

KNOWLEDGE MANAGEMENT (KM)- A NEW MANAGEMENT PARADIGM IN MINT

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Abstract *Knowledge management (KM) is one of the leading approaches used for organizational improvement in which a range of specific processes and practices for identifying, capturing, acquiring, organizing and preserving knowledge and for making it available for transfer, sharing and reuse across the organization are being used. KM can help research and development (R&D) organization to intensify innovation by using information and communication technology (ICT) to facilitate the knowledge flow. Even though KM is a new management paradigm in MINT, the KM structure, policy, objectives, strategies and initiatives has been established. However implementation rate is rather slow and the impact of KM initiatives is not readily felt. This paper has identified and compared KM case studies. These are analysed and assessed based on their challenges, strategies and lesson learnt from an ICT perspective. The analysis and assessment of the case studies is used to develop action plans to improve MINT KM implementation. The result of this analysis and assessment will be proposed as MINT KM solution in the future.*

Introduction

According to Abell in Ibrahim *et al.* (2006), there are five influential subjects that changes how people and organizations work. They are total quality management, business process reengineering, intangible assets, learning organizations, and knowledge management. As an innovative research and development (R&D) organization in the field of nuclear science and technology, MINT (Malaysian Institute for Nuclear Technology Researches) has to be excellent in research and applications of nuclear technology and contribute towards sustainable development of the country.

R&D organization is basically a knowledge-based organization in which knowledge is very important in the R&D process. According to Nonaka (1995), knowledge is within and between the minds of individuals and is tacitly possessed. Knowledge has the capability to add value to the organization (or individual). The focus of managing the knowledge is quite impossible, so we are really interested in facilitating knowledge flow. Davenport and Prusak (1998) added that information and communication technology (ICT) and R&D would go hand in hand in order to facilitate the knowledge flow (Davenport and Prusak, 1998). Loshin (2001) added that KM is the art or science of collecting organizational data and, by recognizing and understanding relationships pattern, turning it into usable, accessible information and valuable knowledge. Next, Mullin in Ibrahim *et al.* (2006) noted that a central focus for R&D, innovation is the successful exploitation of ideas to create a new, useful offering of product or service.

The findings stated above, clearly indicates the benefit of KM in an R&D organization such as MINT. Even though KM is a new management paradigm in MINT, the KM structure, policy, objectives, strategies and initiatives have been established. However implementation rate is rather slow and the impact of KM initiatives has not been felt. Perhaps some fundamental questions have not been answered. What performance goal(s) is the organization trying to achieve by having KM? Addressing this question will direct the organization to answer the following sub-questions Noordin and Hassan (2006) :

- What knowledge do we have?
- What knowledge to be managed?
- How to manage it?

The general goal of knowledge management is to capitalize the knowledge assets to achieve maximum attainable organizational performance (Noordin and Hassan, 2006). How does managing knowledge in MINT improves its performance? MINT needs to learn from others who have successfully implemented KM in their organizations, assess what is lacking and formulate new action plans.

KM in public sector organizations

Most research and application studies had been done in large private organizations and not much information about KM had been gathered from the public sectors. Successful companies are continually evolving in many ways, as they have to increase profit margins, sustain their growth and handle competition within their own markets. KM in public sectors is still at its infancy stage (Sharom *et al.*, 2006).

According to O'Dell and Grayson (1998), KM is about conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve organizational performance (Anon, 2003). Preliminary studies about knowledge sharing in Malaysia shows that KM is referring to individual attitude contributions in order to determine his or her intention to engage in knowledge sharing and to stay ahead of competition. To accomplish these goals, some actions should be taken such as Noordin and Hassan (2006).

- The organization is able to exploit internal knowledge within human memory of skilled employees
- The organization is able to convert individual knowledge into organizational knowledge, moreover, individuals must consciously undertake the task of sharing
- Knowledge sharing must be cultivated
- Organizations must provide means for such behaviour to be instilled within its employees

According to Von Krogh *et al.* (2000), an enabler as a conceptual tool is needed in order to describe a process or asset that allows an organization to achieve its objective. The enabler is used to describe KM efforts in order to emphasize on systems and infrastructures, which ensure knowledge is created, captured, shared, and leveraged. These include culture, technology and measurement (Anon, 2003). Three critical enablers have been identified in companies practicing KM. This is shown in Figure 1.

