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Research Article

Knowledge Management Implementation Frameworks: A Review

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One reason why many organizations are still struggling with knowledge management (KM) and failing in their endeavours to realize its full potential is that they lack the support of a strong theoretical foundation to guide them in its implementation. A sound KM implementation framework helps to fulfil this need by providing important guiding principles and directions. However, developing such a framework can be a challenging task for managers and practitioners as they may lack the knowledge of what characteristics, elements and constructs should be included in it. Implementation frameworks that do not have the necessary elements in place can paint an incomplete picture of KM and its implementation process, thus providing a suboptimal guidance for conducting KM. This paper reviews the existing KM implementation frameworks presented in the literature in order to determine and propose a set of guidelines for constructing them. By utilizing these guidelines to develop a KM implementation framework, it is hoped that a stronger theoretical foundation can be constructed, thus facilitating the accomplishment of KM. Copyright © 2004 John Wiley & Sons, Ltd.

INTRODUCTION

Knowledge management (KM) deals with the management of knowledge-related activities (Wiig, 1997; Civi, 2000) such as creating, organizing, sharing and using knowledge in order to create value for an organization. A more formal definition of KM, given by the American Productivity and Quality Center, is 'the strategies and processes of identifying, capturing and leveraging knowledge' (Manasco, 1996). It is an emerging field that has gained considerable attention, predominantly from the industrial community. This is evidenced by the significant number of organizations embarking on various KM programmes in their quest to enhance their competency and organizational performance. Clearly, the question now is no longer whether organizations need KM or not, but rather how they can implement and subsequently manage it.

Although the importance of KM has been widely promoted and recognized, it seems that few organizations are truly capable of leveraging and managing knowledge in their organizations. According to Storey and Barnett (2000), a significant proportion of KM initiatives will fail. This is because implementing KM is not a piecemeal and easy task that organizations can undertake. It involves the support of a technological infrastructure, a change in organizational culture and the management of different types of knowledge. Organizations that have jumped on the bandwagon to implement it may fail in their efforts if they do not know how and where to start and lack the guidance of a proper and cohesive implementation framework.

Implementing KM remains a challenging task for organizations and as Drucker (1993), the father of modern management theory, has asserted, one of the most important challenges facing organizations in a contemporary society is to build systematic practices for managing knowledge. Therefore, it is appropriate that a sound implementation framework be developed to guide organizations before

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the actual implementation takes place to ensure the success of their KM endeavours. The issue here is to provide directions on constructing a KM implementation framework and to reveal what key elements should be included in it. By simply constructing such a framework or adapting it from the literature, and blindly following it without having the proper elements in place, may hamper an organization's effort to successfully implement KM. In addition, it is important that a 'KM implementation framework' be viewed differently from a 'KM framework'. The former should suggest a way forward to implementing KM, whereas the latter might not be centred on this. This distinction can also be drawn from the information systems (IS) literature where there are frameworks that provide an understanding of IS (Bacon and Fitzgerald, 2001; O'Donovan and Roode, 2002) and those for implementing it (Hansen, 1995; Barnes and Targett, 1999).

This paper reviews the various KM implementation frameworks that have been reported in the literature, the purpose being to compare them, to identify their similarities and differences and to provide important insights about the elements or contents that are addressed. By doing this, the way is paved for the authors to suggest a set of guidelines for building a KM implementation framework. Acknowledgement of these guidelines will certainly lay the foundation for practitioners and managers to develop a more comprehensive, cohesive and applicable implementation framework that will help them in their journey towards achieving KM.

The main objective of this paper, therefore, is to propose a set of guidelines that entails key characteristics to be considered when constructing a KM implementation framework. To accomplish this, the paper first looks at the definition of an implementation framework and why one is needed in the KM field. It then goes on to identify and review the various KM implementation frameworks that have been presented in the literature by classifying them according to the approaches used in their construction. Following this, it discusses some of the important insights gained from analysing the implementation frameworks, such as their common features and limitations. Based on this analysis, the paper concludes with a set of guidelines for developing what should be a more comprehensive KM implementation framework.

DEFINING AN IMPLEMENTATION FRAMEWORK

Many researchers and scholars in the field of KM have used the word 'framework' in a haphazard and ad hoc manner without defining it (Jarrar, 2002; Mentzas, 2001; Gore and Gore, 1999). They have developed KM frameworks but no mention has been made regarding their meaning. In order to fully appreciate what is meant by a framework and to avoid confusion, a clear definition is needed.

