



Critical success factors for implementing knowledge management in small and medium enterprises

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Abstract

Purpose – To date, critical success factors (CSFs) for implementing knowledge management (KM) in small and medium enterprises (SMEs) have not been systematically investigated. Existing studies have derived their CSFs from large companies' perspectives and have not considered the needs of smaller businesses. This paper is aimed to bridge this gap.

Design/methodology/approach – Existing studies on CSFs were reviewed and their limitations were identified. By integrating insights drawn from these studies as well as adding some new factors, the author proposed a set of 11 CSFs which is believed to be more suitable for SMEs. The importance of the proposed CSFs was theoretically discussed and justified. In addition, an empirical assessment was conducted to evaluate the extent of success of this proposition.

Findings – The overall results from the empirical assessment were positive, thus reflecting the appropriateness of the proposed CSFs.

Practical implications – The set of CSFs can act as a list of items for SMEs to address when adopting KM. This helps to ensure that the essential issues and factors are covered during implementation. For academics, it provides a common language for them to discuss and study the factors crucial for the success of KM in SMEs.

Originality/value – This study is probably the first to provide an integrative perspective of CSFs for implementing KM in the SME sector. It gives valuable information, which hopefully will help this business sector to accomplish KM.

Keywords Critical success factors, Knowledge management, Small to medium-sized enterprises

Paper type Literature review

Introduction

Knowledge has become one of the critical driving forces for business success. Organisations are becoming more knowledge intensive, they are hiring “minds” more than “hands”, and the needs for leveraging the value of knowledge are increasing. As a result, knowledge has been treated systematically much like other tangible resources and many organisations are exploring the field of knowledge management (KM) in order to improve and sustain their competitiveness. The need for a more systematic and deliberate study on the critical success factors (CSFs) for implementing KM is crucial. Organisations need to be cognizant and aware of the factors that will influence the success of a KM initiative. Ignorance and oversight of the necessary important factors will likely hinder an organisation's effort to realise its full benefit.

Initially, KM appeared to be adopted only in large, multinational and international companies and hence, research work on CSFs has been largely centred on them. Most



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of these studies have not considered the differences of company size as well as the specific features of small and medium enterprises (SMEs) that could affect KM. However, as it has now become a widely spread business discipline, it is no longer the concern of just large organisations. As asserted by Frey (2001), although major corporations have led the way in introducing and implementing KM, it is increasingly important for small businesses to manage their collective intellect. Okunoye and Karsten (2002) stated that KM has indeed become the underlying sources for successful organisations regardless of their size and geographical locations. Therefore, a better understanding of the CSFs for implementing it in SMEs is needed in order to ensure the success of their efforts.

This paper compares and reviews the existing CSFs proposed by various authors in the literature. An analysis is conducted to identify their possible weaknesses and deficiencies, which could be further improved. By combining these factors, the author then proposes a set of CSFs for KM implementation, which is believed to be more suitable for SMEs. Each of the proposed CSFs is discussed and the results of an empirical assessment employed to evaluate them are then reported.

Review of critical factors for KM implementation

A broad range of factors that can influence the success of KM implementation has been mentioned in the literature. For example, much has been stated about culture, information technology (IT) and leadership as important considerations for its accomplishment. However, no systematic work exists on characterising a collective set of CSFs for implementing KM in the SME sector. An appropriate set of CSFs which are relevant for SMEs will help them to keep in mind the important issues that should be dealt with when designing and implementing a KM initiative.

CSFs can be defined as “areas in which results, if they are satisfactory, will ensure successful competitive performance for the organisation” (Rockart, 1979). Saraph *et al.* (1989) viewed them as those critical areas of managerial planning and action that must be practised in order to achieve effectiveness. In terms of KM, they can be viewed as those activities and practices that should be addressed in order to ensure its successful implementation. These practices would either need to be nurtured if they already existed or be developed if they were still not in place. Based on the above definition, CSFs in this study are treated as those internal factors which are controllable by an organisation. External factors such as environmental influences are not taken into account since organisations have little control over them when implementing KM. Some of the pertinent studies on CSFs for KM will now be reviewed and their possible weaknesses highlighted.

Based on the insights gleaned from the study of practices and experiences of leading companies in the KM field, Skyrme and Amidon (1997) highlighted seven key success factors. These include a strong link to a business imperative, a compelling vision and architecture, knowledge leadership, a knowledge creating and sharing culture, continuous learning, a well-developed technology infrastructure and systematic organisational knowledge processes. It was stated that not all of these factors would be important for small scale pilot projects. However, they would certainly need to be considered for those organisations that were formalising KM or transforming themselves into true knowledge-based enterprises.

