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Full Length Research Paper

Organizational knowledge management capabilities and Knowledge management success (KMS) in small and medium enterprises (SMEs)

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To date, organizational knowledge capabilities for implementing knowledge management in small and medium enterprises (SMEs) have not been analytically examined. Previous studies have observed such capabilities from large businesses' standpoint and have not measured the organizational knowledge capabilities' requirements of SMEs. Secondly, there is lack of such studies in developing economies. The present study aims to bridge this gap and investigate the organizational knowledge capabilities required for implementing KMS successfully in SMEs' sectors, specifically in developing economies. A set of 7 organizational knowledge management capabilities was developed, which is thought to be prerequisite for KMS success in SMEs. The theoretical significance of these capabilities was discussed and the hypotheses were also empirically tested. Generally, the results obtained from the empirical evaluation were positive, indicating the significance of the proposed set of organizational knowledge management capabilities. The study is a value addition in the field of knowledge management in Pakistan's context.

Key words: Knowledge management success (KMS), knowledge, small and medium enterprises (SME), capabilities.

INTRODUCTION

Knowledge management (KM) is a vital element for small and medium sized businesses. To date, knowledge has been considered as a key resource and systematically managed in some sectors for achieving a competitive advantage (Davenport et al., 1998; Machlup, 1984; Wiig, 1997). Omerzel and Antoncic (2008) discussed the importance of KM in their study and pointed out that effective KM improves the organization's capability to survive, grow and maintain competitive advantage. On the other hand, Earle (2001) focused that organizational performance could be enhanced by improving knowledge creation, sharing, utilization and protection. The KM success fundamentally depends upon effectiveness of knowledge management system (KMS) adopted by an organization.

To date, organizational knowledge capabilities for implementing knowledge management in small and medium enterprises (SMEs) have not been analytically examined. Previous studies have observed such capabilities from large businesses' standpoint and have not measured the organizational knowledge capabilities' requirements of SMEs. Secondly, most studies about this problem are conducted in developed economies and there is lack of such studies in developing economies. The present study aims to bridge this gap and investigate the organizational knowledge capabilities required for implementing KMS successfully in SME sector, specifically in developing economies.

Some studies have discussed the ways to successfully implement KMS in different organizations (Davenport and Prusak 1998; Davenport et al., 1998). There are several factors involved in successful implementation of KMS.

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The successful implementation of KMS needs to develop effective processes to capture, store, utilize and transfer knowledge and also train employees about the advantages of knowledge management (Davenport, 2000). According to Petrash (1996), KM is a blend of human, IT and communication tools. Ruggles (1997) elaborated the key role IT played in value addition, storing and sharing of knowledge. Van der Spek and Spijkervet (1997) also emphasized the important role played by IT and communication tools in efficient management of knowledge. On the other hand, some researchers identified human factors as most important in ensuring effective implementation of KMS in any organization (Asllani and Luthans, 2003; Cross and Baird, 2000; Davenport, 1997; Hickins, 1999).

Available literature about knowledge capabilities that was studied and analyzed in current scenario SMEs, are facing regarding knowledge management implementation. The study developed a set of 7 organizational knowledge management capabilities by incorporating the conclusion drawn through literature and adding some new capabilities, which is thought to be a prerequisite for KMS success implementation in SMEs. The theoretical significance of these capabilities was discussed and the hypotheses were also empirically tested.

LITERATURE REVIEW

The KM literature has described several factors which are essential for successful implementation of KMS. These factors include top management support, a clear KM vision, technical infrastructure, a sound KM culture, KM linkage to business objectives and many others. However, no study has discussed specifically the organizational knowledge capabilities required for KMS success in SME sector. A defined set of organizational KM capabilities which are prerequisites for SMEs will assist them to cope with the critical issues and problems while implementing successfully a KMS (Wong, 2005).

HYPOTHESIS DEVELOPMENT

H_1: Organizational knowledge capabilities are positively associated with the success of knowledge management systems in SMEs.