The *Oxford English Dictionary* (2003) defines a framework as 'a structure composed of parts framed together, esp. one designed for enclosing or supporting anything; a frame or skeleton'. According to Popper (1994), a framework is a set of basic assumptions or fundamental principles of intellectual origin that forms the underlying basis for action. Thus, it can be interpreted as a structure that comprises relevant entities or a set of guiding principles and ideas that support a discipline. If KM is to be accomplished, a structure, a set of principles or a framework is needed to underpin and provide a theoretical basis for performing the relevant actions and activities.

Rubenstein-Montano *et al.* (2001b) stated that KM frameworks are characterized by their role as overseer or provider of guidance for the discipline. This means that they direct work in the discipline and provide guidance and direction for how KM should be carried out. Dale (1999) defined a framework as a means of developing and presenting plans; it is a guide that allows organizations to execute an appropriate course of action at a pace which suits their business situation. More essentially, frameworks secure links between theory and practice and so can help to ease the emergence of KM into practice.

The KM frameworks that have been presented in the literature tend to focus on different aspects of KM and have different purposes. Among them, the most notable includes the knowledge creation framework developed by Nonaka (1991, 1994) and Nonaka and Takeuchi (1995), which describes how the evolution and conversion between explicit knowledge (characterized by its ability to be codified or put in writing) and tacit knowledge (which is mostly people bounded and hard to articulate) can lead to a knowledge creation spiral in an organization. Arguably, this is not a KM framework per se, as it only deals with the creation of knowledge, which is only a portion of what constitutes KM.

The second type of KM framework found in the literature comprises those that characterize and describe the knowledge cycle processes of KM. As evident from the analysis carried out by Rubenstein-Montano *et al.* (2001a), many of them only provide a set of activities where the emphasis is on the knowledge cycle processes or activities. They mainly address the phases of knowledge

flow (from creation to application) in an organization without providing guidance on how to implement KM. As such, it is believed that this type of framework answers the question 'What is KM?' by explaining and describing the types of KM process. Examples of such frameworks are numerous and include the one by Bose and Sugumaran (2003) as well as a majority of those reviewed by Rubenstein-Montano *et al.* (2001a).

Another type of KM framework includes those that have been developed by researchers to serve as a basis for examining how KM has been performed in industry. These frameworks provide a reference to facilitate the structuring, analysis and evaluation of the KM initiatives undertaken in various case companies. The frameworks developed by Apostolou and Mentzas (1998) and Lai and Chu (2002) fall into this category.

The literature review has highlighted a further type of high-level KM framework. These are the ones that provide more detailed directions on the implementation of KM. This type of framework seems to address not only the question of 'what is' but also 'how to' because it prescribes and suggests ways for organizations to engage in KM activities. In essence, these are the implementation frameworks that are the focus of this paper.

Based on the general definition given for frameworks and the distinction between an 'implementation framework' and a 'framework' in the context of KM, it is appropriate to propose a definition for a KM implementation framework. In this paper, it is taken to be 'a structure or a set of guiding principles which is depicted in such a way as to provide guidance and direction on how to carry out KM in an organization. Essentially, it addresses not only the ''what is'' question by delineating the key concepts and elements of KM, but also the ''how to'' question by suggesting its *modus operandi*.'

WHY AN IMPLEMENTATION FRAMEWORK IS NEEDED

In the authors' opinion, developing a KM implementation framework should be the first stage of any initiative to implement KM. Developing such a framework lays the essential 'groundwork' and it can be equated to designing a prototype before a new vehicle is manufactured. It provides well defined constructs and guiding principles to ensure that there is no wavering from the KM plan. In other words, it helps to ensure that organizations do not veer from a correct path of accomplishing KM. Without proper guidance, organizations may focus too heavily on the use of information technology without bringing a correspondent change to their human and cultural aspects (Arora, 2002). They may focus their strategy on the management of explicit knowledge by improving access to it, its transfer and use while neglecting the management of tacit knowledge. In some cases, organizations pursue a KM initiative without aligning it with their overall business strategies and objectives, thus finding themselves to be less successful and not achieving their intended goals. All these problems emanate from the absence of a sound framework to guide the implementation process. In essence, a KM implementation framework is needed to support the implementation process and to improve the chances of successfully incorporating KM into an organization.

