM that support each other in a functional manner. Moreover, he points out that the organization may focus on a limited number of blocks and expands step by step, moving from implementation to administration. The model proposed by Wiig (1993) is one of the most highly developed in the KM literature, as it covers both strategic and operative aspects in some detail.

(b) The Holistic Model (Collison and Parcel, 2001)

In this model, Collison and Parcell (2001) have generously shared their practical experiences and lessons learned in one leading global communities of knowledge-BP. The model describes how to turn objectives into results by learning before, learning during and learning after. Another key element of the holistic model is the captured knowledge. This means capturing know-how in such a way that it can be reused. They emphasized that knowledge needs storing for reuse because you cannot leave it in people's head. If you can find an effective way to capture it for transfer, others can look for it and find it, and the know-how will stay in the corporation even if the staff leaves. One of the best ways that they have found to store know-how for effective reuse is by building a knowledge asset.

In this model there needs to be a link between the learning before/ during/ after circle and the knowledge itself, both to accessing what has already been captured and to capturing new knowledge. Networks and communities of practice are primary routes for enabling this access. They likened the way customers use a bank – making a withdrawal from a 'knowledge bank' at the start of a project and depositing new knowledge at the end. The real business benefits come from working on all parts of the model and embedding the

activities into the routine business processes. This develops a sustainable capability rather than an ongoing dependency on 'experts'.

(c) Integrative KM Model (Hidayat, 2001)

Prof. Dr. Hidayat Hussein (2001) from the University Industry Selangor noted that the core of the KM system is the knowledge base or the organizational memory. It is the repository of effective knowledge. Effective knowledge is not just information but it is an output resulting from the interference of human, which draws their attention by using their creativity and innovation with the use of information technology. The dynamism of knowledge creation requires the human attention, innovation and creativity for renewal of archived knowledge, creation of new knowledge and innovative applications of knowledge.

Employees of the organization present the human aspect of the model. They are the major players and catalyst of the KM system. The interaction between employees in properly managed organization will lead to pervasive learning and sharing of knowledge that will increase knowledge base richness. The conduct of the employees' interactions depend on organizational culture. The culture should emphasize the use of information technology. Since information requires human attention for creation of knowledge, the information technology infrastructure must be designed to provide the tools for assessing internal and external information at the right time, the mutual consultation and sharing of information, collaboration and storage of information.

(d) KAFRA (Kontext aware FRAmework) (Okunoye, 2003)

KAFRA is a framework that encompasses all the organizational aspects of KM and the context-aware framework of KM that could support organizations in developing countries and guide their transition to a knowledge economy. This framework enables organizations to pay attention to the environmental context and how this affects the assumptions about each component, the method and the research approach used to arrive at the actual users. The framework could be used by any organization, irrespective of size, location and economic background. The only prerequisite is the willingness of the organization to be competitive and to participate in the knowledge economy. Any consultant with adequate background training could also adapt the framework in providing KM solution to their client. Firstly, this framework could guide organizations in their KM initiatives, in order to analyze their environmental factors, and determine what organizational and technological factors need to be addressed. Secondly, a chief knowledge officer, or other knowledge role person, could use the framework to establish a KM project team and justify the decision to the organizations leaderships. Thirdly, the framework could be used to support the argument that KM is neither a technological nor organizational issue; rather it is a holistic approach that requires interaction of both. All these could make KM appealing to organizations and assist them to reap the accomplished benefits. They could also save resources, by doing the right thing at the right time.

(e) The Organizational Info-architecture (Vegas, 2004)

This is an integral model for information and knowledge organization in the context of KM strategy. KM is conceived from a systematic perspective: organizational reality is thought of as a complex unit of linked relationships. The working definition of KM strategy refers to the deliberate effort of an organization to create, develop, keep and use its intellectual capital to achieve the organizational strategic objectives.

The intellectual capital – and the intangible knowledge assets – become the most important assets of the organization and its single most important competitive advantage. The new resource for value creation is intellectual capital. In this perspective, intellectual capital constitutes the key concept of KM and encompasses three components: relational

capital (or customer capital), structural capital and human capital. From this KM conceptual perspective, intellectual capital with its three components is conceived as a triangular model to denote their interdependence. The basis of the alignment with its strategic intention is the axis of the organization, always in accordance with continuous improvement, innovation, new models and business expansion objectives.

