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Abstract

Purpose – *This paper aims at identifying segments among knowledge management (KM) practitioners and analyzes whether performance varies across these segments. The field of KM aims at enhancing performance through knowledge practitioners. However, not all KM implementations have similar outcomes.*

Design/methodology/approach – *A literature review is conducted through secondary sources. Based on the themes identified for research, qualitative research through a focus group discussion (FGD) and personal interviews is used to explore the themes. This is used to develop a conceptual KM framework. An instrument is developed which is tested for validity and reliability. The instrument is administered to respondents and 313 responses are obtained. Convenience sampling is used to select the respondents. Further, k-means cluster is used to identify segments among KM practitioners. A one-way analysis of variance (ANOVA) test is conducted to determine if the average scores of KM constructs varied between the three clusters. Further, ANOVA test is also used to analyze whether organizational and financial performance scores vary between the three clusters. Post hoc test is used to determine the extent of variation between cluster pairs.*

Findings – *The results show that the sample comprises three segments which were subsequently labeled as active, partly and passive KM practitioners. It was found that active KM practitioners scored highest on various KM constructs, passive KM practitioners scored the least and partly KM practitioners had scores in between the two. One-way ANOVA results showed that the average scores of KM constructs varied significantly between the three clusters. The results show that a significant difference is found in organizational as well as financial performance between any two cluster pairs.*

Research limitations/implications – *The sample comprises 313 respondents, of which around 65 per cent are from services industry and 67 per cent from private sector. A higher representation from public sector and manufacturing industry would have made the comparison more meaningful. The findings are based on data collected from India, and therefore, the results may not be generalizable to all economies.*

Practical implications – *The three clusters identified from the sample data may help organizations who have initiated the KM process to benchmark themselves with the obtained clusters and identify the trust areas important to their KM initiative.*

Originality/value – *The study builds upon both qualitative methodology through FGD and personal interviews and quantitative methodology through questionnaire and surveys. This comprehensive coverage of KM constructs and identification of respondent clusters is insightful. It also provides researchers useful means to enhance performance through KM within clusters.*

Keywords *Performance, India, Knowledge management, Cluster analysis*

Paper type *Research paper*

Introduction

The Indian economy is among the largest economies of the world with a population of more than 1.2 billion. India started as primarily an agrarian economy, which, with passage of time, shifted its focus towards manufacturing and industrial development. The past two decades have been eventful for India in terms of transformation of the economy from an industry-based economy to being a knowledge economy.

> **"The most important reasons for the emergence of knowledge economy are globalization, need for innovation and differentiation, proliferation of technology and changing stakeholders expectations."**

At a macro level, the biggest challenge that India faces can be expressed in terms of innovation capability, technology penetration and education. There is also an increasing risk of growing gap between the advanced countries – the ones that are utilizing knowledge to the maximum – and developing countries including India, the ones that have not been able to take advantage of the potential of knowledge. However, we are learning fast. With the opening up of economy, various structural and policy changes have been made to make India a preferred destination for investment and doing business.

The most important reasons for the emergence of knowledge economy are globalization, need for innovation and differentiation, proliferation of technology and changing stakeholders expectations. Globalization has resulted in the emergence of a global marketplace where both Internet and mobile connectivity have made a significant contribution to globalization. There is a far greater awareness of opportunities that has resulted in high employee turnover and perennial loss of knowledge. Fernandez and Sabherwal (2010) believe that increasing domain complexities, accelerating market volatility, intensified speed of responsiveness and employee turnover are four underlying trends driving KM. With marketplaces becoming highly competitive and products becoming innovative, there is an ever increasing reliance on KM to create customer value.

Further, to innovate and differentiate knowledge is crucial. Knowledge is required to take sound decisions, but often the knowledge does not fully reside with the decision makers. So the real challenge for managers is how to capture and retain this knowledge base. The collective knowledge residing in the minds of employees, customers, suppliers, etc. is the most vital resource of an organization's growth, even more than the traditional factors of production, i.e. land, labor and capital (Drucker, 1994; Grossman, 2006; Kluge *et al.*, 2001, Fernandez and Sabherwal, 2010). Thus, the three traditional factors of production have become easier to handle; a fourth "knowledge" is at the heart of today's global economy and emerging as a differentiator (Kluge *et al.*, 2001).

From the earlier discussion, it is evident that knowledge is increasingly becoming acceptable as a more powerful asset than the traditional factors of production. Yet, because of its abstract nature, its importance to the growth of a nation and an organization is difficult to evaluate. Knowledge is a source for developing new ideas, innovations and inventions. So what exactly is knowledge and its management?

The concept of knowledge has diverse views. Davenport *et al.* (1998) view knowledge as high-value form of information combined with experience, context, interpretation and reflection that can be applied to decisions and actions. McDermott (1999) defines knowledge as a human act, a residue of thinking which comes from experience and which belongs to and circulates through communities. Bollinger and Smith (2001) define knowledge as the understanding, awareness or familiarity acquired through study, investigation, observation or experience over the course of time. It's the understanding of relations and causalities, and is therefore essential in making operations effective, building business processes or predicting the outcomes of business models (Kluge *et al.*, 2001). The process of creation and transfer of knowledge has been a critical factor in an organization's success and competitiveness.

According to Fernandez and Sabherwal (2010), KM may simply be defined as doing what is needed to get the most out of knowledge resources. American Productivity and Quality

Center (APQC's) definition of KM considers it to be "the systematic process of identifying, capturing and transferring information and knowledge people can use to improve" (O'Dell *et al.*, 2004). It refers to identifying and leveraging the collective knowledge to help organizations compete (Krogh, 1998) and is the art of creating commercial value from intangible asset (Sveiby, 1996). It is viewed as the deliberate strategy of getting the right knowledge, to the right place, at the right time (Chase, 1997; Hendriks & Vriens, 1999). According to Wiig (1999), KM is broad, is multi-dimensional and covers most aspects of the enterprise activities.

The aim of the paper is to review and compare the various KM dimensions which are critical for improving performance. Based on the review of literature, focus group discussion (FGD) and personal interviews, the authors have proposed a model outlining constructs for KM implementation in the Indian context. This paper looks at identifying segments among KM practitioners and analyzes whether performance varies across these segments. By pursuing this objective, we aim to answer two key questions:

1. "What are the key constructs of systematic knowledge management for enhancing performance?"
2. "Identifying respondent clusters in Indian organizations and examining whether performance varies between them".

In reviewing literature involving identifying clusters based on KM and KM-induced performance constructs, there is a lack of research studies. The present research is therefore intended to fill this research gap.

The paper is organized as follows. First, it discusses the literature on important KM constructs required for a KM initiative, followed by a discussion on its impact on performance. It includes a description of the research gap and need for the study, followed by research objectives. This is followed by an explanation of the research methodology. The last part of the paper discusses findings of the study, which are supplemented with conclusion, limitations and scope for future study.