Based on the authors' perspective and some of the points raised by Holsapple and Joshi (2002), other reasons why a KM implementation framework is important, include the following:

- To improve the awareness and understanding of the KM domain. It provides a conceptual definition of KM and it helps people to understand what KM is and what knowledge elements and processes are involved. Thus, it helps to alleviate the confusion surrounding this discipline as it provides a clarification of the KM phenomenon.
- To provide a more holistic view of KM. It enables people to look at it and consider all its facets from a broader perspective. In addition, it helps people to reflect on and conceptualize KM in an integrative manner.
- It facilitates the communication of KM across an organization. A framework provides a common vocabulary and language for people. It helps managers to communicate their KM vision to their employees and it helps the discourse of KM implementation issues in the organization.
- It helps to determine the scope of KM projects and initiatives. This is because a framework sets the virtual boundary of KM for organizations to employ as it outlines the phases and activities to be addressed as well as the elements and influences to be considered.
- As an assessment tool, it helps managers and practitioners to determine if they have considered all the relevant issues pertaining to KM implementation. It helps managers to cover and address key issues of KM which might otherwise be overlooked.
- Finally, an implementation framework facilitates the management of the implementation process and helps to coordinate organizational efforts in a more systematic and controlled manner.

CLASSIFICATION OF IMPLEMENTATION FRAMEWORKS

To date, different approaches have been employed to construct frameworks. Some are depicted in the form of a diagram or visual representation, while others use a series of 'steps to be followed' (Yusof and Aspinwall, 2000). Based on these approaches, KM frameworks can be classified as either 'system', 'step' or 'hybrid'. The first describes and characterizes KM in the form of a graphical representation with the aim of providing a systemic and holistic perspective on KM implementation. Key constructs and elements are put together to provide both an overview of their relationship and a means of fully understanding the key issues in a unified manner. Step approach frameworks, on the other hand, provide a series of steps or procedures to be followed in the KM implementation process. System approach frameworks are therefore more 'descriptive' in nature whereas step approach frameworks are more 'prescriptive'. The hybrid contains elements of both of these approaches since it describes the overall perspective of the key concepts as well as prescribing steps to be followed. Publications regarding KM implementation frameworks were few and far between. However, those that were found will now be reviewed using the above classification. It should be noted that, while not all of these approaches have been clearly specified as implementation frameworks, they are included in the review because they are consistent with the authors' definition of implementation frameworks. The purpose is to draw some general inferences in order to propose a set of guidelines for developing such frameworks.

SYSTEM APPROACH FRAMEWORKS

Holsapple and Joshi (2002) proposed a threefold KM framework with three main building blocks, namely knowledge resources, KM activities and KM influences. The knowledge resources component represents the organization's pool of knowledge that is embodied in any of the six types of resources: participants' knowledge, culture, infrastructure, knowledge artifact, purpose and strategy. The KM activities block characterizes the processes that an organization should use to manipulate its knowledge resources. Holsapple and Joshi (2002) identified four such activities: acquiring, selecting, internalizing and using knowledge—the latter refers to the activities of generating and externalizing knowledge. How these activities are accomplished depends on the influence of a number of factors, which are set out in the third building block: KM influences. This block describes the influences that can shape the implementation of KM in an organization and they have been broadly grouped into three categories: resource (financial, human, knowledge and material), managerial (leadership, coordination and measurement) and environmental (competitors, customers, markets, suppliers and other 'climates'). Although their framework does not prescribe ways to conduct KM, the three building blocks when viewed together provide the key ingredients for implementing it.

Jarrar (2002) analysed 40 cases of KM application in various large organizations in order to identify best practices and, based on his analysis, he proposed a framework for KM implementation. It comprises four building blocks, each containing a set of activities and practices to successfully implement KM. 'Set a strategic priority for KM' is the first building block of the framework. He proposed that the starting point for KM is to give a strategic priority to its activities which can be facilitated through aligning the KM's goals and strategies with the organizational business strategies, linking KM to value creation, and gaining senior management support and commitment. The second building block is 'define and understand organizational knowledge'. Before embarking on the actual core processes of KM, organizations should define what they consider as knowledge, identify their knowledge assets and understand how and where knowledge is developed in their organization. Once the knowledge assets have been identified, organizations can then proceed to manage them. This gives rise to the third building block, which is 'manage knowledge'. This element deals with issues such as collecting, presenting, transferring and measuring knowledge, and focuses on building infrastructures and tools to support KM. Activities that are included in this block are establish a process to transfer learning within the organization; utilize information technology capability; employ a team to manage the KM process; and measure the value of intellectual capital. The last building block is the 'knowledge environment', which highlights the importance of a conducive and suitable organizational culture for facilitating knowledge sharing, creation and development in the organization.