A study to investigate the factors which can influence the management of knowledge in organisations was carried out by Holsapple and Joshi (2000). First, they derived a set of factors from various literature sources. Then, they conducted a Delphi study, comprising an international panel of KM academics and practitioners to further explore and evaluate the factors that they had developed earlier. They proposed three major classes of influences (managerial, resource and environmental), with different factors in each. Managerial influences comprised four main factors, coordination, control, measurement and leadership; resource influences consisted of knowledge, human, material and financial resources; whereas environmental influences included factors such as competition, markets, time pressure, governmental and economic climates, etc.

From the evaluation of their Delphi study (final round), it was reported that there was a lack of detailed inclusion of technology and culture as critical factors. For example, culture was not explicitly presented but was only included as a sub-concept under the knowledge resource factor. This representation is somewhat insignificant. In the author's opinion, culture is a very important consideration for KM and it should be represented as a factor, rather than as a sub-element of another. Certain factors were also perceived to be missing such as knowledge infrastructure, communication, training, education, organisational planning, strategy setting, and reward issues. In addition, it was argued by one of the panels that the process of implementing KM would entail the need for sponsorship, support and understanding, not merely leadership as proposed by them. Nevertheless, all these concerns should be considered in an effort to further develop and refine the critical factors.

Davenport *et al.* (1998) conducted an exploratory study on 31 KM projects in 24 companies, one of the aims being to determine the factors associated with their effectiveness. Before doing so, they evaluated the performance of the projects using indicators analogous to those for assessing the success of other business change initiatives. As a result, 18 projects were classified as successful, from which eight common success factors were identified. They were linking KM to economic performance or industry value, a clear purpose and language, a standard and flexible knowledge structure, multiple channels for knowledge transfer, a knowledge-friendly culture, a technical and organisational infrastructure, change in motivational practices, and senior management support. It was further stated that while the last four factors were the hardest to develop, they were also the ones that mattered most. However, since this was an exploratory study, it was agreed by Davenport *et al.* (1998) that linking the identified factors to the success of KM should be viewed as hypothesised, not proven.

Chourides *et al.* (2003) identified various critical factors for successful KM implementation in five organisational functional areas: strategy, human resource management (HRM), IT, quality and marketing. Their work was built upon an earlier questionnaire survey of the financial times stock exchange (FTSE) 100 companies as well as a review of existing literature to identify key practices and factors for adopting KM. Subsequently, they conducted a longitudinal study in eight case organisations, which were at various stages of implementing KM programmes to further compare and assess their critical factors. In particular, interviews with key staff of these organisations were conducted for this purpose.

The way in which their critical factors are presented are like “a list of things to do” rather than a set of CSFs as suggested by other authors such as Skyrme and Amidon (1997) and Davenport *et al.* (1998). An in-depth scrutiny of their critical factors unveil some emerging concerns and issues. The author feels that some of their factors are too specific which might be hard to generalise across organisations. For example, they suggested monitoring the “KM people portfolio matrix” as a critical factor for KM in the HRM area. This matrix is merely one of the many techniques that can be utilised to facilitate the conduct of a people audit. Arguably, organisations can also employ other alternatives to monitor their people in order to be successful in KM.

Besides this, certain critical factors such as “improve time to market skills” and “improve organisation velocity to respond to customer needs” are less appropriate. It can be argued that these are the things that organisations should do to improve their efficiency and customer satisfaction. They can be interpreted as the objectives or purposes of KM, not those that are vital for making KM a success. Clearly, they are not in line with the definition of CSFs as provided earlier in the paper. Another factor, which is “innovation through research” is also less relevant for SMEs. This is because not all of them are involved in a research activity and thus, calling for a critical need to conduct this activity can be misleading.

Liebowitz (1999) proposed six key ingredients in order to make KM successful in organisations. He suggested the need for a KM strategy with support from senior leadership, a chief knowledge officer (CKO) or equivalent and a KM infrastructure, knowledge ontologies and repositories, KM systems and tools, incentives to encourage knowledge sharing and a supportive culture. Specifically, important lessons learnt from firms who were early adopters of KM were used to support his propositions. In the first ingredient, he advocated the creation of a centre of expertise for every knowledge discipline or subject matter, as a KM strategy which could be undertaken by organisations. The resource requirement for such an activity could be tremendous and this reflects a focus towards those organisations that have the necessary expertise, human and financial resources.