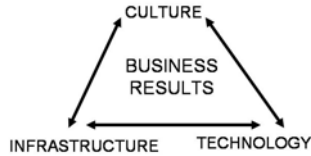


Figure 1. Three Enablers of Knowledge Flow (Ibrahim, 2006)

Davenport and Prusak (1998) added *culture* is the system of shared meaning within an organization that strongly influences the ways in which its members act. Culture permeates the organization and influences the infrastructure and IT. Culture has great impact and is difficult to change. *Infrastructure* includes physical layouts, hierarchies (organization structure) and the KM business processes. This category can include the KM program itself. Infrastructure impacts culture and can aid hinder the KM efforts, especially in terms of employee interaction (hence bi-directional arrows in Figure 1) Davenport and Prusak (1998). Finally, there is *information technology*. Much of the KM literature is dedicated to this aspect of KM strategies, especially in terms of codification of knowledge in the organization, as it can enable communication among employees and can foster innovation. The use of IT feeds back into the culture and can lead to a particular KM IT orientation. IT also has had a profound impact on infrastructure, reducing physical barriers of time and place, and affecting the legitimacy of hierarchies based solely on controlled access to information Ibrahim *et al.* (2006).

KM enablers are divided into two parts, which are technology enabler and organizational enabler. *Technology enabler* consists of technologies facilitating KM practices in the

organization such as expert system, knowledge bases, software helpdesk tools, document management systems and other IT systems supporting organizational knowledge flows. *Organizational enablers* for KM programs includes Communities of Practice, before-, after-, and during-action reviews, peer assists, information taxonomies, coaching and mentoring, and so on (Anon. , 2006).

KM enablers are so interwoven that change in one can result in inhibition by another unless *a holistic approach* is taken. The *holistic approach* is used to address the challenges, in order to develop, implement and maintain a viable and effective programme to support the organization objectives and results (Ibrahim *et al.* , 2006; Kassim, 2006).

KM Models

According to McElroy (2002), *first generation concepts* of KM centre on people sharing knowledge with each other. Knowledge could consist of ideas, documents, emails, media and etc. This idea fuelled the software industry to market products such as document management systems (DMSs) where members of an organization could post their knowledge objects for others to access. Knowledge sharing alone does not lead to innovation. Organizations

who only share knowledge often get locked up in stagnant knowledge that needs refining. Organizations today, more than ever need to be fluid and proactive to market trends. Knowledge sharing only lets an organization maintain not progress. The most referred model of the first generation concept is Nonaka and Takeguchi (1995) *Knowledge Creation Spiral Model*. It has classified knowledge into tacit (non-codifiable) and explicit knowledge (codified form such as books, manuals, reports etc.) then tacit knowledge can be converted into explicit knowledge through activities such as socialization, externalisation, internalisation and combination. When the knowledge conversion cycle completes into higher level then a new knowledge is created (Ibrahim *et al.*, 2006; Ahmed *et al.*, 2006).

Second generation of KM focuses on knowledge creation, a social process that can be enabled with software solutions. Knowledge creation starts with knowledge sharing. A contributor brings an idea to the table and members with their organization take that knowledge through a cycle of feedback and refinement. This process is also known as the *Knowledge Management Life Cycle* Anon. (2006). Organizational processes emphasize on information processing technologies as one of the elements contributing to management enhancement and leveraging human knowledge and learning for the benefit of the organization (Pervaiz *et al.* , 2002). Software products such as wiki and other collaboration software solution support this type of approach. According to

Dueck (2001), although IT plays a role in facilitating knowledge creation, capture and reuse, however, it is the people and their interaction that create knowledge Ibrahim *et al.* (2006).

There are two streams of activity that occur simultaneously in organizations, which are tactical and strategic. In the Knowledge Management Process Framework proposed by Bukowitz and Williams (2000), the *tactical* side of KM process which is the day to day use of knowledge spans four basic steps as i) people gather information they need for daily work, ii) use knowledge to create value, iii) learn from what they create and, ultimately, iv) feed this new knowledge back into the system for others to use as they tackle problems of their own. Secondly, *strategic* level KM which is a more long range process of matching intellectual capital to strategic requirements calls for i) a continual assessment for existing intellectual capital and a comparison with future needs, ii) build and sustain intellectual capital, and iii) divesting knowledge to create higher value. Yet looking at the organization through a KM lens calls forth a whole new model of organization – one that requires a new form of management and a new contract with the individuals that comprise the system and determines its success. It is not leadership as usual, but leadership as a partner with middle management and the front line. These approaches are defined by using the application of KM processes cycle (Figure 2) (Bukowitz and Williams, 2000; Kassim, 2006; and Tay , 2006).