Gore and Gore (1999) prescribed a knowledge management framework which can underpin the adoption of KM in an organization. They asserted that the *raison d'être* for a knowledge management approach is knowledge creation and, central to their framework, are three important aspects which

organizations should consider in implementing KM. The first is the exploitation of existing explicit knowledge in which activities such as reviewing the information flow and examining the utilization of current information bases would be beneficial to the organization. The second aspect is the capturing of new explicit knowledge that can be derived from the analysis of working practices, products and processes. The last aspect is the creation of tacit knowledge and its conversion into organizational knowledge. The opportunity to self-organize and to form teams is the main driver for tacit knowledge creation and, simultaneously, the interaction which takes place in the team forms a foundation for externalizing an individual's tacit knowledge into organizational knowledge. Together with these aspects, they also specified the importance of top management formulating a vision to underpin the whole KM process.

A framework developed within the context of the four phases review, conceptualize, reflect and act was discussed by Wiig *et al*. (1997) in their effort to suggest a range of methods and techniques for performing KM. The first phase, review, refers to the act of monitoring and evaluating organizational performance to determine whether expected results have been achieved or not. The second phase, conceptualize, consists of two main activities which are inventorying knowledge in an organization and analysing the knowledge household. Inventorying knowledge means discerning the state of knowledge in an organization by identifying the knowledge assets, determining which business processes use them and linking the two together. Analysis of the knowledge household refers to the identification of problems or bottlenecks, strengths, weaknesses, opportunities and threats concerning the knowledge. The reflect phase deals with the formulation and prioritization of improvement ideas, translating those selected into improvement plans and assessing their associated risk. The act phase points to the actual implementation of the plans and, typically, involves the following generic knowledge activities: develop, distribute, combine and consolidate. These four phases typify a KM cycle and jointly form an iterative and cyclic KM framework.

STEP APPROACH FRAMEWORKS

McCampbell *et al*. (1999) proposed a sequence of steps to guide the implementation of KM practices within an organization. They are:

(1) Form powerful coalition.
(2) Communicate vision of KM.
(3) Establish teams for needs assessment.
(4) Analyse the needs of KM.
(5) Identify and collect knowledge.
(6) Design a technological structure to warehouse knowledge.
(7) Test the technology.
(8) Maintenance of the technology.
(9) Retest the technology.
(10) Training of knowledge workers.
(11) Roll out the use of KM practices.
(12) Track usage.
(13) Make systems go live.
(14) Measure quality and productivity, measure the performance of KM practices, conduct a need assessment review (which are ongoing processes).

In their elaboration of these steps, they made a distinction between internal and external knowledge. Generally, their approach is technologically driven and focuses on building a knowledge repository because terms such as 'design a technological structure', 'test the technology', 'maintenance of the technology' and the like are central elements in their framework.

Wiig (1999) introduced a set of 16 common building blocks in a step-wise manner to guide the introduction of KM practices in an organization. They were presented in the following order of implementation:

(1) Obtain management buy-in.
(2) Survey and map the knowledge landscape.
(3) Plan the knowledge strategy.
(4) Create and define knowledge-related alternatives and potential initiatives.
(5) Portray benefit expectations for knowledge management initiatives.
(6) Set knowledge management priorities.
(7) Determine key knowledge requirements.
(8) Acquire key knowledge.
(9) Create integrated knowledge transfer programmes.
(10) Transform, distribute and apply knowledge assets.
(11) Establish and update a KM infrastructure.
(12) Manage knowledge assets.
(13) Construct incentive programmes.
(14) Coordinate KM activities and functions enterprise-wide.
(15) Facilitate knowledge-focused management.
(16) Monitor knowledge management.

Accompanying these building blocks, Wiig (1999) discussed the purpose and characteristics of each building block and provided examples of KM activities to introduce them.

HYBRID APPROACH FRAMEWORKS

A very comprehensive implementation approach has been developed by Rubenstein-Montano *et al.* (2001b). First, they built an underlying framework based on the notion of systems thinking, which is said to encourage the consideration of the entire knowledge spectrum. This framework depicted the KM tasks or processes to be performed and identified the attributes that could influence the success or failure of KM: organizational culture, learning, strategy and types of knowledge (explicit versus tacit). By adopting and building on the contexts and principles contained in this framework, they proceeded to develop a methodology, which prescribed a series of steps to be followed in implementing KM. The methodology is divided into five general phases: strategize, model, act, revise and transfer. Each phase is further decomposed into specific procedures and sub-procedures, providing a very detailed guide to performing KM. Mapping the elements described in the framework onto the steps proposed, it is apparent that strategy is addressed in the strategize phase as is culture, while learning is addressed in the act phase and KM tasks generally span all the phases. The types of knowledge (explict versus tacit), however, are not directly outlined in the phases and can only be implicitly deduced from certain of the sub-procedures proposed.