According to Hasanali (2002), the success of a KM effort depends on many factors. He highlighted five categories of factors namely leadership, culture, structure, roles and responsibilities, IT infrastructures, and measurement. Likewise, the APQC (1999) included strategy and leadership, culture, technology and measurement in their framework as enablers which can support the operation of KM. Although these factors are eminently sensible, it is believed that the success of KM is dependent on more aspects. A comprehensive set of factors is needed to give a more complete view of those that are necessary. Table I provides a comparative summary of some of the main issues of these studies.

Analysis of the critical factors

Previous studies of CSFs for KM implementation have been heavily focused on large companies. This is because most of the early adopters and superior performers of KM were in fact large and multinational corporations. As such, existing factors are mainly large companies oriented, thereby reflecting their situations and needs. Directly applying these factors into the SMEs environment may not be sufficient without an understanding of their very own and specific conditions. Previous studies fall short of studying and identifying the CSFs from the SMEs perspective. They have not

Author(s)	Objective	Origin of factors	Outcome
Skyrme and Amidon (1997)	To present the key success factors for KM	Study of leading companies in KM	Seven factors
Davenport <i>et al.</i> (1998)	To identify the factors that contribute to the success of KM projects	Exploratory study of 18 successful KM projects in organisations which were early adopters of KM	Eight factors
Holsapple and Joshi (2000)	To develop and assess a descriptive framework for characterising the factors that influence KM	Various literature sources, an initial framework and a Delphi study comprising KM academics and practitioners	Three main categories of influences with different factors in each category
Chourides <i>et al.</i> (2003)	To derive best practices and performance measures for KM	Review of existing theories, a survey of FTSE 100 companies and longitudinal studies of eight case organisations	A range of factors in five functional areas
Liebowitz (1999)	To describe the key ingredients for successful KM	Synthesis of important lessons learnt from early adopters of KM	Six ingredients
Hasanali (2002)	To present the CSFs for KM	Consulting experience	Five categories of factors
APQC (1999)	To use the enablers as a basis for structuring their benchmarking studies	Consulting experience. Co-developed with Arthur Andersen.	Four enablers

Table I.
Comparisons of studies on critical factors for KM

considered the features, characteristics and situations of smaller firms. Nor have they explored other factors, which could potentially be more important for SMEs when accomplishing KM.

The availability of resources in an organisation is crucial because it can govern the quantity and quality of efforts which can be expended on KM. If there is an obstacle to achieving effective KM in SMEs, it is very probably due to their resources. SMEs are not like "little large businesses". In general, they have a scarcity of resources (Welsh and White, 1981; Lee and Oakes, 1995; Motwani *et al.*, 1998; OECD, 2002; Jun and Cai, 2003) i.e. lack of time, financial and human resources, which differentiates them from their larger counterparts. Resource is therefore inevitably an important factor to be considered when implementing KM in the SME sector. However, this is an aspect which has been overlooked by most of the studies reviewed. Aside from Holsapple and Joshi (2000), no other authors have included it as an essential factor.

No mention is made of the need to provide training to employees when embarking on a KM journey. While large organisations may have long grasped the underlying concept of KM and have advanced knowledge on various related technologies, this is not necessarily true for SMEs. Jeffcoate *et al.* (2000) stated that SMEs have limited knowledge on technology and lack technical expertise. Similarly, Lim and Klobas (2000) pointed out that small businesses lack an understanding of KM processes. Thus, it appears that there is a greater need for SMEs to provide appropriate training associated with KM, to their employees.

Another central KM issue in SMEs is the occurrence of knowledge loss, through key employees leaving the companies (Wong and Radcliffe, 2000; Wickert and Herschel, 2001; Finn and Phillips, 2002). SMEs are prone to this phenomenon, since individuals are constantly seeking better careers and job prospects, and higher salaries in larger organisations. Without doubt, when employees leave a company, they will take with them all the knowledge that is embedded in their mind. Retaining employees in an organisation is highly dependent on effective people management strategies. In fact, people management plays a much wider role and it lies at the heart of KM. Based on the above review, it has not been explicitly addressed as a critical factor for KM.