Hypothesis 1 was established based on the belief that properly managed personal capabilities can provide numerous KM benefits in terms of enhancing employees' knowledge efforts and increasing KM success rate. In order to empirically test hypothesis 1, seven sub-hypotheses were established.

Development of a clear KM vision and strategy

Every business has its own mission and vision and a strategy to achieve this mission. The successful implementation of KMS within an SME largely depends upon its integration with different domains of knowledge. A successful KMS must be compatible with organizational mission and vision. Many studies have emphasized the need of a clear vision and strategy for successful implementation of KMS (Akhavan et al., 2006; Bozbura, 2007; Chourides et al., 2003; du Plessis, 2007; Liebowitz, 1999; Skyrme and Amidon, 1997; Wong and Aspinwall, 2005). Developing a clear KM vision and strategy is critical for knowledge creation, application and retention. From the afore, we argue that establishing a clear KM vision and strategy is important for KMS successful implementation. These assumptions lead us to propose that:

H_{1a}: For SMEs, development of a clear KM vision and strategy, positively affects successful implementation of knowledge management systems.

KMS linkage to business objectives, strategy and value

The integration of any KM initiative with organizational objectives is essential to be successful. On the other hand, Wood and Sheina (1999) emphasized the need for determining priority for defined organizational objectives. After determining the priority, the relevant knowledge must be specified and the ways to integrate these objectives and specified knowledge. Another important consideration is value addition through innovative processes and strategies (Nissen and Espino, 2000). The effective management of intellectual property is also an important organizational strategy for achieving KM success.

Developing a linkage between KMS and business objectives, strategy and value is vital for knowledge creation and its effective utilization through individual and group working in an organization. From this, we argue that integrating KMS with business objectives and strategy is important for KMS successful implementation, as such integration enhance the success of core knowledge activities. These assumptions lead us to propose that:

H_{1b}: For SMEs, KMS linkage to business objectives, strategy and value, positively affects successful implementation of knowledge management systems.

Developing advanced technical organizational infrastructure

A well developed technological infrastructure is required for capturing, transferring and sharing knowledge. Such infrastructure helps in capturing knowledge from all internal and external organizational sources, stores them and makes it available for current and future use for value creation (Chen and Chung, 1998; Gray, 2001). A well

establish technological organizational infrastructure also act as a bridge between old and new knowledge and help in integrating them for putting this knowledge into action. Further technological organizational structures are utilized to improve organizational learning, an important aspect of KMS success (Romm et al., 1997; Shaw and Subramaniam, 2001). Some other studies have also focused on the need of strong technological infrastructure for successful implementation of KMS (Akhavan and Jafari, 2006; Alavi and Leidner, 2001; Chong, 2006; Davenport et al., 1997; du Plessis, 2007; Hasanali, 2002; Lee and Hong, 2002; Wong and Aspinwall, 2003).

Establishing sophisticated technical organizational infrastructure is indispensable for knowledge storage, transfer and sharing among different components of an organization. This kind of infrastructure improves the organizations ability to search, access and retrieve information, and can support collaboration and communication between organizational members. From the above, we argue that establishing a sophisticated technical organizational infrastructure important for KMS successful implementation, as such a structure enhances the success of core knowledge activities. These assumptions lead us to propose that:

H_{1c}: For SMEs, developing advanced technical organizational infrastructure positively affects successful implementation of knowledge management systems.

Establishing top management support

The most important aspect for successful implementation of any KMS is to achieve the full support and loyalty of top management. Several studies have discussed the significance of the role played by HR in successful implementation of KMS, particularly top management (Cabrera and Cabrera, 2005; Egbu, 2004; Hislop, 2003). Top management behaviour is a source of inspiration for employees and develops their confidence to take part in successful implementation of KMS. According to some authors (Holsapple and Joshi, 2000; Jennex et al. 2005; Ribiere and Sitar, 2003; Wong, 2005) top management developed the essential organizational environment like a healthy culture, employees' morale and change management system for KMS success.