Mentzas (2001) suggested a framework to leverage the value of organizational assets. It is portrayed with the following elements and structure: (1) knowledge assets that need to be managed are at the heart of the framework; (2) knowledge strategy, process, structure and system, which are needed to facilitate knowledge-related activities, surround the knowledge assets; (3) knowledge interaction networks at the individual, team, organizational and inter-organizational levels make up the outer periphery of the framework. In addition, Mentzas (2001) outlined certain phases that can help the thinking and planning of a KM project. They are awareness—gain awareness about the importance and benefits of KM; plan—determine the vision, scope and feasibility of the KM initiative; develop—build, test and review the design of an holistic solution for KM; operate—roll out a company-wide KM implementation; measurement—measure the effectiveness of the KM initiative; and lastly training—provide training to the knowledge workers and staff on the new processes and technologies. This approach, together with that developed by Rubenstein-Montano *et al.* (2001b), are quite appealing and attractive because both of them have been explicitly organized into different phases which are quite similar to the Plan–Do–Check–Act (PDCA) cycle of quality management.

ANALYSIS OF IMPLEMENTATION FRAMEWORKS

Based on the review of the implementation frameworks, it is apparent that there is a lack of consistency amongst them since their constituents as well as their emphases tend to vary. This supports the view of Rubenstein-Montano *et al.* (2001a), who reviewed KM frameworks in general, that there is a lack of consensus and common ground about the necessary elements that should be covered. For example, while the framework proposed by Holsapple and Joshi (2002) outlines the existence of knowledge influences that can affect the conduct of KM, no influential factor is found to be depicted in the framework developed by Gore and Gore (1999) and McCampbell *et al.* (1999). Gore and Gore (1999) have specifically differentiated the knowledge types to be managed, i.e. tacit and explicit, but this issue was not addressed by Jarrar (2002) and Wiig *et al.* (1997).

It is not the intention here to provide a divergent view of the frameworks discussed, but instead to identify and consolidate the main elements or issues addressed in them in order to recommend a set of principles that should be considered in the development of a KM implementation framework. Based on a systematic deductive analysis, four elements can be inferred from the frameworks. They are:

(1) the structure;
(2) knowledge types or knowledge resources;
(3) KM processes or activities;
(4) KM influences or factors.

These four elements have been identified because they appeared to be the more salient ones found in the framework. Tables 1, 2 and 3 show the comparisons of each type of framework by mapping them onto these elements.

In terms of structure, the frameworks are compared on a Plan–Execute–Evaluate basis. In the system approach category, Wiig *et al.* (1997) explicitly structured their framework into four phases: conceptualize, reflect, act and review; while Holsapple and Joshi (2002) did not employ any structure. Those proposed by Jarrar (2002) and Gore and Gore (1999) did not appear to have a clear structure. With regard to the frameworks in the step approach category, no clear structure was

Table 1 Comparisons of system approach frameworks

	Holsapple and Joshi (2002)	Jarrar (2002)	Gore and Gore (1999)	Wiig *et al.* (1997)
Structure				
Plan	—	Set strategic priority Define and understand knowledge	Formulate vision	Conceptualize Reflect
Execute	—	—	—	Act
Evaluate	—	—	—	Review
Knowledge types/resources	Knowledge embedded in participants, culture, infrastructure, artifacts, purpose and strategy	—	Tacit knowledge Explicit knowledge	—
KM processes/ activities	Acquire, select, internalize and use knowledge	Collect, present, distribute and measure knowledge	Mainly focuses on knowledge creation and externalization	Develop, distribute, combine and consolidate knowledge
KM influences/factors	Resource influences Managerial influences Environmental influences	Knowledge environment	—	External and internal developments

'—', not indicated or not clearly indicated.