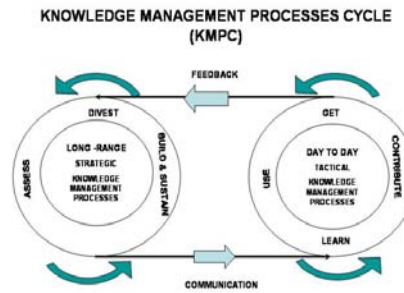


Figure 2. Knowledge Management Processes Cycle (KMPC) (adopted from Kassim, 2006)

Previous literature indicates that KM is not about technology but technology facilitates the effectiveness of KM through collective knowledge sharing and knowledge flow (Ibrahim *et al.*, 2006; Kassim, 2006). Information technology and infrastructure can be changed relatively quickly. However, a sustained commitment to the desired KM practices is required to drive the slower cultural evolution. IT can make it easy to access and share information and knowledge. The technology selected must be consistent with cultural goals of the organization and must be implemented immediately instead of waiting too long for the best technology. A new KM implementation needs six imperatives which are: i) instil organization's goal and strategies, ii) access tacit knowledge, iii) provide search tools, iv) promote creativity, v) capture new learning, and vi) build supportive culture Ibrahim *et al.* (2006).

Research Objectives

According to Aminuddin (2005), the first KM activity officially held in MINT was KM Awareness Workshop held in 2002. Next, in 2004, Human Resource

Development (HRD) Division reorganized how it carried out its function to be in line with KM principles. Following that, they produced new guidelines for staff and developed information system to facilitate implementation. At the same time, other KM enthusiasts or champions also implemented KM within their own area of responsibility and their contribution and support has been crucial. In 2005, KM strategic plan was formalised. The following policy is being adopted :

- Inculcating and nurturing KM habits particularly knowledge identification, acquisition, sharing and preservation
- Establishing mechanisms, procedures and systems to gather, organize and share explicit and tacit knowledge of researchers and technical support staff, lessons learnt and frequently used information so that it could be shared, utilized and further developed

MINT objectives are to inculcate KM culture, develop innovative k-workers, intensify innovation, increase customer and stakeholder satisfaction, and improve organizational excellence.

This paper will focus on KM strategies that could be supported by ICT:

- Capturing information and knowledge at the point it is produced and documenting, organising and preserving them systematically
- Encouraging utilization and sharing of knowledge
- Developing systems, procedures and technology to capture, share and utilize lessons learnt and develop best practices
- Organizing programs and develop systems for sharing and transferring knowledge on core competencies among organizational members
- Promoting formation of Communities of Practice (CoPs) to provide forum for sharing and transferring of knowledge through intellectual discussion, collaboration, cooperation and networking
- Developing infrastructure and information structure to support KM initiatives

There are many challenges faced in implementing KM in MINT:

- Nurturing KM culture such as knowledge sharing, knowledge capturing and knowledge preservation
- Implementing KM policy and strategic plans because it covers quite a broad scope
- Too many competencies and technologies are being developed
- Not enough man power to handle KM
- Lack of KM skills
- Some of the KM initiatives is not manageable and had to be terminated

From an IT perspective, MINT has successfully developed several KM tools such as shared folders, databases, MINT portal and basic KM systems like SPIWEB, My Asset and SMPK. However, utilization of these systems and tools needs to be increased and more tools and systems need to be developed and made available to fulfill the knowledge needs of the people in MINT.

The objectives of this paper are to identify weaknesses in the current KM practices and implementation and to make recommendations on how to overcome them.

Research Methodology

The research methodology is based on literature reviews on KM case studies. These case studies results and findings are collected from various organizations including local (Subang Jaya Municipal Council and IT companies in Klang Valley) and international firms (United States of America (USA), Europe, Japan and India) is discussed in identifying best practices and loopholes that should be avoided.

Case Studies

This paper analysed case studies by comparing challenges, strategies or initiatives and lesson learnt from local and international organizations. The tables of comparisons are shown below : (Mohamad, 2006; Ismail and Songip, 2006; Damodaran, 2006; Kassim, 2006; Singh, 2004; Tay, 2006).