Instituting top management support is also crucial for knowledge creation, sharing and retention through effective team management. From this, we argue that attaining top management support is important for KMS successful implementation, as such support enhance the success of core knowledge activities. These assumptions lead us to propose that:

H_{1d}: For SMEs, establishing top management support positively affects successful implementation of knowledge management systems.

Nurturing a KM culture

The development of a supportive organizational culture is essential for effective implementation of KMS. The promotion of a supportive culture involves establishing such organizational norms and beliefs which alter positively the way individuals behave in an organization. A KM oriented culture focuses mainly on effective KM and introduces the effective ways of knowledge creation, transfer and utilization. Many studies have emphasized on developing such an organizational culture (Akhavan et al., 2006; Chong, 2006; Davenport et al., 1998; Martensson, 2000; Pan and Scarbrough, 1998; Wong and Aspinwall, 2005; Wong, 2005).

Nurturing a healthy KM culture is essential for knowledge transmit, exchange of ideas and knowledge sharing through individual and group interactions. From these, we argue that establishing a supportive KM culture is important for KMS successful implementation, as such a culture enhance the success of core knowledge activities. These assumptions lead us to propose that:

H_{1e}: For SMEs, nurturing a KM culture positively affects successful implementation of knowledge management systems.

Integrating KMS with staff

The success of a KMS largely depends upon staff efficiency and commitment. Therefore, developing strong ties between KMS and staff is important. The KMS adopted in an organization needs to be simplified in an understandable language for staff and it should have the ability to provide superior and speedy solutions. Also the staff members' involvement and commitment should be enhanced through rewards and compensations. Many researchers have highlighted the necessity of integrating KMS with staff members of an organization for its successful implementation (Lehner and Haas, 2010; Minonne, 2007; Wong and Aspinwall, 2005).

Integrating KMS with staff is critical for knowledge understanding, transmit and knowledge sharing through individual and group interactions. Thus, we argue that integrating KMS with staff is important for KMS successful implementation; as such integration enhances the success of core knowledge activities. These assumptions lead us to propose that:

H_{1f}: For SMEs, integrating KM with staff positively affects successful implementation of knowledge management systems.

Defining relevant KM roles

Hasanali (2002) pointed out KM roles as a key factor for success of KMS. He further elaborated the roles of top