Proposed critical factors for SMEs

As is evident, different sets of CSFs have been put forward by different authors. In spite of this, they can possibly be grouped into a number of generic factors such as management leadership and support, culture, technology, strategy, measurement, roles and responsibilities, etc. These are common in KM efforts and therefore, they are also believed to be applicable to SMEs.

However, one should also consider the needs and situations of SMEs when developing CSFs for them. As mentioned earlier, there are some distinctive issues that require considerable attention in the SME sector. In order to address these issues and to compensate for the drawbacks of previous studies, new factors should be introduced. By integrating the common factors and introducing some new ones, the author proposes a more comprehensive model of 11 factors for implementing KM in SMEs. They are:

- management leadership and support;
- culture;

- IT;
- strategy and purpose;
- measurement;
- organisational infrastructure;
- processes and activities;
- motivational aids;
- resources;
- training and education; and
- HRM.

This proposition is the result of a systematic effort that identifies the factors in a holistic, integrative and comprehensive manner. Although there are some similarities with previous studies, two new factors have been added. A comparison between the author's proposed factors with those of other authors is given in Table II. Having proposed the CSFs for implementing KM in SMEs, the next section will discuss each of them in detail.

Discussion

Management leadership and support

Management leadership plays a key role in influencing the success of KM (Horak, 2001; Pan and Scarbrough, 1998; Holsapple and Joshi, 2000; Ribiere and Sitar, 2003). Leaders are important in acting as role models to exemplify the desired behaviour for KM. They should for example, exhibit a willingness to share and offer their knowledge freely with others in the organisation, to continuously learn, and to search for new knowledge and ideas. It is vital that they model their behaviours and actions through deeds, not just words. By doing so, they can further influence other employees to imitate them and increase the propensity of employees to participate in KM. Other leadership competencies that would be important include steering the change effort, conveying the importance of KM to employees, maintaining their morale, and creating a culture that promotes knowledge sharing and creation. In essence, leaders establish the necessary conditions for effective KM (Holsapple and Joshi, 2000).

As with all change and improvement programmes, support and commitment from senior management is critical to a KM initiative (Martensson, 2000; Manasco, 1996; Truch, 2001; Jarrar, 2002; Sharp, 2003; Davenport *et al.*, 1998). Storey and Barnett (2000) added that support from top management should be ongoing and be delivered in a practical manner. Such support could then be transformed into concerted efforts that would contribute to the success of KM.

Culture

Organisational culture is another imperative factor for successful KM (Davenport *et al.*, 1998; Pan and Scarbrough, 1998; Martensson, 2000). It defines the core beliefs, values, norms and social customs that govern the way individuals act and behave in an organisation. In general, a culture supportive of KM is one that highly values knowledge and encourages its creation, sharing and application. The biggest challenge for most KM efforts actually lies in developing such a culture. A survey result reported

Table II.
Comparisons between the
author's proposed CSFs
and those of other studies

General factors	Skyrme and Amidon (1997)	Holsapple and Joshi (2000)	Davenport <i>et al.</i> (1998)	Liebowitz (1999)	Hasanali (2002)	APQC (1999)	Author's proposition
Management leadership and support	Knowledge leadership	Leadership	Senior management support	Senior leadership support	Leadership	Leadership	Management leadership and support
Culture	A knowledge creating and sharing culture		Knowledge-friendly culture	A supportive culture	Culture	Culture	Culture
Technology	A well-developed technology infrastructure		Technical infrastructure Standard and flexible knowledge structure	Knowledge ontologies and repositories KM systems and tools	IT infrastructure	Technology	IT
Strategy	Strong link to a business imperative A compelling vision and architecture		Clear purpose and language	A KM strategy		Strategy	Strategy and purpose
Measurement		Measurement	Link to economic performance or industry value		Measurement	Measurement	Measurement
Roles and responsibilities			Organisation infrastructure	A CKO or equivalent and a KM infrastructure	Structure, roles and responsibilities		Organisational infrastructure
Processes	Systematic organisational knowledge processes Continuous learning	Control Coordination	Multiple channels for knowledge transfer				Processes and activities
Rewards and recognition			Change in motivational practices	Incentives to encourage knowledge sharing			Motivational aids
Other		Resources					Resources Training and education Human resource management

by Chase (1997) affirmed that culture was the largest obstacle faced by organisations in creating a successful knowledge-based enterprise.