1. Local Organizations:

- **Klang Valley IT Companies**

Challenges	Strategies/ Initiatives	Lesson learned
<ul style="list-style-type: none"> • Organizational managers lacked tools/management models to be used as guides 	<ul style="list-style-type: none"> • An implementation of a process-oriented model on KM activities in understanding, managing and evaluating KM processes in order to determine the impact on the organizational effectiveness 	<ul style="list-style-type: none"> • KM processes can improve organizational effectiveness if the organizational creativity is present • Companies (small to medium) find it easier to practice KM • KM processes cycle can assist organization in monitoring KM processes within an organization

- **Subang Jaya Municipal Council (MPSJ)**

Challenges	Strategies/ Initiatives	Lesson learned
<ul style="list-style-type: none"> • Creating a knowledge based staff and community that focus on the use of information, knowledge and easy communication as a value and wealth creation through intensive usage of ICT 	<ul style="list-style-type: none"> • Acquire an enterprise portal (OCPS) and encourage staff to use it through support management, steering committee and personal approach and single sign-on to integrate OCPS with other applications such as email, leave application and forum and training. 	<ul style="list-style-type: none"> • An effective knowledge sharing platform can improve organizational collaboration & communication and enhances productivity and efficiency of employee

2. International Organizations:

- **3M Corporation**

Challenges	Strategies/ Initiatives	Lesson learned
<ul style="list-style-type: none"> • Create environment where people are motivated to access and share information and to convert that information into knowledge 	<ul style="list-style-type: none"> • Concentrated on the tacit to tacit area of KM • Knowledge by design – defined the customers’ unarticulated needs into new innovations • Knowledge by emergence – developed product applications after new technologies were discovered 	<ul style="list-style-type: none"> • This company has successfully developed various diverse new products from the sharing of the same knowledge or innovation and defining knowledge goals, which give direction to innovative research and

		<p>development</p> <ul style="list-style-type: none"> Prerequisites of a successful KM implementation are: a conducive learning & experimenting work culture, top management long term commitment, job security and good recognition program leads to successful KM, global personal networks which resulted in knowledge sharing, acknowledge “heroes of innovation” and recruited the right people.
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• **World Bank International**

Challenges	Strategies/ Initiatives	Lesson learned
<ul style="list-style-type: none"> Provide all employees with “just-in-time” knowledge, provide customers with answers in a faster manner, increase its capacity for serving multiple stakeholders with the strategic use of existing and new knowledge Harness the technology to link people together and to leverage its impact for development Shift the culture towards sharing, set and implement knowledge quality standards, avoid knowledge “junkyards” Achieve an integrated knowledge approach across the organization 	<ul style="list-style-type: none"> Developed the Education Knowledge Management System (EKMS) to facilitate knowledge synthesis, stimulate discussion and identify areas that need attention and provided staff with access to best practice examples, tools and ideas 	<ul style="list-style-type: none"> Established an integrated KM framework Regulated the knowledge economy Consolidated external knowledge partnerships Facilitated the organizational cultural shift

• **ABC Inc. (not its real name), India**

Challenges	Strategies/ Initiatives	Lesson learned
<ul style="list-style-type: none"> • How to promote a sharing culture and make contributions and reuse happen • Tacit knowledge transfer – how to do it • Inadequate information and communication technology tools – to move from search engines to knowledge navigators, knowledge representation and search tools that gives user only useful knowledge, intelligent analysis of information, data mining etc. • Presence of conflicting technologies • Ensure quality and currency of content • Measure the benefits of KM 	<ul style="list-style-type: none"> • Promote knowledge sharing culture • Technology improvement by using expert system, OLAP (Online Application Processing), neural networks, and intelligent filters for external news etc. • KM portal and effective company-wide KM system establishment 	<ul style="list-style-type: none"> • The collection of sharable content, if not properly managed, can increase cost and can make later reuse difficult and impossible. Collection and reuse must be integrated into and become normal work processes. KM portal should satisfy employees’ need for personalized, just-in-time information. • A dedicated KM staff oversees the selection and presentation of information across the organization. KM Champions Group of representatives of projects can assist the KM staff. • Minimize knowledge sharing overhead by automating the capture of knowledge and making it a natural by-product of project execution. • Knowledge contribution and knowledge reuse activities need to be tied to incentives in order to be popular and widespread. • Annual conferences provide forums for sharing of new knowledge arising from the ‘research’ and distil the knowledge created to make it core knowledge.