Literature review

An overview of the literature about KM constructs

KM is an iterative process and starts with a business driver or vision of what a company wants to achieve. For effective KM implementation, organizations need to create processes and systems to capture and apply knowledge sources from internal and external stakeholders. Earlier researchers have identified many key aspects in the KM processes such as acquiring, collaborating, integrating and experimenting (Leonard-Barton, 1995); knowledge acquisition, knowledge conversion into useful form, application and protection (Gold *et al.*, 2001); acquisition, indexing, filtering, linking, distributing and application (Alavi, 1997); and knowledge acquisition, knowledge sharing and knowledge distribution (Nevis *et al.*, 1998). Managing knowledge in organizations requires managing several processes of knowledge such as initiation, implementation, ramp-up and integration (Szulanski, 1996); generation (acquisition; dedicating resources; fusion; adaptation; and building knowledge networks), codification and transfer (Davenport and Prusak, 1998); acquisition, conversion, application and protection (Gold *et al.*, 2001); acquiring, selecting,

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internalizing and using (Holsapple and Joshi, 2002); acquisition, selection, generalization, assimilation and emission (Holsapple and Jones, 2004); creation, transfer, integration and leverage (Tanriverdi, 2005), creation, storage, sharing and evaluation (Gumus, 2007); generation, codification, transfer and application (Singh and Soltani, 2010); and acquisition, creation, storage and application (Aujirapongpan *et al.*, 2010).

Alavi and Leidner (2001) consider organizations to consist of four socially enacted knowledge processes: creation, storage/retrieval, transfer and application. KM could be viewed as a system made up of sub-processes like knowledge codification, sharing, distribution, storage, leadership support and reward and recognition system. This system or mechanism is referred to as organizational memory (Grant, 1996), which guides knowledge capture, storage and dissemination. Walsh and Ungson (1991) proposed organizational memory "bins" including organizational culture, processes, work procedures, organizational structures, work ecology and internal and external information archives. More recent researchers have extended the earlier thought process. Wang *et al.* (2008) have discussed KM orientation concept as comprising four main component factors: organizational memory, knowledge sharing, knowledge absorption and knowledge receptivity.

In addition to KM planning and implementation process, a number of KM enablers have been suggested by researchers. Arthur Anderson and APQC propose that four enablers (leadership, culture, technology and measurement) can be used to foster the development of organizational knowledge through the KM process (Jager, 1999). Lee and Choi (2003) consider organizational culture, structure, people and information technology (IT) as the most important enablers to a successful KM within the organization. Wong (2005) identified 11 critical success factors in small and medium enterprises, which are management leadership and support, culture, strategy and purpose, IT, measurement, organizational infrastructure, process and activities, motivational aids, resources, training and education and human resource management. According to Chong and Choi (2005), employee training, employee involvement, teamwork, employee empowerment, top management leadership and commitment, organizational constraints, information system infrastructure, performance measurement, egalitarian culture, benchmarking and knowledge structure are critical enablers to the success of a knowledge-based organization. Organizational leadership, culture, structure and technology have been researched in detail and advocated by many researchers.

Lee and Choi (2003) believe that KM enablers may be structured based upon a socio-technical theory. It is important to provide a balanced view between a technological and social approach to KM. Therefore, KM should always be viewed as a system that comprises a technological subsystem as well as a social one (Wong and Aspinwall, 2004). The social system can be further classified into structural, cultural and human resource (Chuang, 2004). Just taking it as an IT initiative can be problematic, as most technologically oriented initiatives have ignored the people issue in KM and failed to meet expected business results (Carter and Scarbrough, 2001). KM should always be 90 per cent people and 10 per cent technology (Jarrar, 2002). Technology is also found to enable flatter organizational structures, which increases organizational effectiveness (Miles *et al.*, 1998; Orlikowski, 2000).

Saroch and Barmash (2007) learned that the biggest challenge to KM is getting support, commitment and a separate budget from top management. Chong (2006) found that if the nature of the business is knowledge-intensive requiring employees to work in teams, leadership plays an important role in empowering employees to take decisions. Anantamula and Kanungo (2010) found top management support is most crucial to build a successful KM initiative, as it ensures strategic focus. KM is a people-driven initiative, and therefore, utmost care is needed to promote social enablers.

Organizational structures and working procedures determine the degree of flow of information between roles and hierarchies (Aujirapongpan *et al.*, 2010). Knowledge flow as

a phenomenon not only occurs through the conventional top-down approach but also bottom-up and horizontal knowledge exchanges (Mom *et al.*, 2007). Communities of practice are one way to enhance cross-functional and inter-departmental exchanges. Smith and McKeen (2004) treat them as a network of people who create, disseminate and retain knowledge in a particular area. Therefore, organization structures determine the effectiveness of the working of such communities. Organizational structures also include incentive schemes, work design, management support policy and rules, regulations and practices. An appropriate organizational structure would be the one that has a minimum of hierarchies and promotes collective knowledge rather than individual behavior (Yang and Chen, 2007). When the organizational structure is less formalized and centralized and more integrated, social interaction among organizational members is higher (Chen and Huang, 2007). Sharing information and knowledge with people at different levels and different functions of a firm enhances the development of shared values (Goffee and Jones, 1996; Holtshouse, 1998).

KM does not happen by chance. A culture which promotes knowledge creation and provides for appropriate support processes is a must. KM is all about people and organizational culture and has been advocated by researchers (Liebowitz, 1999; Jarrar, 2002, Chen and Huang, 2007). For KM to succeed it's important that managers encourage employees to contribute their ideas without fear of making mistakes (Davenport *et al.*, 1998), i.e. it requires a culture that promotes open-mindedness and commitment to learning (Sinkula *et al.*, 1997). Communication and trust are critical for effective KM (Krogh, 1998; Choi and Lee, 2003). The difficulty in most KM efforts lies in changing organizational culture and people work habits; however, most KM efforts treat these cultural issues as secondary implementation issues (McDermott, 1999). It's important to create opportunities for socialization. According to Peters (2007), access to knowledge breeds more knowledge and the best KM techniques ensure that everyone is involved.

KM constructs and performance – the relationship

A review of literature reveals that organizations that excel at KM have been able to generate results for their organization such as gains in productivity, savings on costs (Bahra, 2001), productivity (Lapre and Wassenhove, 2001; Holsapple and Singh, 2004), faster delivery, quality improvement (Mukherjee *et al.*, 1998, Zack *et al.*, 2009), innovation (Francisco and Guadamillas, 2002; Holsapple and Singh, 2004; Zack *et al.*, 2009) and reduced cycle time.

But attaching a value to intangible assets is difficult because of the associated uncertainties. According to Wolford and Kwiecien (2004), the frequently asked question is, how can you put a value to knowledge? But, linking KM practices to business results and competiveness is not easy and there are disparate views among researchers. Hiebler (1996) believes that organizations that are able to create and use a set of measures tied to financial results seem to come out ahead in the long run. Soo *et al.* (2002) feel that although knowledge is difficult to measure, it does have a clear impact on outcome. There are a good number of proxies that can be used to measure KM, e.g. measuring certain firm processes (i.e. problem solving and decision making) or outcomes (i.e. innovative outputs). The value of knowledge can be looked at from stakeholders' perspective: individual, company and its customers. KM can impact things like recruitment and retention, response time for problem solving, customer satisfaction and avoidance of problems. In addition to hard numbers, success can also be represented in the form of "soft" benefits such as anecdotes and success stories (Smith and McKeen, 2004).