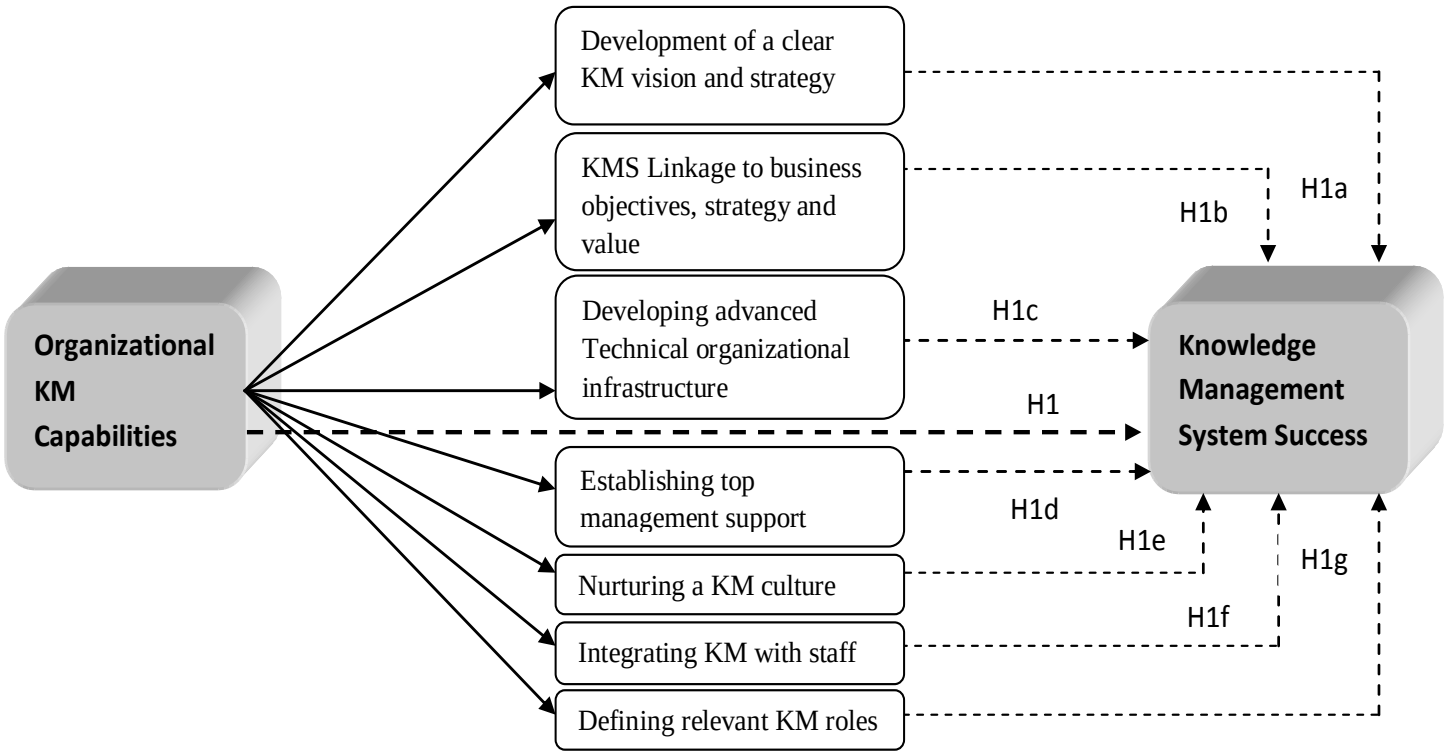

Figure 1. Conceptual model.

management, central KM group, KM core group. According to Hasanali, the top management role was to promote the concept of KM and provide supervision, direction and support. The central KM group's role is to provide preliminary support to KMS projects. Whereas, the KM core group is responsible for knowledge sharing and acquisition. They ensure the maximum involvement and skill building of employees in KMS implementation.

Defining and establishing relevant KM roles is essential for knowledge creation, sharing and utilization through individual and group interactions. From this, we argue that defining relevant KM roles is important for KMS successful implementation, as defining and establishing these roles enhance the success of core knowledge activities. These assumptions lead us to propose that:

H_{1g}: For SMEs, defining relevant KM roles positively affects successful implementation of knowledge management systems.

METHODOLOGY

What clearly emerges from a discussion of organizational capabilities related variables is that knowledge management initiatives cannot be a success story when SMEs' lack such capabilities. KMS, being practiced in SMEs of Pakistan is generally inefficient and is still at a basic level. Most of the SMEs are unfamiliar with KM systems and their advantages. KM system being practiced in SMEs and organizational capabilities has been evaluated in the study. Further, the sample, study design, and measures are discussed. On the basis of literature review, the tentative model is presented in Figure 1.

The study examined 250 managers and practitioners through a survey at SMEs in Pakistan. A total of 162 respondents completed survey (64.8% response rate). Sample selected was a mix of managers and practitioners working in production, marketing, sales, finance and administration departments. Out of 162 respondents, 87% were males, the major group for genders lies inside the 20 to 30 years age range. The entire respondents were workforce in Pakistani SMEs. Also, the entire respondents were having education to degree level; among 68% were educated to master's level. Further, Table 1 presents the summary of the sample responded.