Table 2 Comparisons of step approach frameworks

	McCampbell *et al.* (1999)	Wiig (1999)
Structure		
Plan	Form powerful coalition Communicate vision of KM Establish teams for needs assessment Analyse the needs of KM	Obtain management buy-in Survey and map the knowledge landscape Plan the knowledge strategy Create and define knowledge-related alternatives and potential initiatives Portray benefit expectations for knowledge management initiatives Set knowledge management priorities Determine key knowledge requirements
Execute	Identify and collect knowledge Design a technological structure Test the technology Maintenance of the technology Retest the technology Training of knowledge workers Roll out the use of KM practices Make systems go live	Acquire key knowledge Create integrated knowledge transfer programmes Transform, distribute and apply knowledge assets Establish and update a KM infrastructure Manage knowledge assets Construct incentive programmes Coordinate KM activities and functions enterprise-wide Facilitate knowledge-focused management
Evaluate	Track usage Measure quality and productivity Measure the performance of KM practices Conduct a need assessment review	Monitor knowledge management
Knowledge types/resources	Internal knowledge External knowledge	Can be inferred from the step: 'manage knowledge assets'
KM processes/ activities	Identify and collect knowledge	Acquire, transform, distribute and apply knowledge
KM influences/ factors	—	Can be inferred from the steps: 'construct incentive programmes' and 'facilitate knowledge-focused management'

'—', not indicated or not clearly indicated.

Table 3 Comparisons of hybrid approach frameworks

	Rubenstein-Montano *et al.* (2001b)	Mentzas (2001)
Structure		
Plan	Strategize	Awareness
	Model	Plan
Execute	Act	Develop
	Transfer	Operate
Evaluate	Revise	Measurement
Knowledge types/ resources	Tacit knowledge Explicit knowledge	Knowledge assets
KM processes/ activities	KM tasks	Process
KM influences/ factors	Culture Strategy Learning	Strategy Structure System

delineated in either McCampbell *et al.*'s (1999) or Wiig's (1999). However, most of the steps that they proposed could be grouped into the Plan–Execute–Evaluate format. The hybrid approach frameworks seem to perform best in this aspect, because Rubenstein-Montano *et al.* (2001b) structured their approach into strategize, model, act, revise and transfer, while Mentzas (2001) organized his into different stages such as plan, develop, operate and measure.

The second element concerned the different types of knowledge. Gore and Gore (1999) and Rubenstein-Montano *et al.* (2001b) signified the presence of tacit and explicit knowledge in their frameworks, while McCampbell *et al.* (1999) differentiated between internal and external knowledge. Holsapple and Joshi (2002) acknowledged the distinction of various types of knowledge by classifying them into different knowledge resources, i.e. knowledge embedded in participants, culture, infrastructure, artifacts, purpose and strategy. Mentzas (2001), on the other hand, included the term 'knowledge assets' in his framework, but did not clearly specify what types needed to be managed. Aside from these, the issue of knowledge types and resources was either not addressed or inadequately addressed by the other frameworks.

One of the elements found in most of the frameworks reviewed was that involving the KM processes or activities. For example, Holsapple and Joshi (2002) suggested acquire, select, internalize and use knowledge; Jarrar (2002)—collect, present, distribute and measure knowledge; Wiig *et al.* (1997)—develop, distribute, combine and consolidate knowledge; McCampbell *et al.* (1999)—identify and collect knowledge; and Wiig (1999)—acquire, transform, distribute and apply knowledge. The framework developed by Gore and Gore (1999) was, however, rather one-sided in this respect, since it focused predominantly on knowledge creation and externalization.

Another constituent that seems to be covered by some of the frameworks was the KM influences or factors. For instance, Holsapple and Joshi (2002) cited 'resource', 'managerial' and 'environmental' as influences which could affect the bearing of KM in an organization, and Jarrar (2002) mentioned 'knowledge environment' in his framework. Rubenstein-Montano *et al.* (2001b) suggested culture, strategy and learning as influences, while strategy, structure and system were considered by Mentzas (2001) as elements which could facilitate knowledge creation and sharing.

Aside from these four key elements, one important consideration for a KM implementation framework which was found missing in most of those reviewed was the provision of an integrated and balanced view of the role which technology and human beings played in KM. Some of the frameworks did not explicitly mention this issue, while others seemed to underscore one particular element and neglect the other. For example, the series of steps prescribed by McCampbell *et al.* (1999) was very much technologically centred as it focused on developing a technological structure to support the KM process, whereas Holsapple and Joshi (2002) contended that their framework could be used in a technological and social domain, but they did not clearly show that in their framework. Generally, most of the frameworks reviewed did not adequately address this issue by providing a clear portrayal between a technological and a human element.