Since culture is a wide concept, it comprises many facets. One cultural aspect which is crucial for KM is collaboration. Goh (2002) asserted that a collaborative culture is an important condition for knowledge transfer to happen between individuals and groups. This is because knowledge transfer requires individuals to come together to interact, exchange ideas and share knowledge with one another. Not only this, collaboration has been empirically shown to be a significant contributor to knowledge creation (Lee and Choi, 2003). Trust is also another fundamental aspect of a knowledge friendly culture (Stonehouse and Pemberton, 1999; DeTienne and Jackson, 2001; Lee and Choi, 2003). Without a high degree of mutual trust, people will be sceptical about the intentions and behaviours of others and thus, they will likely withhold their knowledge. Building a relationship of trust between individuals and groups will help to facilitate a more proactive and open knowledge sharing process.

Besides this, there is a need to foster an innovative culture in which individuals are constantly encouraged to generate new ideas, knowledge and solutions. Likewise, Goh (2002) suggested a culture which emphasises problem seeking and solving. Individuals should also be permitted to query existing practice and to take actions through empowerment (Stonehouse and Pemberton, 1999). By empowering individuals, they will have more freedom and opportunities to explore new possibilities and approaches. Equally important is the element of openness whereby mistakes are openly shared without the fear of punishment. In this respect, reasonable mistakes and failures are not only tolerated but allowed and forgiven. Making mistakes should be viewed as an investment process in individuals because it can be a key source of learning.

Owing to the highly influential nature of a culture to the success of KM, Davenport *et al.* (1998) asserted that companies should ensure that their KM initiatives fit into their organisational culture, or else they should be prepared to change it. The importance of matching a KM initiative with the culture, style and core value of an organisation was also highlighted by McDermott and O'Dell (2001).

Information technology

It is indisputable that one of the key enablers for implementing KM is IT. Its capability has evolved from merely being a static archive of information to being a connector of a human to information and of one human to another. IT can enable rapid search, access and retrieval of information, and can support collaboration and communication between organisational members. In essence, it can certainly play a variety of roles to support an organisation's KM processes (Alavi and Leidner, 2001; Lee and Hong, 2002). However, it is noteworthy to recognise that IT is only a tool not an ultimate solution (Wong and Aspinwall, 2003).

There is a broad collection of information technologies that supports KM which can be applied and integrated into an organisation's technological platform. According to Luan and Serban (2002) they can be grouped into one or more of the following categories: business intelligence, knowledge base, collaboration, content and document management, portals, customer relationship management, data mining, workflow, search, and e-learning. Important factors that need to be considered in the development of a KM system include simplicity of technology, ease of use, suitability to users' needs,

Strategy and purpose

One of the means for driving the success of KM is to have a clear and well-planned strategy (Liebowitz, 1999). This provides the foundation for how an organisation can deploy its capabilities and resources to achieve its KM goals. While several strategies for implementing KM have been suggested in the literature (O'Dell *et al.*, 1999; Liebowitz, 1999; Soliman and Spooner, 2000), a suitable one should be well adjusted to the situation and context of the organisation in hand. In order to attach more significance to a KM strategy, it should support an imperative business issue of an organisation. There seems to be common agreement in the literature that it has to be linked or integrated with the enterprise business strategy (Zack, 1999; Cook, 1999; Maier and Remus, 2002).

Closely related to the notion of strategy, is the development of a compelling and shared vision for pursuing KM. It is essential that employees support this vision and believe that it will work. In addition, clear objectives, purposes and goals need to be set and understood by everyone involved. To further expand this, the value proposition of KM has to be clearly laid down in order to create a passion among management and employees to accomplish it. In short, all the above elements need to be carefully developed before a substantial investment is made to initiate a KM effort.

Measurement

Measurement acts like a data collection system that gives useful information about a particular situation or activity. An initiative like KM will suffer the risk of becoming just another management fad, if it is left unmeasured. Sayings like "you cannot manage what you cannot measure" and "what is measured is what gets done" certainly hold true for KM. According to Arora (2002) and Ahmed *et al.* (1999), measuring KM is necessary in order to ensure that its envisioned objectives are being attained. Measurement enables organisations to track the progress of KM and to determine its benefits and effectiveness. Essentially, it provides a basis for organisations to evaluate, compare, control and improve upon the performance of KM (Ahmed *et al.*, 1999).