This research examines organizational knowledge capabilities relationship with KMS success in SMEs. The data for this study were based on a survey conducted in Pakistan. The total sample surveyed consisted of 250 managers and practitioners in SMEs sector. All participants were selected through probability sampling. A simple random sample of 250 managers and practitioners was taken from different areas of Pakistan. The structured survey was delivered directly to all 250 small business managers and KM practitioners. Two follow-up visits were made to increase the response rate, resulting in total 162 responses. The managers and practitioners selected as sample were working in organizations which have relatively better KM system. The KM success of these organizations was based on their annual sales growth, profitability growth and new product development efficiency. Further, the responded sample contained 6 kind of businesses, in which the food sector (27.3%), furniture (21.4%), electronic equipment sector (16.1%) are major categories in studied sample. Further key businesses included in studied sample are represented by textile, garments and other fiber products (15.1%), sports equipment,

Table 1. Characteristics of the sample.

Characteristic	N	Percentage
Age (years)		
20 - 30	91	56.17
30 - 40	52	32.09
40 – 55	19	11.72
Sex		
Male	141	87.03
Female	21	12.9
Level of education		
Masters and above	111	68.5
Graduation	51	31.4
Total	162	100

cultural and office machinery (11.4%), and pharmaceutical (8.7%).

The main instrument used in collecting data was questionnaire, which was self administered. The survey instrument consisted of two sections: consisting of an introductory section, that is, respondent's profile. Section two consists of the KM success and organizational knowledge capabilities. Section three comprised of 7 factors categorizing, development of a clear KM vision and strategy; KMS linkage to business objectives, strategy and value; developing advanced technical organizational infrastructure; establishing top management support; nurturing a KM culture; integrating KMS with staff and defining relevant KM roles. Each category consists of five questions. These 7 variables were operationalized with the help of measures given in Appendix 1.

The respondents' were asked to evaluate the perceived impact of these factors on the KMS success in SMEs on a five point scale ranging from one (not critical) to five (very critical). The respondents have assigned scores to each of these factors. The questionnaire was distributed and collected from the practitioners/managers of businesses that are categorized as SMEs based in Pakistan. The responses from the survey were used to supplement the data supplied in the questionnaire. A secondary source was also used for data collection through articles, journals, magazines, books and periodicals to obtain historical data and other relevant information. The questionnaire responses were scored and codified as follows: not at all critical = 1; to a little extent critical = 2; to an average extent critical = 3; to a large extent critical = 4; to a very large extent critical = 5. SPSS version 16 was employed for data estimation and analysis.

Reliability of the scale

The seven organizational variables were adopted and used to measure each of the seven constructs, viz a viz, development of a clear KM vision and strategy; KMS linkage to business objectives, strategy and value; developing advanced technical organizational infrastructure; establishing top management support; nurturing a KM culture; integrating KMS with staff and defining relevant KM roles. These measures were made by integrating the studies mentioned in hypothesis development and further reliability was tested as indicated in Table 2. Some minor modifications were carried out to make the meaning of some items clearer. To determine the reliability of the scale the internal consistency method is used in this study, as mostly this method is used for reliability estimation. Further, this method is very effective in field studies. The internal consistency reflects the degree of homogeneity among a set of measurements. Different reliability coefficients are used to estimates internal consistency, for example, Cronbach's alpha (Saraph et al., 1989). In this study, Cronbach's alpha was employed and calculated separately for each criterion of the questionnaire. The results are shown in Table 2. Generally, alpha values greater than 0.7 are regarded as sufficient (Nunnally, 1994).

RESULTS AND DISCUSSIONS

Means and standard deviations (S.D.) for all the variables were calculated in order to get a thought regarding the trend of the respondents' perception and determine the importance of organizational capabilities for KMS success. Table 3 signifies the mean value and standard deviation for the observed variables. Small standard deviation for entire variables designates reliability of the data and small deviation in respondents' view points. In addition, the entire mean values more than three indicate the significance of the variables.