The discussions above therefore, lay the foundation for proposing guidelines to be followed when developing a KM implementation framework. The authors suggest that an implementation framework should:

(1) be developed with a clear structure such that it provides directions on how to conduct and implement KM;
(2) clearly delineate the knowledge resources or types of knowledge to be managed because different types of knowledge require different management strategies;
(3) highlight the necessary KM processes or activities which are needed to manipulate the knowledge;
(4) include the influences or factors that will affect the performance and bearing of KM;
(5) provide a balanced view between the role of technology and of human beings in KM.

Having suggested these guidelines, the next section will discuss why each in turn is crucial when constructing a KM implementation framework.

DISCUSSION OF GUIDELINES

As has been stated, the first element to be considered when developing a KM implementation framework is to employ a clear structure depicting the tasks which need to be undertaken. From an organization's perspective, a structure determines how employees are organized both horizontally and vertically, how tasks and responsibilities are divided among them and how they interact formally and informally with one another. Putting this into context demonstrates that an implementation framework should adopt a structure that can clearly organize and characterize the type of activities to be performed. One way to achieve this is to organize and divide the activities into different phases or stages, as evident from the frameworks developed by Wiig *et al.* (1997), Rubenstein-Montano *et al.* (2001b) and Mentzas (2001). Although different terminologies have been used by authors to structure their frameworks, there are similarities and common ideas amongst them. For instance, the term 'strategize' is quite analogous to 'conceptualize' because both are concerned with the planning of KM. Although there is no commonly accepted method for structuring a framework, a well defined concept such as the Plan–Do–Check–Act (PDCA) cycle (Dale and Cooper, 1992) can always be used to organize the tasks that need to be performed.

A KM implementation framework should recognize the different types of knowledge that reside in an organization in order to address them appropriately. To date, the most prevalent way to differentiate types of knowledge is to categorize it as either tacit or explicit. The distinction between the two should be apparent in the framework because each of them demands different management strategies. Explicit knowledge is formal and is often articulated, expressed, represented, codified and documented. It is relatively easy to store explicit knowledge in a repository and to transfer and distribute it throughout an organization. In contrast, tacit knowledge is very personal, deeply rooted in an individual's mind, and profoundly embedded in one's experience, action, behaviour and value. As such, it is hard to clearly express and codify tacit knowledge because it is something that is hidden and entrenched in an individual. Evidently, these two categories are located at different ends of the knowledge spectrum with disparate characteristics and hence should be treated differently. Tacit knowledge is created solely by individuals, whereas explicit knowledge can be acquired from external sources. A corporate listing of people who are knowledgeable in a particular area is one way of organizing tacit knowledge, whereas a computerized knowledge map would be more relevant for explicit knowledge. Likewise, face-to-face conversations, group meetings and practice forums are better for transferring tacit knowledge whereas shared lessons-learned databases, groupware and electronic data interchange are more appropriate for explicit knowledge. Goh (2002) suggested that tacit knowledge demanded a 'softer' and more interpersonal means of transfer but explicit knowledge required a 'harder' and more technologically driven approach. Rubenstein-Montano *et al.* (2001b) affirmed it quite aptly by stating that 'tacit knowledge cannot be treated in the same way explicit knowledge is treated'.

Having considered the types of knowledge to be managed, the next thing that should be covered in a KM implementation framework is the processes and activities that manage these knowledge resources. KM processes are fundamental functions that an organization performs in processing and manipulating its knowledge resources (Holsapple and Joshi, 2002). Some authors have referred to them as KM activities, while others have called them KM tasks, but conceptually they represent the same thing. They should be addressed in a KM implementation framework because they highlight to practitioners the major activities that should be undertaken to operate with their knowledge resources. Examples of such KM processes include creating, acquiring, capturing, organizing, storing, accessing, transferring, sharing, distributing, applying and using knowledge, to name but a few. It is these processes that actually create benefits for organizations from their knowledge resources. In retrospect, KM itself is concerned with the management of knowledge-related activities with the aim of enhancing an organization's performance. According to Wiig (1997), the chairman of the United States Knowledge Research Institute, KM is the management of effective knowledge processes (EKP) to maximize an enterprise's knowledge-related effectiveness and returns from its knowledge assets. These processes lie at the heart of KM and it is imperative, therefore, that a KM implementation framework gives a clear delineation and representation of those that are necessary. An assortment of KM processes has been reported in the literature and, in fact, there are many standalone frameworks that have been developed around this concept only.