Rao (2005) considers five types of KM metrics which would help assess the level of KM implementation within a company. These are technology metrics, process metrics, knowledge metrics and employee metrics. Holsapple and Joshi (2002) have classified KM influences into three categories:

1. resource (financial, human, knowledge and material);

2. managerial (leadership coordination and measurement); and
3. environmental (competitors, customers, markets, suppliers and other "climates").

Chong *et al.* (2006) identified 38 indicators grouped into five dimensions:

1. systematic knowledge activities;
2. employee development;
3. customer satisfaction;
4. good external relationship; and
5. organizational success.

Alegre *et al.* (2011) examined how KM affects innovation performance in biotechnology firms in France. They found that KM practice can enhance sustained competitive advantages in innovation performance, but it does so indirectly through the creation of KM dynamic capabilities.

To determine the impact of KM on performance, a safe assumption could be to consider success as made up of qualitative and quantitative measures. It's important to make a distinction between value creation and value realization, as traditional forms of financial accounting measure value realization, and not value creation. It's important to also include a measure of value creation (Smith and McKeen, 2004). Moving a level deeper and trying to define success in terms of KM is difficult because common metrics for success – profitability, market capitalization, market share, etc. – are generally the indirect result of KM and are influenced by many other factors (Kluge *et al.*, 2001).

Thus, KM initiatives influence performance, which could be explained in terms of financial and non-financial performance. Non-financial performance indicators include enhanced productivity, improved quality of product and services, better utilization of existing resources, customer expectations, reduced duplication of efforts, etc. Financial performance indicators include measures like net profit margin, return on assets and return on capital employed. For our understanding, we refer to non-financial performance indicators as organizational performance indicators.

KM in Indian organizations

Singh *et al.* (2006) carried out a survey to access the impact of KM practices in Indian manufacturing industries. Data were collected and analyzed for 71 industries under this category. They found that the main reasons why these organizations are focusing on KM are gaining completive advantage and creating new knowledge. However, culture and financial constraints are among the highest-ranked barriers for KM implementation.

Chadha and Kapoor (2010) studied KM practices in auto component industries in India. Aspects covered in the questionnaire included the competitive priorities of the organizations, type of knowledge sharing and system implemented in the organization, hurdles in effective implementation of KM, key benefits of implementing KM and steps to encourage knowledge sharing in organization. Jyoti *et al.* (2011) investigate the impact of KM on the innovative capacity in Indian telecommunication organizations. They found a significant relationship between KM and innovation. Further, knowledge approach, knowledge protection and knowledge utilization processes of KM affect technical as well as non-technical innovation.

Singh and Soltani (2010) investigated the degree of awareness and implementation of KM principles and practices in Indian IT companies. Various phases of KM (knowledge generation, knowledge codification, knowledge transfer and knowledge application) were taken into account and an index was prepared. The index for conceptual understanding and commitment

and knowledge acquisition was found to be high, while it was low for knowledge usage, culture, technology, learning, sharing, assessment and knowledge architecture.

Among Indian organizations, Infosys Technologies Limited has created an internal metric known as Knowledge Maturity Model (KMM) for tracking its progression on KM initiatives. According to Mehta *et al.* (2007) and Garud and Kumaraswamy (2003), KMM incorporates various levels to determine the state of KM implementation. This KM framework encompasses business strategy, people, processes and technology and follows a principle of incremental change and not forcing employees to use the system (Suresh *et al.*, 2008). Tata Consultancy Services Limited has developed a Knowledge Management Maturity Model known as 5iKM3 to access and harness the organizations' ability to manage knowledge. According to Mohanty *et al.* (2005), the states of knowledge maturity can be achieved by systematically addressing the three pillars of KM, i.e. people (people mindset and culture), process (process, policy and strategy) and technology (technology and infrastructure). Rao (2005) considers five types of KM metrics necessary to estimate the state, viz., technology, process, knowledge, employee and business. Tata Steel Limited developed Knowledge Manthan Index to measure the effectiveness of its initiative by capturing aspects like involvement of people, sharing of ideas, quality of implementation, etc. (Khanna *et al.*, 2005). Similarly, Wipro Technologies Limited developed a Knowledge Management Engagement and Effectiveness (KMEE) index which gives the top management a clear view both at the organizational level as well as at each of the business unit levels. The KMEE is calculated through a set of parameters. For example, one of the parameters for engagement is the number of visitors to a repository as a ratio of the total number of users. Similarly, one of the parameters for effectiveness is the number of hours saved by reusing components as a ratio of total number of hours spent on coding (Chatzkel, 2004).

A study by Pillania (2005) covering Indian software, pharmaceutical and petroleum industries compared KM implementation in public and private sector and found that KM strategy of Indian organizations is lacking more in the public sector than the private sector.

A review of the literature in Indian organizations reveals that majority of the work has been done in the area of KM model and index development. Some work is also done in the comparison of KM across industries and sectors. However, not much research is found in identification of respondent clusters among organizations implementing KM. The first research gap relates to identification of KM clusters. Choi and Lee (2003) found that KM methods could be categorized into four styles (dynamic, system, human-oriented and passive); Mehrizi and Bontis (2009) identified three approaches (socialization, collaboration and codification) to KM. However, there are no studies that present what types of KM styles are prevalent in Indian organizations. Therefore, it is worthwhile to identify if similar clusters can be identified among respondents from Indian organizations.

Just like any other process, KM too cannot thrive in absence of metrics or measurement. KM is cited as an antecedent to firm performance (Lee *et al.*, 2005). According to Wang *et al.* (2008), the better a firm is at KM, the more competitive it will be in the market and the better its performance. Kogut and Zander (1992) argue that the sharing of knowledge between individuals and groups within a firm, the use of existing knowledge and the creation of new knowledge can give rise to strategic resources and capabilities that enable some firms to outperform others. The second research gap is pertaining to the fact that not much research is available in the Indian context to determine knowledge-induced performance variations across organizations. Assuming the earlier findings to be true, it is obvious to believe that performance will vary depending on the extent of KM implementation in an organization.

Based on the earlier identified research gaps, the objectives of the study are formulated.

Objectives of the study

1. To segment the sample respondents based on the various KM constructs.
2. To examine if organizational and financial performance vary between various segments as obtained in Objective 1.

Research methodology

An exploratory study was carried out by conducting an in-depth review of literature which was followed by an FGD and some personal interviews. The questions explored were primarily related to KM constructs and their impact on performance. An FGD was conducted with eight participants. Later, ten personal interviews were conducted with KM practitioners. Transcripts were prepared from FGD and personal interviews, and notes were prepared based on the interpretation of data. On the basis of the notes, answers to questions framed were analyzed. An attempt was made to identify themes and patterns and organize them into coherent constructs to bring meaning to the text. The steps (Powell, 2003) that were used to examine the qualitative information were as follows:

- understanding the data collected;
- focus the analysis;
- categorize the information;
- identify relationship within and between constructs; and
- conceptualizing the themes together.