The results in Table 3 indicate that top management support, culture and technological infrastructure are the most important capabilities required for KMS success. These results are consistent with Davenport et al. (1998), findings. However, in this study, the findings also revealed KM vision and strategy as an important factor for KMS success, whereas Davenport et al. (1998) had not considered it as a significant factor. Also, other KM capabilities that is, KMS linkage to business objectives and strategy, integrating KM with staff and defining relevant KM roles in this study were perceived much more important. This indicates that the respondents attach greater importance to these capabilities for successful implementation of KMS in SME sector.

KMS successful implementation like any other organizational modification needs greater support from top management and leadership. The results in Table 2 indicate that this factor is ranked as most important.

Table 2. Results of reliability analysis.

Factor	Number of items	Alpha
Development of a clear KM vision and strategy	7	0.7435
KMS linkage to business objectives, strategy and value	6	0.7658
Developing advanced technical organizational infrastructure	5	0.8341
Establishing top management support	6	0.8428
Nurturing a KM culture	8	0.7947
Integrating KMS with staff	4	0.7564
Defining relevant KM roles	5	0.7342

Table 3. Mean and S.D. of factors for the degree of importance of organizational capability.

Factor	Mean	Standard deviation
Development of a clear KM vision and strategy	4.641	0.8453
KMS Linkage to business objectives, strategy and value	3.932	0.7354
Developing advanced technical organizational infrastructure	4.674	0.8154
Establishing top management support	4.916	0.8021
Nurturing a KM culture	4.835	0.7531
Integrating KMS with staff	3.245	0.7317
Defining relevant KM roles	3.536	0.7143

Therefore, the SMEs need to consider this as basic capability and needs to put more attention in developing this capability as core one. Top management is the source of developing employees' positive KM behaviour, which ensures KMS success. Therefore, they should employ their skills such employees' behaviour which helps in sharing and transfer knowledge within the organization.

The results in Table 3 also indicate that nurturing a KM supportive culture is significantly critical than other KM capabilities like developing IT structure and KM strategy, etc. Liebowitz (1999) in his study emphasized the critical role played by a KM supportive culture for any KMS initiative, in his views the success of KMS more than 90% depends upon nurturing a KM supportive culture. Another key consideration in ensuring successful implementation of KMS is to have an advanced technological organizational infrastructure. The organizational infrastructure both, technological as well as non-technological is the vital component for developing an effective KMS. Development of a clear vision and strategy with a mean of 4.641 was ranked fourth most important KM capability needed for KMS success in SMEs. A well developed and clearly defined KM organizational strategy helps in developing an effective KMS. The least important capabilities in this study are KMS linkage to business objectives and strategy, integrating KMS with staff and defining relevant KM roles. Though these factors are relatively least important in this study, still, they are quite significant for success of KMS in SMEs.

Each of the organizational knowledge capabilities factors' mean scores was used to construct correlation, as well regression analysis consequent to studied hypotheses. The results were used to validate the stated hypotheses.

The results in Table 4 are self evident to support study's main research hypothesis that Organizational knowledge capabilities are positively associated with the success of knowledge management systems in SMEs at a confidence level of 95%. Overall, the results support hypothesis H_1. The results in table 4 indicate that top management support is the most important capability influencing KMS success, with a KM supportive culture and organizational technological infrastructure as the subsequently two important capabilities. The entire organizational capabilities associated variables illustrate significant statistical correlation with KM success. The results further signify all proposed sub hypotheses H_{1a}, H_{1b}, H_{1c}, H_{1d}, H_{1e}, H_{1f} and H_{1g}. Though KMS linkage to business objectives, integrating KMS with staff and defining relevant KM roles have little weaker relationships but still significant. In other words, SMEs having such capabilities are more able to successfully implement KMS.

Conclusion

This research indicates that a correlation exists between some types of organizational knowledge capabilities and KMS successful implementation. The study concentrated

Table 4. Regression analysis.