In providing a more comprehensive guide to implementing KM, a framework should also answer the question of how the accomplishment of KM will be influenced. This suggests that an implementation framework should also take into account the influences that will shape the performance of KM. Practitioners and managers need to be aware of both the inhibitors that will impede their progress towards achieving a knowledge-based organization and the enablers that will facilitate their efforts in addressing KM. Acknowledging and appreciating these influences is crucial as it helps organizations to formulate measures to take advantage of and capitalize on the enablers that will help them, while at the same time mitigating and diminishing the inhibitors that will hinder their efforts. The types of influences that will affect the performance of KM have already been researched in great detail in the KM literature. Organizational culture, in particular, has been advocated by various researchers as a crucial factor that will determine the success or failure of a KM initiative (Beckman, 1999; Jarrar, 2002; Apostolou and Mentzas, 1998; Liebowitz, 1999). This is because organizational culture has far-reaching implications on how knowledge is created, shared and distributed in an organization. A culture that emphasizes knowledge hoarding, discredits trust, cooperation and collaboration, undermines learning and knowledge seeking, and encourages the punishment of mistakes, often finds it difficult to create and share knowledge. However, it is outside the scope of this paper to elaborate on what types of influences should be included in a framework, and the authors feel that it is sufficient to suggest that a comprehensive KM implementation framework should incorporate a set of influences that will provide important insights to managers for planning the right strategies to implement KM.

Another important consideration for a KM implementation framework is to provide a balanced view between a technological and a social approach to KM. If this issue is not adequately addressed, there may be an inherent tendency for practitioners to take an overly narrow approach towards implementing KM. An exclusive inclination towards either a pure technological or social view may lead to an incomplete picture of what is needed for a successful KM effort. An overly narrow approach to KM can be problematic and most technologically driven approaches have failed, largely because they ignored the people issues in KM (Carter and Scarbrough, 2001). Information technology is a good repository for storing knowledge and an effective channel for transferring knowledge that goes beyond the boundaries of space and time, but in itself is not KM. In contrast, humans alone are inadequate to promote good KM practice because they are slow in converting, manipulating and transferring knowledge. Therefore, KM should always be viewed as a system that comprises a technological subsystem as well as a social one, which is in line with the socio-technical perspective discussed by Sena and Shani (1999). In order to enable KM, both hard tools and soft skills need to be created and nurtured (Gao *et al.*, 2002; Offsey, 1997) and hence it is crucial that both elements are designed into a KM implementation framework.

CONCLUSIONS

One reason why many organizations are still struggling with KM and why they have not yet realized the full potential of a deliberate KM effort is that they lack the support of a strong foundation and theoretical underpinning to guide them. The authors believe that a sound KM implementation framework helps to fulfil this void by providing important guidelines and necessary support to help organizations embark on their journey to become knowledge-based organizations. It offers directions on how to implement KM and facilitate its transformation from theory into practice. However, developing a KM implementation framework can be a challenging task for managers and practitioners as they may be ignorant of what characteristics, elements and constructs should be included in the framework. Implementation frameworks that do not possess the necessary elements can paint an incomplete picture of KM and its implementation process, thus providing less than optimal guidance for organizations to accomplish KM.

In addition, the review of the existing KM implementation frameworks in this paper reveals that they are fragmented since the elements and constructs that characterize them tend to vary. There is little common ground and guidelines to provide a direction on what should be included in an implementation framework. Therefore, this paper advances a set of guidelines that should be considered when a KM implementation framework is to be developed. These guidelines are the results of the synthesis and analysis carried out on existing KM implementation frameworks and related KM literature. The guidelines proposed in this paper for developing a KM implementation framework are as follows:

(1) Incorporate a clear structure to organize the tasks.

(2) Address the different knowledge resources or types.
(3) Include the KM processes or activities that manipulate the knowledge.
(4) Point out the influences that can affect the performance of KM.
(5) Provide a balanced view between a technological and a social perspective.

These guidelines are felt by the authors to be imperative for KM for two reasons: (1) they provide a set of principles to help in the development of a more comprehensive implementation framework; and (2) they help to ensure that the same general requirements and elements are addressed when developing an implementation framework. Furthermore, these guidelines could be used as a useful benchmarking tool to evaluate KM implementation frameworks.

Arguably, it was found that most of the frameworks reviewed still suffer from certain drawbacks, which are not totally in accordance with the guidelines suggested in this paper. None of the frameworks reviewed has taken all the guidelines into account. The next stage of this research project is to develop a more comprehensive and pragmatic KM implementation framework that embraces all the guidelines provided above. Hopefully, with a stronger theoretical underpinning, the path towards implementing KM in organizations will be easier.

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