Vegas (2004) defined Organizational Info-architecture as a knowledge environment. Thus, the Organizational Info-architecture is based on technological platforms and network systems (digital platforms, development in collaborative working environments, data retrieval and information storage system, hypermedia, artificial intelligence system, simulation system, and others) making communication and information exchange between individuals and teams possible to pursue a wide range of activities (participation in communities of knowledge, virtual forums, database queries, information analysis, preparation of technical reports, research and development, etc.) associated to knowledge processes in organizational context of a KM strategy. In summary, regardless of the size of complexity of organizations and their technological capacity, learning and knowledge processes are deliberately created by organization when it creates a learning and knowledge environment.

The literature review and previous study presented the model of how to introduce and sustain KM practice in organization. The success of the model requires human attention, innovation and creativity. It encompasses all the organization aspects of KM and this could support organization in developing countries and guide the transition to a knowledge economy. Intellectual capital components include human capital, structural capital and relational capital. They are the most important asset and can provide competitive advantage.

The review presented here suggests that there are various conceptual framework being carried out by different types of organization managing different type of business but again the goals and objectives of the framework is non other than to manage knowledge creation, articulation and dissemination processes which facilitates the practice of sharing and learning in the organization. This study could further develop or modify the presented framework, which serves as a starting point for developing and understanding of the relationship between knowledge management and organizational performance.

As for the framework or models, it is found that no particular model best suits the propose study in the National Library of Malaysia. However, a prolific result is hoped to be achieved by enhancing or blending some of the models. This study could use the KAFRA Framework (Okunoye, 2003) to evaluate the working environmental factors, of the National Library of Malaysia before it embarks on the practice of knowledge management. The link between the learning before/ during/ after circle from The Holistic Model (Collison and Parcell, 2001) may perhaps be used to propose a conceptual model on how to implement knowledge management in the National Library of Malaysia.

3. A Proposed Framework for Managing Knowledge in the NLM

Setting up frameworks for knowledge transfer (sharing) is the most important task in developing successful KM tools (Dixon 2000). Organization needs to define frameworks in which members in the organization can learn from each other. In order to be successful, these frameworks have to be supported by consistent and up-to-date knowledge. In order to assure the correctness of knowledge, it is proposed that knowledge update activities should be properly planned and coordinated in a collaborative way. In this way, a KM system becomes a way of enabling organizational learning for continuous process improvement based on continuous collaborative knowledge filtering and refining. The