This was used to define KM constructs, identify relationships between constructs and conceptualize a research framework. The data collected from literature review, FGD and personal interviews were subjected to content analysis to bring out the common constructs discussed.

The generation of items is considered the most important element of establishing sound measures (Hinkin, 1995). Based on the analysis of data collected through literature review, FGD and personal interview, a pilot instrument is developed. During the pilot instrument development, 110 items were found to represent different dimensions of KM (see Appendix). Out of these, 25 items were related to KM performance. A closer evaluation of the 25 items initially selected in the pilot instrument reveals that the 25 items cover the dimensions discussed by Chong *et al.* (2006). During the pilot testing of the instrument, many of the respondents were not enthusiastic in participating in the survey because of large number of items in the scale. This issue was discussed with the experts and they were of the opinion that number of scale items should be reduced by eliminating the non-discriminating ones.

Before sending the instrument for data collection, the instrument was shown to two experts working in the area of KM to get their feedback in terms of identification of irrelevant questions, addition or deletion of questions and refinement of statements to bring more clarity. The experts were of the view that 24 items were not so relevant or duplicate questions and thus should be deleted. The remaining 86 items were used to collect data using a 5-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Data collected from pilot survey are analyzed to check if these items are valid and internally reliable. Principal component analysis is conducted to check for construct validity of pilot instrument. The reliability of each construct was assessed through degree of internal consistency given by Cronbach's coefficient alpha value (Cronbach, 1984).

For scale reduction, Nunnally and Bernstein (1994) believe that the most conceptually appealing approach is calculating the product-moment correlation of each item with the total score and then by ranking the correlations, one can devise a final scale of any desired

length. Correlation coefficient was computed between each item and total score and arranged in descending order. A cutoff of 0.542 was used to select the top 50 statements, i.e. 36 statements were treated as non-discriminating and removed in the final instrument. The final instrument comprised 50 statements. This was followed by data collection and testing of the final instrument for construct validity and reliability. Construct validity of final instrument is carried out through exploratory factor analysis using principal component analysis. This is done to verify if whether all the statements belong to their respective hypothesized constructs. Further, Cronbach alpha coefficient is computed to test for reliability. After testing for construct validity and reliability, the instrument is used for data collection.

Dimensions covered in the questionnaire and sample description

The aspects covered in questionnaire included questions related to KM planning and design process, KM implementation and evaluation process, leadership, culture, technology, structure and measurement of performance. KM process is discussed in two stages, i.e. KM planning and design and KM implementation and evaluation. KM planning and design mandates organizations to develop an understanding of the goals and objectives of KM and clear idea of the business problems they are trying to address using KM. It also included aligning KM projects' objectives with the overall business objectives. Before embarking on the journey, the stage calls for building a business case for KM implementation and identification of resources to support the same. The second stage, KM implementation and evaluation is about putting ideas and planning into practice. It looks at actualizing the process of embedding knowledge into organizational outputs and developing indicators to measure stakeholder satisfaction.

For final data collection, 1,100 respondents across 65 Indian organizations were contacted through email, telephone, personal visits and online medium. In all, 330 respondents filled the survey; however, at the time of data entry, 17 survey forms were found to be partially filled. These 17 incomplete forms were removed from the sample. A total of 313 usable responses were obtained, indicating a response rate of 28.5 per cent. The sample comprised 209 respondents from the private sector and 104 respondents from the public sector. Similarly, 112 responses were obtained from the manufacturing industry and 201 from the services industry. The respondents were top-level (directors, vice president, general managers, chief information officer, etc.) and middle-level (managers, programmers, sales executives, data analyst, etc.) executives. The surveyed firms were drawn from a broad spectrum of industry sectors like computer hardware, software, telecommunications, automobile, consulting, power, etc. The age of the respondents ranged from 32 to 50 years. On average, the working experience of the participants ranged from 4 to 30 years. Convenience sampling was used to select the participants.

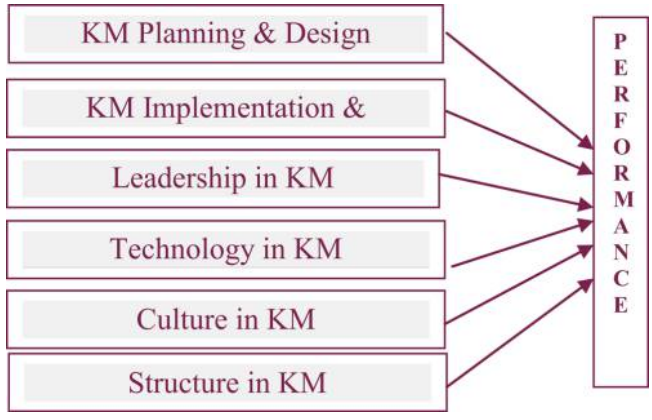
To achieve Objective 1, i.e. to segment KM practitioners in Indian organizations, cluster analysis is used. First, hierarchical cluster analysis is used to determine the optimal number of clusters. Later, k-means cluster analysis is carried out using the average scores of the six KM constructs to identify various clusters. The clusters are then appropriately labeled. Further, to achieve Objective 2, i.e. to compare the performance (organizational and financial performance) between the obtained clusters, a one-way ANOVA was carried out to determine if organizational performance varies between the obtained clusters. In case significant difference is found, then to determine the cluster pairs between which the difference is significant, a post hoc test will be conducted. The same process will be followed in the case of the financial performance construct.

Research framework and formulation of hypothesis

On the basis of the literature review presented earlier, a KM Planning and Implementation Framework (KMPI) is developed, as shown in Figure 1 below. It comprises six KM constructs:

1. KM Planning and Design (KMPD);

Figure 1 KM Planning and Implementation (KMPI) framework



2. KM Implementation and Evaluation (KMIE);
3. Leadership in KM (LKM);
4. Technology in KM (TKM);
5. Culture in KM (CKM); and
6. Structure in KM (SKM).

These six constructs were found to influence performance. Here performance is explained by organizational (non-financial) performance and financial performance.

Researchers (Mukherjee *et al.* (1998); Bahra (2001); Lapre and Wassenhove (2001); Francisco and Guadamillas (2002); Holsapple and Singh (2004); Smith and McKeen (2004); Rao (2005); Zack *et al.* (2009)) cite research studies which show that KM influences both organizational and financial performance. Based on the studies discussed in review of literature, it is expected that the influence of KM on "Org Perf" and "Fin Perf" would be different in the obtained clusters, if any. Therefore, it can be hypothesized that the average "Org Perf" and "Fin Perf" scores in obtained clusters (if any) will be same against the alternate hypothesis that they will be different. Hence, the null hypothesis can be written as:

H1. There is no significant difference between the average score of "Org Perf" between obtained clusters.

H2. There is no significant difference between the average score of "Fin Perf" between obtained clusters.