Measurement is also needed to demonstrate the value and worthiness of a KM initiative to management and stakeholders. Without such evidence, support and confidence from top management to sustain it will diminish. Since it is difficult, if not impossible to quantify the benefits of KM in the short term, providing narrative indicators to reflect its success at its early stage is important. Another key aspect of measurement is to evaluate the impact that KM has on bottom line financial results. However, linking KM activities directly to financial results can be tough, since many intertwining variables can affect the financial performance of a company at the same time. While it is important to correlate them, care must be taken not to claim a pure causal relationship (Hasanali, 2002).

It is important that traditional hard measures are supplemented by soft, nonfinancial measures in order to provide a more holistic approach to measuring KM (Ahmed *et al.*, 1999). Some of the methods being used include intellectual capital metrics (Sveiby, 1997; Liebowitz and Suen, 2000; Bontis, 2001) and the balanced scorecard (Kaplan and Norton, 1992; Arora, 2002). Nevertheless, there is still no

absolute method for measuring KM in an organisation (Gupta *et al.*, 2000), and this is an area which is still being explored by academics and practitioners (de Gooijer, 2000).

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Organisational infrastructure

Another central aspect for implementing KM is the development of an appropriate organisational infrastructure. This implies establishing a set of roles and teams to perform knowledge-related tasks (Davenport *et al.*, 1998). Despite the fact that some existing functions within an organisation such as HRM and IT have already been working with knowledge issues, establishing a group of people with specific and formal responsibilities for KM is crucial. Roles within this team can either be devolved to existing positions or to new ones.

One of the more commonly mentioned roles in the literature is the CKO or equivalent. He/she takes the leading role to coordinate, manage and set the course for KM (Earl and Scott (1999), Abell and Oxbrow (1999), Herschel and Nemati (2000), Davenport and Volpel (2001), and Grover and Davenport (2001) for a more detailed elaboration of a CKO). While large companies may have the resources to establish a team with multiple layers of roles for KM, SMEs will need to take a smaller scale approach.

Processes and activities

A KM process refers to something that can be done with knowledge in the organisation (Johannsen, 2000). Processes that can possibly characterise the KM discipline are numerous. Many authors have suggested a number of activities or processes associated with KM (Alavi and Leidner, 2001; Nissen *et al.*, 2000; Wong and Aspinwall, 2003; Bhatt, 2000; Despres and Chauvel, 1999; Marshall *et al.*, 1997; Demarest, 1997). For example, four main processes were discerned by Alavi and Leidner (2001): creation, storage/retrieval, transfer and application. The execution of KM processes lies at the heart of creating a successful knowledge-based enterprise. Thus, it is important that organisations adopt a process-based view to KM.

Appropriate interventions and mechanisms need to be in place in order to ensure that KM processes are addressed in a systematic and structured manner. For instance, in knowledge sharing, technological networking tools should be supplemented with face-to-face discussion because the latter can provide a richer medium for transferring knowledge. Coordination of the KM processes to be performed is also crucial (Holsapple and Joshi, 2000). In addition, they can be incorporated into employees' daily work activities so that they become common practices in an organisation.

Motivational aids

There is a saying that "you can lead a horse to water, but you cannot make it drink". Successful KM requires the development of a "grass root desire among employees to tap into their company's intellectual resources" (Hauschild *et al.*, 2001). If individuals are not motivated to practise KM, no amount of investment, infrastructure and technological intervention will make it effective. Hence, one of the important factors is to establish the right incentives, rewards or motivational aids to encourage people to share and apply knowledge. Giving incentives to employees helps to stimulate and reinforce the positive behaviours and culture needed for effective KM.

In order to build a knowledge-based enterprise, incentive systems should be focused on criteria such as knowledge sharing and contribution, teamwork, creativity and innovative solutions. Yahya and Goh (2002) stated that such systems should reward risk-taking attitudes and emphasise group-based compensation. In particular, rewarding employees with a focus on group performance will instigate a higher level of knowledge exchange between them. Hauschild *et al.* (2001) extended this notion by stating that employees will be more inclined to seek and contribute knowledge, if their incentives are based on goals that they can influence, but not achieve on their own. Linking rewards solely to individual performance or outcome which can result in competition will certainly be detrimental to a knowledge sharing culture.

The provision of both monetary and nonmonetary benefits could be incorporated into a reward system that supports KM. In addition, approaches to motivate employees and recognise their contributions could also be tied to their annual job performance review. This implies treating KM practices as important criteria in an employee's performance evaluation and assessment system (Trussler, 1998; Buckman, 1998).