proposed NLM knowledge bank as shown in Figure 1 will go through four main processes described below.
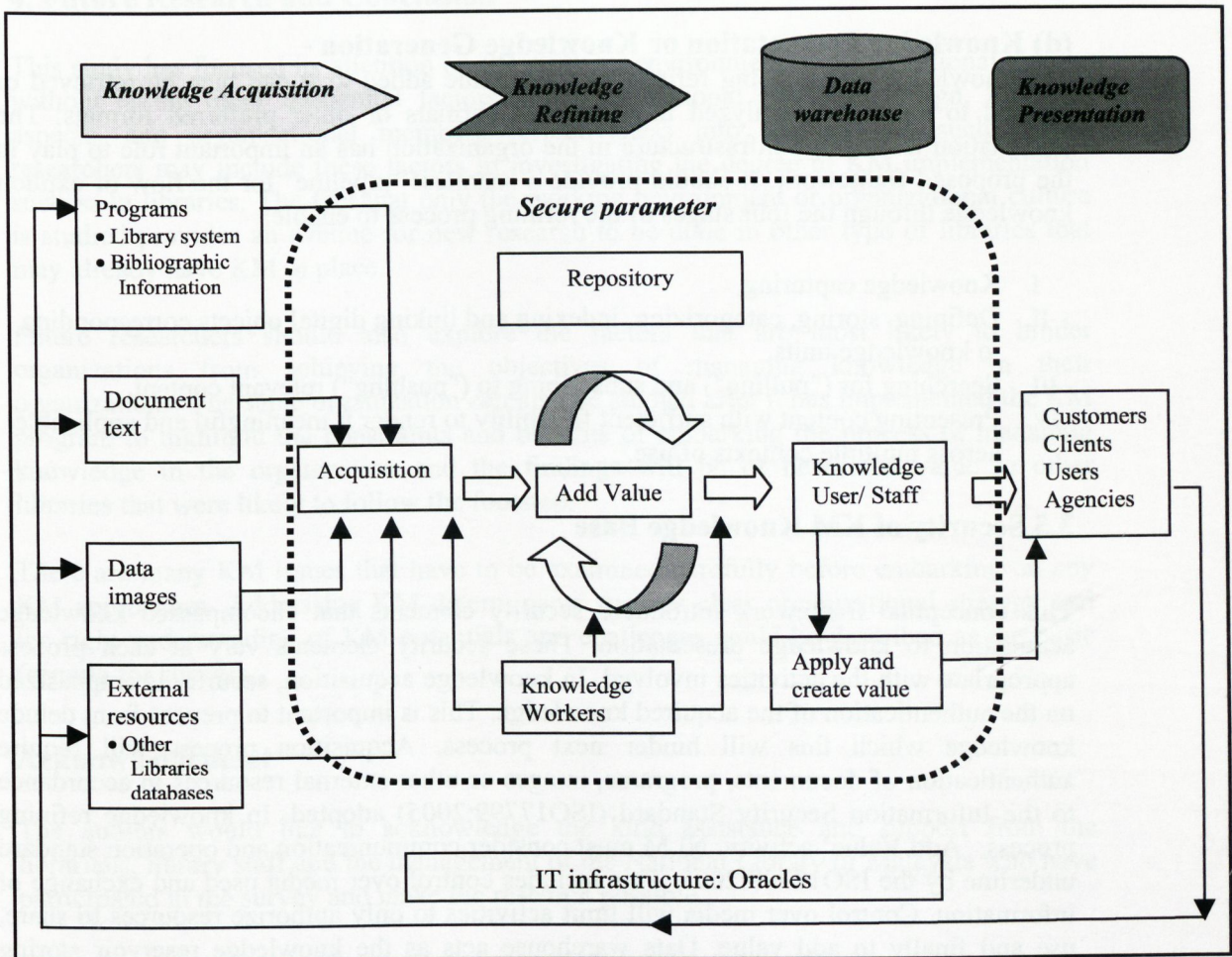

Figure 1: NLM Knowledge Bank

(a) Knowledge Acquisition

Information and knowledge is either created within the organization or can be acquired from many different internal and external sources. Internal sources include the Library system and programs available, Bibliographic information, Document Text and Data images. Knowledge can also be acquired from external source e.g. other libraries databases, other Ministries and departments etc.

(b) Knowledge Refining (Adding Value)

Captured knowledge, before being added to the Data warehouse, is subjected to value adding process (refining) such as cleansing, labeling, indexing, sorting, abstracting, standardizing, integrating and re-categorizing.

(c) Knowledge Storing and Retrieval (Repository or Data warehouse)

To reflect the full range of explicit organizational knowledge, repositories should strive to record significant and meaningful concepts, categories and definitions (declarative knowledge), processes, action and sequences of the events (procedural knowledge), circumstances and intentions under which knowledge was developed and is to be applied (specific contextual knowledge) and the linkages among them. The Data warehouse

should be indexed according to those concepts and categories (Taxonomy), providing access paths that are meaningful to the organization. It should accommodate changes to additions to that knowledge (e.g. by linking annotations) as subsequent authors and creators adapt the knowledge use in additional contexts.

(d) Knowledge Presentation or Knowledge Generation

The knowledge that is being refined and has value added to it can then be retrieved or queried to be use or analyzed in predefined formats or other preferred formats. The information technology infrastructure in the organization has an important role to play in the proposed framework. It should provide a seamless 'pipeline' for the flow of explicit knowledge through the four stages of the refining process to enable:

I. Knowledge capturing,
II. Defining, storing, categorizing, indexing and linking digital objects corresponding to knowledge units,
III. Searching for ("pulling") and subscribing to ("pushing") relevant content,
IV. Presenting content with sufficient flexibility to render it meaningful and applicable across multiple contexts of use.