Analysis and results

Outcomes of content analysis

Based on the steps defined in content analysis in methodology, five constructs were identified for KM planning and implementation process. They are plan, design, implement, evaluate and accelerate. These five constructs have been selected because they were considered salient by respondents. Further, they also appeared in approaches and frameworks discussed by previous researchers.

In addition, some key enablers were considered extremely important by respondents during the FGD and personal interviews. These are leadership, technology, culture and structure.

Apart from the KM process constructs and key enablers, respondents also cited KM-induced performance indicators. Majority of respondents felt that KM relationship with

time and cost could explain its impact. Other factors could be return on investment, customer, supplier and employee satisfaction index, etc.

Based on the earlier analysis, a pilot instrument was prepared (see Appendix).

Construct validity and reliability of final instrument

Before the final instrument could be used for empirical analysis, it's important to first test for its reliability and validity. To verify, if all the statements form a part of the original hypothesized constructs, construct validity is carried out through exploratory factor analysis using principal component analysis. Exploratory factor analysis was carried out using SPSS software. The results are presented in Table I. The KMO statistics for each of the KM constructs varied from 0.730 to 0.936, which is satisfactory. Further, Bartlett's test of sphericity was found to be significant for all the constructs. The results indicate that each of the constructs resulted in only one factor with factor loading greater than 0.5. The variation explained ranged from 49 to 84.2 per cent. The results show that construct validity of the final instrument is high.

To test the reliability of the instrument, Cronbach alpha coefficient was computed for the individual constructs as well as overall. As mentioned earlier, an alpha value of 0.60 is acceptable (Churchill, 1979). As per Nunnally (1978), for reliability, the minimum acceptable level of Cronbach's coefficient is 0.70. If the value of alpha is between 0.80 and 0.95, it implies a very good reliability, whereas if the value is between 0.70 and 0.80, it implies good reliability (Chawla and Sondhi, 2011). The value of Cronbach alpha for each of the constructs and overall (50 statements) is given in Table II. It is seen that the value of Cronbach alpha for various constructs varied from 0.769 to 0.911 and for the overall items it is 0.973. The Cronbach alpha values obtained showed that the reliability of the scale is either good or very good.

Results of cluster analysis

As an initial step, as explained earlier in research methodology, hierarchical cluster is used to identify the number of optimal clusters. Based on the analysis, a three-cluster solution is

Table I Construct validity through factor analysis

Serial number	*Constructs (no. of statements)*	*KMO statistics*	*Bartlett's test of sphericity*	*No. of factors*	*Variance explained (per cent)*
1	Organizational performance (7)	0.915	Significant	1	65.3
2	Financial performance	0.756	Significant	1	84.2
2	KM planning and design (8)	0.874	Significant	1	49.0
3	KM implementation and evaluation (11)	0.936	Significant	1	50.0
4	Technology (6)	0.869	Significant	1	58.6
5	Culture (6)	0.874	Significant	1	56.6
6	Leadership (5)	0.869	Significant	1	64.2
7	Structure (4)	0.730	Significant	1	59.3

Table II Reliability (Cronbach alpha) values for various KM constructs

Serial number	*Construct (number of statements)*	*Cronbach alpha*	*Interpretation*
1	Organizational performance (7)	0.911	Very good reliability
2	Financial performance (3)	0.905	Very good reliability
3	KM planning and design (8)	0.848	Very good reliability
4	KM implementation and evaluation (11)	0.898	Very good reliability
5	Technology (6)	0.857	Very good reliability
6	Culture (6)	0.844	Very good reliability
7	Leadership (5)	0.859	Very good reliability
8	Structure (4)	0.769	Good reliability
9	Overall (50)	0.973	Very good reliability

obtained. Next, k-mean cluster analysis is then used to refine the cluster solution. In k-mean cluster analysis, the assumption is that the number of clusters, k, is known in advance, which in this case is found to be three. The average scores computed for the various KM constructs are used for the segmentation process.

Table III presents the results of the k-means cluster analysis. The results show that the average scores of all the KM constructs are significantly different in the three clusters. For example, the average score of the construct KMPD is significantly different across the three clusters, as indicated by one-way ANOVA. Similarly, results can be interpreted for the remaining five constructs, i.e. KMIE, TKM, CKM, LKM and SKM.

Interpreting cluster profiles

The final cluster centers that represent the average importance of each KM construct on a scale of five for each cluster obtained are shown in Table IV. An analysis of the characteristics of the three clusters shows that there are three KM practitioner segments. In terms of respondent distribution, the first cluster had 129 respondents, second cluster had 38 respondents and the third cluster had 146 respondents. It is also evident from the table that Cluster 3 scores highest on all KM constructs, while Cluster 2 scores the least. Cluster 2 and 3 can be considered to be two extreme KM behaviors, while Cluster 1 lies somewhere in between, with the scores near midpoint on a scale of five.

The first cluster (n = 129, 41 per cent) is labeled as "Partly KM practitioners", as their score was just nearing midpoint. The second cluster (n = 38, 12 per cent) was labeled as "Passive KM practitioners", as their score was below midpoint, while the third cluster (n = 146, 47 per cent) was labeled as "Active KM practitioners", with scores above midpoint and nearing four on a scale of five. The characteristics of these three clusters are described later.

Cluster 1 comprises respondents whose average KM construct scores are neither very high nor low. This cluster is characterized by the fact that the mean score of various KM constructs are nearing midpoint. This respondent group scores moderately on KMPD,

Table III Results of one-way ANOVA to test the significant difference in average scores of KM constructs between clusters

	Between groups		*Within groups*			
Construct	*Mean square*	*df*	*Mean square*	*df*	*F*	*Significance*
KMPD	41.195	2	0.201	310	204.497	0.000*
KMIE	45.844	2	0.184	310	249.414	0.000*
TKM	52.851	2	0.286	310	184.748	0.000*
CKM	59.970	2	0.208	310	287.736	0.000*
LKM	66.127	2	0.214	310	309.271	0.000*
SKM	65.247	2	0.219	310	297.839	0.000*

Notes: *Indicates difference in means of three of clusters as indicated by one-way ANOVA

Table IV Final cluster centers showing construct differences in three clusters

KM constructs	*Cluster 1 (partly KM practitioners)*	*Cluster 2 (passive KM practitioners)*	*Cluster 3 (active KM practitioners)*
KMPD	3.253 (M)	2.450 (L)	3.973 (H)
KMIE	2.910 (M)	2.069 (L)	3.673 (H)
TKM	3.092 (M)	2.056 (L)	3.832 (H)
CKM	3.142 (M)	2.048 (L)	3.936 (H)
LKM	3.153 (M)	2.132 (L)	4.063 (H)
SKM	2.992 (M)	2.026 (L)	3.923 (H)
No. of cases	129	38	146

Notes: L = low; M = medium; H = high

TKM, CKM and LKM. However, they score low on KMIE and SKM. So it can be interpreted that respondents in the first cluster have introduced some KM elements formally and can be characterized as partly adaptive KM practitioners.