Resources

Successful KM implementation is dependent upon resources. Financial support is inevitably required if an investment in a technological system is to be made. Human resources are needed to coordinate and manage the implementation process as well as to take up knowledge-related roles. Time is also a consideration; organisations have to free up time for their employees to perform KM activities such as knowledge sharing. Similarly, providing time and opportunities for people to learn is important (Martensson, 2000). Besides this, attention, according to Davenport and Volpel (2001) is one of the scarcest resources in many companies. They called for a need to focus on attention management as a key to successful KM.

Since resources availability is a primary concern in SMEs, it has to be properly considered when implementing a KM initiative. For example, the programme scope must not be too substantial for their available resources. Investment decisions in KM should be based on a sound consideration of resources, and not on the belief that it is "a nice to have" business programme. In addition, proper budgeting of resources is crucial for KM. Arguably, one of the key issues for SMEs in achieving effective KM is to deal with their resources. This implies understanding how they can be better acquired, allocated and managed for its success.

Training and education

Training and education is another important consideration for successful KM. In a basic sense, organisational members need to be aware of the needs to manage knowledge and to recognise it as a key resource for the viability of a company. This issue can be addressed if proper basic training is provided to the employees. Through such training, they will have a better understanding of the concept of KM. It also helps to frame a common language and perception of how they define and think about knowledge.

Besides this, employees could be trained and educated in using the KM system and other technological tools for managing knowledge. This helps to ensure that they can utilise the full potential and capabilities offered by these tools. In addition, training for individuals to understand their new roles for performing knowledge-oriented tasks

might be needed. Equally important is to equip them with the skills to foster creativity, innovation, and knowledge sharing. Horak (2001) suggested that for effective KM, skills development should occur in the following areas: communication, soft networking, peer learning, team building, collaboration and creative thinking. Likewise, Yahya and Goh (2002) showed that training related to creativity, team building, documentation skills and problem solving had a positive impact on the overall KM process.

Human resource management

Certainly, KM practitioners cannot afford to ignore the value that can be gained from HRM. After all, people are the sole originators of knowledge. As stated by Davenport and Volpel (2001), “managing knowledge is managing people; managing people is managing knowledge”. The significance and roles of HRM in KM have been discussed by a number of authors (e.g. Soliman and Spooner, 2000; Garavan *et al.*, 2000; Brelade and Harman, 2000; Robertson and Hammersley, 2000). While it is vital to KM for many reasons, the main focus here is on the issues of employee recruitment, development and retention.

Effective recruitment of employees is crucial because it is through this process that knowledge and competences are brought into the organisation. Employees with the required knowledge and desired skills to fill knowledge gaps should be recruited. Furthermore, it is essential that companies enlist those who have the tendency and inclination for creating and sharing knowledge. Additionally, Robertson and Hammersley (2000) highlighted the significance of recruitment to focus on the ability of candidates to fit into the firm’s culture or distinctive way of working rather than just matching them to a job specification.

Employee development is seen as a way to improve and enhance the personal value of individuals. The skills and competences of knowledge workers need to be continuously developed in order for them to produce valuable contributions to a company. If not, as with other tangible assets, their value will depreciate. Hence, companies have to provide appropriate professional development activities to their employees.

Another central issue in KM is how to retain knowledge from being lost. This is where the function of employee retention gains its significance in KM, particularly for the SME sector. In order to retain employees to work for a company, it is important to provide opportunities for them to grow and to advance their career. HR policies and practices need to be designed to allow them to meet their personal aspirations (Brelade and Harman, 2000). Equally important is to offer a conducive working environment in which employees feel comfortable and to foster job satisfaction among them.

Empirical assessment of the CSFs

Aside from the theoretical justification of the proposed CSFs, an empirical evaluation provided further support. Based on the comprehensive discussion above, all the factors and their underlying issues and elements were carefully shaped into a survey instrument. This was then used to empirically investigate the importance of the CSFs. A group of academics, consultants and practitioners who had contributed to the KM literature was randomly selected from pertinent KM journals to participate in the survey. It is worth pointing out that all of the participants did not have a close

connection with the author. As part of the survey, they were asked to assess the extent of the instrument’s success in characterising those factors crucial for implementing KM in the SME sector. Their perceptions were captured using a six-point Likert scale, ranging from “not successful at all” to “extremely successful”. This scale was then grouped into three levels – poor, satisfactory, good. Poor comprised the “not successful at all” and “slightly successful” scales; “moderately successful” and “successful” were denoted satisfactory; and “very successful” and “extremely successful” were taken as good.