3.5 Security of KM Knowledge Base

This conceptual framework introduces security elements that encompassed knowledge acquisition to knowledge presentation. These security elements vary at each process appropriate with the activities involved. In knowledge acquisition, security is emphasized on the authentication of the acquired knowledge. This is important to prevent from delude knowledge which this will hinder next process. Acquisition process will require authentication of documents, programs, images or other external resources in accordance to the Information Security Standard (ISO17799:2005) adopted. In knowledge refining process, 'Add Value' activity, NLM must consider communication and operation standard underline by the ISO17799:2005. This includes control over media used and exchange of information. Control over media will limit activities to only authorize resources to share, use and finally to add value. Data warehouse acts as the knowledge reservoir storing important knowledge in NLM. As an important depository of NLM, it is essential to secure activities involve in this process thus maintaining integrity of repository in this framework. In order to emulate integrity throughout the whole process, one of the foremost steps is to embrace information access control management, excising this standard as part of the policy of NLM.

The NLM Knowledge Bank will need to provide 'open' education and knowledge because it can be accessed by anyone, from anywhere and at any time. Users can immediately access all the data from various sources and allows for easily upload and share any kind of document/web content through the personalized interface that delivers vision of this web content and application. Knowledge bank can generate reports/statistics, be a knowledge resource and as analytical utilities. It will be able to act as a medium for knowledge capturing and dissemination in the organization. Working as a living memory through a defined 'knowing and forgetting' scenarios it should be capable of serving as a knowledge source that facilitates delivery to the right person at the right time.

Future expectations of the NLM Knowledge Bank include improving decision making of the top management in the organization. It should enhance responsiveness to the customers need or the library users. After implementing the NLM Knowledge Bank, there

will be an improvement in the efficiency of the staff and the operations, which can lead to innovative services, which could best serve the public.

4. Future Research and Conclusion

This study has focused its attention on the working environment or organizational culture without taking other influential factors like organizational structural design, financial aspects, and organizational members' effectiveness into account. As such, future researchers may include these factors in investigating the degree of KM implementation success in libraries. The fact that only the working environment or organizational culture is studied provides an avenue for new research to be done in other type of libraries that may already have KM in place.

Future researchers should also explore the factors that are most likely to hinder organizations from achieving the objectives of managing knowledge in their organizations. The same organization can also be studied after it has implemented the KM program to highlight the constraints and benefits of embarking the process of managing knowledge in the organization and the findings will be of beneficial value to other libraries that were likely to follow the footstep.

There are many KM issues that have to be examined carefully before embarking on any KM approaches. Addressing KM determinants such as clear organizational strategy and the right understanding of KM potentials and challenges could be described as the basic formula for success.

Acknowledgement

References

Collison, Christ and Geoff Parcell. 2001. *Learning to fly: practical lessons from the world's leading knowledge company*. Milford, CT: Captone publishing.

Dixon, N.M. 2000. *Common knowledge: how companies thrive by sharing what they know*. Cambridge, Mass.: Harvard Business School Press

Hidayat bin Hussain. 2001. Knowledge management model: towards organizational learning. Paper presented at the *PPM/PSZ Conference on Knowledge Management in the Digital World*. Johor Bahru, 22-24 October 2001.

ISO17799:2005 information security standard. Available at http://www.praxiom.com/iso-17799-3.htm

Lee, Hwa-Wei. 2006. *Knowledge management and the role of libraries*, Available at http://www.white-clouds.com/iclc/cliej/cl19lee.htm

Okunye, Adekunle Olusola. 2003. *Knowledge management and global diversity: a framework to support organisation in dveliping countries*. Finland: University University of Turku. Available at http://www.cc.jyu.fi.adeolun/e-papers/dissertaion2003.pdf

Perpustakaan Negara Malaysia, 2007. Available at http://www.pnm.my/

Vegas, Saadia Sanchez. 2004. Knowledge Management: Intellectual capital and social capital: An approach to Latin America. *IFLA Journal*, 30(2): 156 -165

Wiig, Karl. 1993. *Knowledge management foundations*. Vol. 1, 2 & 3. Texas: Schema Press.