The second cluster comprises those respondents whose average KM construct scores are just above two on a scale of five. Hence, it can be interpreted that the respondents in the second cluster have low average scores on all KM constructs. It can also be inferred that respondents in this cluster have neither introduced any KM initiatives formally or informally and therefore are unclear with their KM approach. A plausible reason could be that respondents lack awareness about the benefits associated with successful KM implementation and are not keen in pursuing it. While respondents in this cluster rather appear to be indifferent to all the KM constructs, they lack the basic awareness about knowledge, which is an area of concern.

Respondents in the third cluster represent the complete opposite of second cluster, i.e. the average scores of various KM constructs are above midpoint and nearing four. Respondents in this cluster appear to be enthusiastic about KM, as they have scored fairly high on all six KM constructs. This also shows that respondents belonging to this cluster have introduced KM in a formal way and have made KM an organization-wide initiative. Due to this clear and unified vision of KM, respondents are able to demonstrate the benefits associated in a much more convincing manner. This cluster attaches a high level of importance to all the KM constructs.

Next, it would be interesting to investigate if performance defined by "Org Perf" and "Fin Perf" varies between the three clusters.

Comparison of organizational performance across three clusters

To verify if the average "Org Perf" scores vary between the obtained clusters, a one-way ANOVA is carried out with "Org Perf" as a dependent variable and the three clusters as independent variables. The result of the ANOVA test for organizational performance is summarized in Table V.

It is evident from the table that the organizational performance significantly varies for the three clusters. Hence, *H1* (There is no significant difference between the average score of "Org Perf" between the three clusters) is rejected.

The average scores of organizational performance in the three clusters (Table VI) show that the scores are highest for active KM practitioners, followed by partly KM practitioners and passive KM practitioners. This shows that the average scores of organizational performance vary across the three clusters. The average score of "Org Perf" for active KM practitioners is found to be 3.873, partly KM practitioner is 3.178 and

Table V Results of one-way ANOVA to test the significance difference in organizational performance between three clusters

Source of variation	*Sum of squares*	*df*	*Mean square*	*F*	*Significance*
Between groups	95.867	2	47.934	178.724	0.000
Within groups	83.142	310	0.268		
Total	179.009	312			

Table VI Average scores of organizational performance across three clusters

Name of cluster	*N*	*Mean*	*SD*
Partly KM practitioner	129	3.1783	0.53721
Passive KM practitioner	38	2.1767	0.64097
Active KM practitioner	146	3.8738	0.46238
Total	313	3.3811	0.75746

passive KM practitioner is 2.176. The results also show that effective KM implementation influences organizational performance. These findings find support in earlier studies where researchers found gains in productivity, savings on cost (Bahra, 2001), productivity (Lapre and Wassenhove, 2001; Holsapple and Singh, 2004), faster delivery and quality improvement (Mukherjee *et al.*, 1998; Zack *et al.*, 2009), innovation (Francisco and Guadamillas, 2002; Holsapple and Singh, 2004; Zack *et al.*, 2009), recruitment and retention and customer satisfaction (Smith and McKeen, 2004). These findings are in line with earlier studies done by researchers where it was found that superior KM performance is indeed a predictor of superior bottom line performance which is measured by financial measures like return on assets, return on sales, operating income to assets, operating incomes to sales, operating income to employees, Tobin's Q and return on assets (Tanriverdi, 2005), return on asset and return on equity (Mukherjee *et al.*, 1998; Zack *et al.*, 2009), return on capital employed and earnings per share (Wang *et al.*, 2008).

After verifying that the average score of "Org Perf" is significantly different for the three clusters, an attempt is made to test if the scores among cluster pairs (partly–passive, active–passive and active–partly) are significantly different or not. Therefore, the null hypothesis can be written as:

H3. There is no significant difference between the average score of "Org Perf" between partly KM practitioners and passive KM practitioners.

H4. There is no significant difference between the average score of "Org Perf" between active KM practitioners and passive KM practitioners.

H5. There is no significant difference between the average score of "Org Perf" between active KM practitioners and partly KM practitioners.

To test the aforementioned hypotheses, a post hoc test is used for pair-wise multiple cluster comparisons. Further, Tukey's significant difference test is also used to determine the cluster pairs for which the difference between each pairs of means is significantly different at 5 per cent level of significance.

Table VII shows that there is a significant difference in the average score of the construct "Org Perf" between any two cluster pairs, viz., active KM practitioner, partly KM practitioner and passive KM practitioner. Post hoc analysis indicates that the average scores of "Org Perf" for partly KM practitioners are higher than that of passive KM practitioners, whereas the average scores of partly KM practitioners are less than that of active KM practitioners. Similarly, when the average scores of "Org Perf" is compared between passive and partly KM practitioners and passive and active KM practitioners, it's found that the average score for both partly and active KM practitioners is higher as compared to passive KM practitioners. Further, the average "Org Perf" scores are compared between active KM practitioners, partly KM practitioners and passive KM practitioners. It is seen that active KM practitioners have average "Org Perf" scores greater than partly and passive KM practitioners. Further, the magnitudes of the difference

Table VII Post hoc test for comparison of "Org Perf" between cluster pairs (partly, passive and active KM practitioners)

(I) Cluster number of Case	*(J) Cluster number of case*	*Mean difference (I-J)*	*Standard error*	*Significance*	*95 per cent confidence interval*	
					Lower bound	*Upper bound*
Partly KM practitioners (129)	Passive KM practitioners	1.002*	0.096	0.000	0.776	1.227
	Active KM practitioners	−0.695*	0.063	0.000	−0.843	−0.548
Passive KM practitioners (38)	Partly KM practitioners	−1.002*	0.096	0.000	−1.227	−0.776
	Active KM practitioners	−1.697*	0.094	0.000	−1.919	−1.475
Active KM Practitioners (146)	Partly KM practitioners	0.695*	0.063	0.000	0.548	0.843
	Passive KM practitioners	1.697*	0.094	0.000	1.475	1.919

Notes: *L = low; M = medium; H = high

clearly indicate that the "Org Perf" score for active KM practitioners is better than partly KM practitioner, which in turn is better than passive KM practitioner.

Therefore, *H3*, *H4* and *H5* are rejected, as significant difference is found between the clusters pairs with respect to the average "Org Perf" score.

Comparison of financial performance across three clusters

Similarly, to determine if there exists a significant difference in the construct "Fin Perf" between the three clusters, a one-way ANOVA similar to "Org Perf" is carried out. The results are summarized in Table VIII.

It is evident from the aforementioned result that there is a significant difference in the average scores of the construct "Fin Perf" between the three clusters, as given by one-way ANOVA at 5 per cent level of significance. Hence, *H2* (There is no significant difference between the average score of "Fin Perf" between obtained clusters) is found to not hold true. It can be concluded, therefore, that the cluster means are not equal and the construct "Fin Perf" significantly differs across the three clusters. Further, the average score of "Fin Perf" for active KM practitioners is 3.550, partly KM practitioner is 2.904 and passive KM practitioner is 2.236 (Table IX).