		<ul style="list-style-type: none"> • Middle management support and acceptance is crucial because it can help evangelise and effectively convert the workforce under their charge. • The use of the latest, most up-to-date and best ICT tools cannot be overemphasized in the design and in maintaining the most effective KM system possible. • A systematic and grass-roots effort in developing a sound and mature process with the clear aim of developing a scalable and evolving enterprise-wide system that harnesses the sharable intellectual capital of the knowledge-work force is what would ultimately pay dividends.
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• **Various Organizations from USA, Europe and Japan**

Challenges	Strategies/ Initiatives	Lesson learned
<ul style="list-style-type: none"> • The knowledge management initiatives lack mass appeal • The initiative simply lack of depth • The knowledge is not qualified • Knowledge codification is ignored • The KM initiatives compete with too many other internal and external systems and processes as an authoritative knowledge 	<ul style="list-style-type: none"> • Established corporate intranet prominence inside the organization • Make KM initiatives appealing by attracting enthusiastic supporters or institutional support to reach critical mass where the benefits outweigh the time and dollar cost to support the endeavour. • Have depths in the initiatives using large and diversified 	<ul style="list-style-type: none"> • Company intranets can be used to communicate new values, business objectives and operational strategies to the rank-and -file

<p>source for employees.</p> <ul style="list-style-type: none"> Investing in an intranet is an expensive endeavour 	<p>repository for its use to become a habitual activity for many employees.</p> <ul style="list-style-type: none"> Validate knowledge captured Add metadata to the documents and organised the documents in a diversified repository to make it easier to search and extract knowledge. 	
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Findings, Suggestions and Future Studies

From this study it is found that:

1. MINT needs to determine its knowledge performance goals and address pertinent questions such as: what knowledge it has, what knowledge it has to manage and what is the most important knowledge to be managed? Knowledge goals must be defined to give direction to innovative R&D. The Competency Development Information System facilitates identification of knowledge and measurement of knowledge and competency levels but more systems are needed to support innovation and facilitate the generation of new knowledge from the existing knowledge.
2. MINT needs to qualify, codify and validate the knowledge stored and provide documents metadata for documents. There should be a dedicated KM staff to extract and edit knowledge and oversee the selection and presentation of information across organization, facilitate knowledge networks, set up and manage knowledge technology infrastructures.
3. MINT needs to integrate all the knowledge tools, databases and systems into an enterprise knowledge portal so that it can be easily accessed and used by the staff. This knowledge portal should have mass appeal and have large and diversified enough knowledge, tools and repository for its use to become a habitual activity. Effective KM system should be designed to facilitate knowledge synthesis, stimulate discussion, identify areas that need attention, harness the sharable intellectual capital of the knowledge-work force, communicate new values, business objectives and operational strategies to the rank-and -file and provide staff with access to best practice examples, tools and ideas.
4. Capturing of knowledge at the point of production must be further encouraged and work processes must be modified to make this happen. Systems and procedures must be developed to automate this and make it part of daily tasks or project execution.
5. MINT needs to evolve from knowledge sharing to the creation, use and reuse of knowledge and information, and turning it into usable, accessible information and valuable knowledge for the successful exploitation of ideas to create new offerings of product or service. It needs to put in place the latest technology and most up-to-date tools to handle this task and move to the second generation KM.
6. MINT needs to consciously move or transfer the right knowledge to the right people at the right time and help people share as well as put information into action in ways that improves organizational performance.
7. The use of IT supported KM systems can give a positive impact on organizational effectiveness provided all the necessary conditions are in place. MINT needs to fulfill all these conditions for example ability to access and exploit tacit knowledge, convert individual knowledge into organizational knowledge, provide search, promote creativity, capture new learning and build a supportive sharing culture.
8. Middle management and front line support should be engaged to evangelize KM and instill KM habits into the work force under their charge.

9. A mechanism to monitor KM processes should be established. KMPC can assist and monitor KM processes within an organization and should be considered in future KM implementation in order to monitor KM by identifying processes, which cause KM ineffectiveness in MINT.
10. KM is found to be more successful in small to medium organizations. It is difficult to implement KM in MINT because it is quite large, there are so many different technologies and competencies being developed and used, and several economic sectors to be served. Hence, to overcome this problem of being a large organization, KM activities should be designed to meet divisional, group and unit level

needs so that it is segmented into smaller size.

Conclusions

Analysing the case studies have helped in identifying weaknesses and loopholes in MINT KM practices and implementation and in providing some recommendations on how to overcome them. It is found that MINT is still operating in the first generation KM and therefore needs to make preparations to leap into the second generation KM as soon as possible. The KM initiatives and programs lack depth, breadth and intensity. Culture, infrastructure and technology enablers should be deployed together to give stronger impact.

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