Organizational knowledge capabilities and KM success: Summary of regression Analysis predicting KM success		
Variables	**Adj. R^2**	**B**
Development of a clear KM vision and strategy	0.77	0.779*
KMS Linkage to business objectives, strategy and value	0.67	0.881*
Developing advanced technical organizational infrastructure	0.79	0.792*
Establishing top management support	0.93	0.891*
Nurturing a KM culture	0.88	0.952*
Integrating KMS with staff	0.63	0.871*
Defining relevant KM roles	0.54	0.649*

*$p < 0.01$

on organizational knowledge management capabilities that academics and practitioners considers important when implementing KMS. This research has developed a set of 7 organizational KM capabilities which are considerably important for KMS successful implementation in SMEs. The study has enhanced some previous studies by combining thoughts and views from them and accumulating some new capabilities. Further, an empirical investigation was carried out to evaluate the significance of proposed capabilities. Overall, the results of empirical investigation are positive and supportive, thus indicating suitability and significance of the proposed capabilities. Probably, this is the first study to present an integrative viewpoint of organizational KM capabilities required for implementing KMS successfully in SME sector.

The proposed organizational knowledge capabilities can work as key factors for SMEs to address in implementing KMS successfully. This will ensure a carful implementation of KMS as well as develop the ability to counter organizational problems and challenges. Academically, this study presented a set of organizational factors which they should study and further evaluate as factors vital for the success of KMS in SMEs. On the other hand, some limitations of the present study must be dealt with. The first of them is that empirical results are resulting commencing a sample of Pakistani firms and therefore findings may be country-specific. Future researchers can select SMEs from other developing economies to examine and enlarge the generalization of the findings. Further, data utilized in present research are composed of the respondents' perceptions, which can possibly vary usually across businesses, ownership and job and employment experience of respondents within SMEs.

Certain limitations must be considered while utilizing the results of this study. The most important limitation in this research was sample. The sample in this study comprised an instrument which was self-administered and was open to both managers and owners. In majority of the SMEs, just some degree of higher management responded. The higher management can possibly contain related information which may have skewed the results in a diverse way. Secondly, the empirical results are derived from a sample of Pakistani SMEs and hence the findings might be country-specific. Further, the data for this study are based the respondents' perceptions, which may vary widely across industries, ownership and function and work experience of respondents within the SMEs.

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APPENDIX

Appendix 1: Constructs and measures

Construct	Measure
Development of a clear KM vision and strategy	A vision for how KM should be integrated into the business, Defined budgets for KM initiatives, Considering KM as organizational strategic objective, Legal protection to intellectual assets, Validating knowledge through peer-review and supervision.
KMS Linkage to business objectives, strategy and value	Learning & applying knowledge from other organizations' processes, Management of knowledge a part of business strategy, Encouraging knowledge sharing across organizational boundaries, Combining external knowledge and internal know-how, Standardizing existing knowledge in the forms of procedures.
Developing advanced Technical organizational infrastructure	Sharing technology with clients and suppliers to foster KM relationships, Effective cataloguing and archiving procedures for documentary KM, Developing a mechanism for knowledge sharing among the employees, Using technology for managing knowledge.
Establishing top management support	Recognizing KM as an important part of the business strategy, Top managements' representation for KM, Considering KM as a formal organizational function, Encouraging internal staff rotation to share best practices and ideas, Managing organizational teams effectively.
Nurturing a KM culture	Developing recording and sharing knowledge as a routine or daily habit of employees, Developing a culture of accepting changes, Developing cooperative environment for information sharing, Developing and promoting good KM behavior like sharing and reusing knowledge, Rewarding individuals for knowledge sharing and reusing.
Integrating KMS with staff	Training and development programs for developing good KM behaviour, Managing intellectual capital in an effective way, Developing knowledge distribution norms among staff and People as a source of knowledge.
Defining relevant KM roles	Top management recognize the need for proactively managing knowledge, Employees participation at all levels in KMS and Intranet used to share knowledge is formal and effective.