After verifying that the average score of "Fin Perf" is significantly different between the three clusters, an attempt is made to test if the scores among cluster pairs (partly–passive, active–passive and active–partly) are significantly different or not. Therefore, it can be hypothesized that the average score of "Fin Perf" among cluster pairs is same against the alternate hypothesis that they are different. As there are three clusters, we would be comparing the mean scores of "Fin Perf" between Cluster 1 and Cluster 2, Cluster 1 and Cluster 3 and Cluster 2 and Cluster 3, respectively. Therefore, the null hypothesis can be written as:

H6. There is no significant difference between the average score of "Fin Perf" between partly KM practitioners and passive KM practitioners.

H7. There is no significant difference between the average score of "Fin Perf" between active KM practitioners and passive KM practitioners.

H8. There is no significant difference between the average score of "Fin Perf" between active KM practitioners and partly KM practitioners.

A post hoc test is conducted to verify if the average score of "Fin Perf" is significantly different for the obtained cluster pairs. Further, Tukey's significant difference test is also used determine the cluster pairs for which the difference between each pairs of means is significantly different at 5 per cent level of significance. The results are summarized in Table X.

Table VIII Results of ANOVA test on financial performance across three clusters

Source of variation	*Sum of squares*	*df*	*Mean square*	*F*	*Significance*
Between groups	62.653	2	31.326	61.750	0.000
Within groups	157.265	310	0.507		
Total	219.918	312			

Table IX Average scores of financial performance across three clusters

Name of cluster	*N*	*Mean*	*SD*
Partly KM practitioner	129	2.9044	0.64978
Passive KM practitioner	38	2.2368	0.86614
Active KM practitioner	146	3.5502	0.72142
Total	313	3.1246	0.83956

Table X Post hoc test for comparison of "Fin Perf" between cluster pairs (partly, passive and active KM practitioners)

(I) Cluster number of case	(J) Cluster number of case	Mean difference (I-J)	Standard error	Significance	95 per cent confidence interval Lower bound	Upper bound
Partly KM practitioners (129)	Passive KM practitioners	0.668*	0.131	0.000	0.358	0.977
	Active KM practitioners	−0.646*	0.086	0.000	−0.849	−0.443
Passive KM practitioners (38)	Partly KM practitioners	−0.668*	0.131	0.000	−0.977	−0.358
	Active KM practitioners	−1.313*	0.130	0.000	−1.619	−1.008
Active KM practitioners (146)	Partly KM practitioners	0.646*	0.086	0.000	0.443	0.849
	Passive KM practitioners	1.313*	0.130	0.000	1.008	1.619

Notes: *Indicates that the mean difference is significant at the 0.05 level

The results shows that the average score for the construct "Fin Perf" among any two cluster pairs, viz., active KM practitioner, partly KM practitioner and passive KM practitioner, is significantly different. While comparing the average scores between partly and passive KM practitioners and partly and active KM practitioners, it is found that partly KM practitioners score higher as compared to passive KM practitioners, while partly KM practitioners score low as compared to active KM practitioners. Similarly, when the average scores of "Fin Perf" are compared for cluster pairs, passive and partly KM practitioners and passive and active KM practitioners, it is observed that passive KM practitioners score lower than both partly and active KM practitioners. For the last cluster pairs, active and partly KM practitioners and active and passive KM practitioners, active KM practitioners score higher than both partly and passive KM practitioners.

Thus, the results show that the average score of the construct "Fin Perf" is significantly different between the three cluster pairs. It is also evident from the table that in organizations actively practicing KM, its influence on financial performance is highest, followed by those which are partly adopting KM. The influence in the case of passive adopters of KM is least as expected. Further, *H6*, *H7* and *H8* are rejected, as the difference in the average "Fin Perf" scores between the three cluster pairs is found to be significantly different.

Conclusion

Summary of the findings

The paper provides empirical evidence in the form of identification of clusters based on the degree of KM practices adopted in the context of Indian organizations. The three clusters obtained are labeled as "Active KM Practitioner", "Partly KM Practitioner" and "Passive KM Practitioner". Thus, KM practitioners in Indian organizations can be segregated into three distinct segments. There were some attributes pertaining to KM which could explain this distinction between the three clusters. All respondents in the active KM practitioners cluster attributed highest level of importance to KM constructs; partly KM practitioners attributed moderate level of importance to KM constructs; and passive KM practitioners attributed lowest level of importance to KM constructs. Thus, it can be concluded that significant differences in the KM priorities were attached by the three clusters.

It also presents the association between the obtained clusters and performance. The ANOVA test supports the alternate hypothesis that organizational and financial performance significantly vary for the three clusters obtained. The results of the post hoc test indicate that organizational and financial performance are significantly different for each cluster pair. This study shows that effective KM mandates developing capabilities and competencies related to processes, culture, technology, leadership and structure, which are key to improving performance. The results are consistent with Lai *et al.* (2014), who found that KM (knowledge management, knowledge creation and acquisition and knowledge storage and dissemination) influences innovation performance. In the Indian context, Jyoti *et al.* (2011) too found a significant relationship between KM and innovation.

"A significant implication for practitioners focuses on the importance of taking an integrated holistic view of both KM constructs as well as their influence on performance."

The results suggest that organizations which are able to demonstrate better KM capabilities help them achieve better performance as compared to their counterparts and competitors.

It is also interesting to note from the clusters obtained that organizations which are actively pursuing KM have scores below four on various KM constructs on a scale of five. This shows that there is a scope for improvement on various KM constructs. Similarly, organizations which are either passively or not doing something substantial in KM score low. It shows that among organizations which are pursuing KM, the alignment of KM objectives with the overall business strategy needs improvement. What is needed therefore is a coherent strategy involving steps to improve various KM constructs like processes, culture, technology, leadership and structure. It's important to identify knowledge workers and form a dedicated team who could spearhead the initiative and ensure that the KM milestones are achieved as planned. The top leadership will play a crucial role in identifying such catalyst and change agents.

Limitations

However, the study has some limitations. The sample comprises respondents from the manufacturing and services industry. To other industries, this research results may not be sufficient and generalizable. As the data pertain to only Indian organizations, the results may hold true in developing economies but may not be generalizable to all other economies.

However, the strength of this study lies in its comprehensive coverage of various aspects related to KM planning and implementation and its impact on performance. It provides for both qualitative methodology through FGD and personal interview and quantitative methodology through surveys and questionnaires. The advantage of this study is that it builds upon both the approaches.

Implications for researchers and practitioners

A significant implication for practitioners focuses on the importance of taking an integrated holistic view of both KM constructs as well as their influence on performance. Effective planning and implementation of KM constructs is a precursor to performance. Further, the identified clusters can be used as a reference by organizations who have initiated the KM process to benchmark themselves to identify the improvement areas. It is also important that researchers should carefully examine the relevance of KM constructs in their own context. Often KM constructs are generalized and assumed to hold true across various regions and geographies. It is imperative for researchers to validate the applicability of the constructs by talking to subject matter experts.

Areas for future research

Further studies would be required to address these limitations. As for future research, it would also be interesting to study KM implementation across other major Indian industries like pharmaceutical, telecommunications, power, etc. This industry sector comparison would give an idea as to which sector is doing excellent in KM. Studies that further dig deep into comparing KM across sectors and respondent hierarchies will also provide useful contribution. More research is needed to systematically examine the influence of KM on

both organizational and financial performance. Larger sample sizes including those from both developed and developing economies will help in generalization of findings and also create an opportunity to find more segments among the sample.