The survey instruments were administered to 100 addressees, with follow-up letters forwarded to those who had not replied within the given deadline. In total, 18 useable replies were received (18 percent response rate), which was considered to be normal and reasonable (Antony *et al.*, 2002). Ten of the respondents identified themselves as academics, six as consultants and five as practitioners (the total exceeds 18 because some of them fitted into more than one category). All the respondents have been very active in the KM discipline, for instance, writing articles for journals (100 percent), giving presentations at conferences (88.9 percent), giving lectures on related topics (83.3 percent), providing consultancy services (72.2 percent), conducting research (66.7 percent) and writing books (66.7 percent). As can be seen in Table III, all of them have at least five years experience in the field and 50 percent of them have been involved for at least 16 years. With these backgrounds and experience, it was felt that this group of respondents certainly had the capability to assess the CSFs.

The distribution of responses from the participants is shown in Figure 1. Forty four percent of the respondents rated the extent to which the proposed CSFs were successful, as satisfactory. The corresponding result for good was 33 percent. Hence, more than three quarters of the respondents endorsed the proposed CSFs as being at least satisfactory for their intended purpose. The mean of the ratings revealed a value close to the successful domain. This shows that on the average, the respondents regarded the CSFs to have been successfully developed to reflect those aspects crucial for adopting KM in the SME sector.

Conclusions

The effective implementation of KM is governed and facilitated by certain factors. Organisations can certainly benefit from a more thorough understanding of the factors that are critical to the success of KM. However, the adoption of factors which are not suitable can impede the achievement of the desired performance. As such, considerable care must be exerted in the development of CSFs for KM.

Table III.
Years of involvement
in KM

Range	Number of respondents	Percent
5 or less	–	–
6-10	6	33.3
11-15	3	16.7
16-20	4	22.2
21-25	4	22.2
26 or more	1	5.6
Total	18	100.0

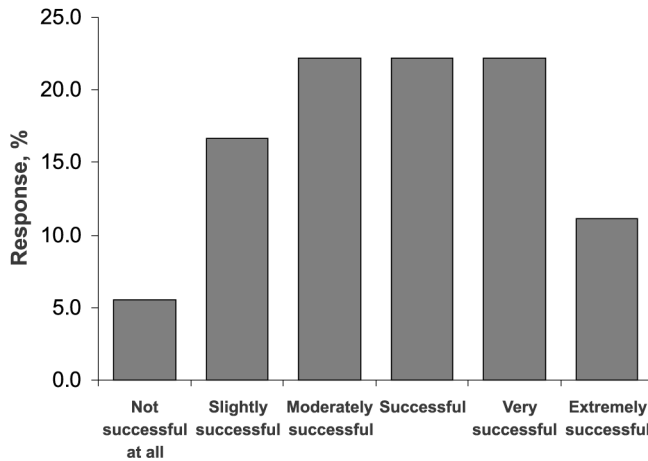


Figure 1.
Extent of success of the CSFs

To date, CSFs for implementing KM in the SME sector have not been systematically examined and investigated. Many of the existing studies have derived their set from a large company perspective. Thus, they have not really been designed to meet the needs of smaller companies. This study has proposed a set of 11 CSFs which is believed to be more appropriate for SMEs. It has improved on initial studies by integrating insights and ideas drawn from them as well as adding some new factors. In addition, an empirical assessment was conducted to evaluate the extent of success of this proposition. On the whole, the results were supportive, thus providing a preliminary indication of the appropriateness of the proposed CSFs. In essence, this study is probably the first to provide an integrative perspective of CSFs for implementing KM in the SME sector.

The set of CSFs proposed is in itself important because it can act as a list of items for SMEs to address and deal with when accomplishing KM. This helps to ensure that essential issues and factors are covered when they are planning and developing KM. At a later stage, it can also provide a basis for them to evaluate their KM practices. For academics, it provides a common language for the discussion and study of the factors underpinning the success of KM in SMEs. Essentially, this study can be employed as a “springboard” for further empirical research. A survey which involved the group of academics, consultants and practitioners as mentioned earlier, and a sample of SMEs, was already conducted to further investigate and validate the CSFs. The findings and results of this survey will be the subject of discussion in a future paper.

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