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Appendix. Pilot instrument

Please indicate your degree of agreement/disagreement on the following statements.

(1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree)

- There is a clear division of responsibilities between project leader and team members
- KM initiatives have increased return on sales (ROS)
- Our KM initiative is planned around critical real-world issues
- The organization has developed ways to map knowledge to value creation
- KM initiatives have enhanced our adaptability to change
- In our organization, people have a positive orientation to knowledge
- The organization have developed a structure of competency types and levels

- The senior management promotes informal bottom-up and top-down communication
- The organization has developed ways to screen/filter knowledge and transfer structured knowledge to targeted knowledge resources
- KM initiatives have resulted in leveraging existing R&D effectively (e.g. increase in number of patents per employee, reduced R&D expenditure etc.)
- KM initiatives have increased our sales turnover
- IT system are used to distribute and integrate knowledge for product/service improvements
- KM initiatives have reduced costs (e.g. operating, inventory carrying, after sales service (warranty) etc
- KM initiatives have increased operating profit margin
- Employees are encouraged to educate themselves (e.g. attending courses, trainings etc)
- KM initiatives have improved quality of product/services
- The organization has identified subject matter experts to evaluate quality of ideas
- KM initiatives have helped in fostering new partnerships/alliances
- The top management provides flexibility of decision making by keeping rules to a minimum
- We have assigned dedicated people and defined role & responsibilities for KM activities
- The senior management acknowledges KM as a key to organizations business strategy
- The organization publicly recognizes employees who share their knowledge
- The organization has prepared a business case before embarking KM initiative
- Competencies required for a particular job is well defined
- The organizations is very clear with business rationale behind implement KM
- We have developed indicators to measure stakeholder satisfaction (employee, customer, vendor, investor etc)
- KM initiatives have improved our brand value
- IT systems are used to access wide range of external information like customer needs, competitor moves, market changes etc.
- The organization has identified external mentor organization to learn from their experience.
- KM initiatives have increased earning per share (EPS)
- The organization uses technology (videoconferencing, teleconferencing, wikis, content management systems, discussion forums etc.) to capture new ideas.
- The organization has developed ways to embed knowledge into organizational outputs (product, services, work processes and procedures)
- Job documentation and knowledge requirement is mapped
- The organization has a number of role models whom we can look up to
- Trust and openness exist between various levels of the organization
- KM initiatives have resulted in employee motivation, empowerment and development
- We meet consumers regularly to assess their future requirements
- IT systems are used to promote engagement/collaboration between cross-functional teams or communities of practice
- KM initiatives have increased return on capital employed.
- Subordinates feel confident about sharing their knowledge with superiors

- People prefer technology driven communication versus face to face communication
- The organization has established a set of KPIs to assess organizational performance
- My organization emphasizes humanity and respect to every member
- Senior management uses only bottom-up pull approach to implement KM
- KM initiatives have reduced time to market of products/services
- Our knowledge leader inspires, mentors, engenders trust and respect
- The KM targets are linked with individual incentives
- IT systems are used to publicize the KM contributions of employees
- Employees discuss problems with other colleagues to identify potential solutions
- KM initiatives have resulted in better utilization of existing intellectual base and reducing duplication of efforts/reinvention of wheel
- KM goals, objectives and policies are well defined
- It is mandatory to document experiences and learning while working on a project/assignment, i.e. de-briefing after every project is mandatory
- We have internally developed critical business measures
- KM initiatives have increased net profit margin
- Tips and tools, job aids and case studies of best practices are extensively used
- IT systems are used for training and development of employees
- Knowledge management is a formal part of the agenda at all regular meetings
- We benchmark our knowledge against that of competitors
- KM initiatives have helped in developing innovation distinctive competences
- The top leadership promotes knowledge management behaviour like sharing, reusing knowledge actively on a day-to-day basis
- We have identified indicators to match each value proposition to track its progress
- The organization provides formal training related to KM practices
- We have developed ways to distinguish between individual team members contribution to shared knowledge.
- We have an up-to-date centralized online directory of subject matter experts
- People are committed to one another's success
- Informal face to face dialogues across hierarchies and functions are commonly used for knowledge sharing
- Employee share ideas/knowledge with others in formal and informal gatherings
- Disaster recovery system along with IT system access policies are in place for effective knowledge sharing and prevent misuse of knowledge
- We have developed indicators to track impact of KM on behavioral changes in stakeholders
- KM initiatives have increased employee contribution/productivity
- For each process there exists an agreed methodology to be followed
- The organization has a KM steering committee to oversee the KM mandate
- Advanced technologies like warehousing, mining, analytics and modeling are used for strategic decision making
- The top management has secured the buy-in from knowledge champions
- The organization has technology which supports conversion of experiential knowledge into explicit knowledge.

- We conduct surveys to assess employee true feelings of the impact of KM on their job.
- The top management continuously asks "Why" to identify knowledge gaps.
- We have developed financial indicators to measure the impact of KM efforts
- The organization has developed formal communities of practice to enable people with common interest share knowledge
- To measure the effectiveness of IT tools in knowledge sharing and transfer, we have identified parameters
- The organization promotes minimization of hierarchical and bureaucratic structure for effective KM
- Technology links all members of the organization together
- KM initiatives have increased the market share
- KM initiatives have increased number of cooperative projects across departments/ units
- The organization has developed ways to acquire external knowledge
- The organization considers change to be natural and necessary
- Knowledge sharing is a way of life of employees in the organization
- Value systems and work ethics are given utmost importance
- IT systems are used for generating new knowledge from existing knowledge
- We often use motivators like a pat on back, motivation words, dinner outing with CEO etc to encourage knowledge sharing
- The organization has the technology to capture, store, index and search best practices
- The senior management encourages people to drive the fear of making a mistake and stop trying
- People are rewarded monetarily for their contribution of new ideas
- KM initiatives have streamlined employee tacit/experiential knowledge capture
- KM vision and strategy is actively promoted by the top management articulating how it contributes to achieving organizational objectives
- Senior management uses only top-down push approach to implement KM
- KM initiatives have reduced service turnover time for complaints
- We have identified non-financial indicators to measure the impact of KM efforts
- Project completion reports and manuals are adequately shared across plants/ locations.
- We have 100 per cent commitment from top management in KM initiative
- KM initiatives have increased return on assets (ROA)
- KM initiatives have enhanced the new product/service success rate
- Our technology purchase/developments are as per our business objectives
- KM initiatives have resulted in meeting customer expectation, satisfaction and their retention
- The organization has developed ways to identify sources of expertise within organization
- Managers lead by example and demonstrate the same while handling practical problems
- KM initiatives have decreased the number of defects/complaints
- KM vision and its activities are aligned with the overall vision of the organization
- Exit interviews are captured regularly to capture critical knowledge and experience when people leave the organization.

- Knowledge is recognized as a key element in strategic planning.

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