The Role of Knowledge Management Practices in Sustaining Innovation in SMEs of North India[†]

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The Industrial Age has been replaced by the Knowledge Age. It is a time when strategic management of knowledge and resources is a critical success factor for the organizations. Good Knowledge Management (KM) practices can equip the organizations to be more innovative and provide better integration and sharing of knowledge, which is the basis for starting new organizations or revitalizing mature organizations. Small and Medium Enterprises (SMEs), the backbone of the economy, significantly benefit from KM practices. This study examines the KM practices followed by the SMEs of north India and tries to find out the reasons for adopting KM practices and their impact on their innovation practices. Using the literature review, this paper has developed a KM instrument and tested a conceptual model linking KM and innovation using regression analysis and structural equation modeling technique. The primary data was collected from SMEs of three industries, i.e., Software, Pharmaceuticals and Textiles, of north India. The study confirms the relationship between adoption of KM practices and innovation strategies in the selected SMEs.

Introduction

Small and Medium Enterprises (SMEs) are an important part of modern economies, providing employment, generating innovation, creating wealth, reducing poverty, enhancing standard of living and contributing to the areas in which they operate. The strength of SMEs lies in motivation, internal networking, tacit knowledge in unique skills, shorter informal communication, less bureaucracy and greater proximity to market (Desouza and Awazu, 2006). But SMEs face resource, finance and skills scarcity and managers often do not have enough managerial expertise and organizational capabilities, which imply poor strategic business planning and human resource management (Balestrin *et al.*, 2008; and Cocca and Alberti, 2010). Knowledge Management (KM) implementation is said to be the best way to overcome these problems and improve SMEs' ability in innovation and organizational performance (Asoh *et al.*, 2002; Bierly and Daly, 2007; Brachos *et al.*, 2007; Butler *et al.*, 2007; Choi *et al.*, 2007; Lee and Chang, 2007; Mohannak, 2007; Timonen and Ylitalo, 2007; Ho,

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2008; Chen and Huang, 2009; Jiang and Li, 2009; Kim and Gong, 2009; Liao and Wu, 2009; Sáenz *et al.*, 2009; Yang *et al.*, 2009a and 2009b; and Zack *et al.*, 2009. KM practices in SMEs also overcome the problem regarding lack of resources, peculiar management problems and high employee turnover rates (Kureshi, 2009). KM provides the means for SMEs to overcome poor business environment and to change the complex business environment to be manageable. KM practices help in removing resource constraints, decreasing cost of products and creating innovative applications for mature products, which helps to move ahead of the competitors (Laere and Heene, 2003; Whittaker *et al.*, 2003; Thorpe *et al.,* 2005; Bartholomew, 2008; Hughes *et al.,* 2009; and Changiz, 2010).

Objective

The major objective of the study is to find the impact of KM practices on innovation strategies in selected SMEs of North India.

Literature Review

The benefits that SMEs can derive from sharing knowledge have long been recognized and well documented. This can be further substantiated through the various studies mentioned below:

Vorobyova and Raju (2018) studied the influence of KM on SMEs of Malaysia. They highlighted KM as a critical component of organizational effectiveness, which in its turn influences a successful path to a globalization strategy for SMEs. KM in SMEs enables them in solving problems, managing dynamic learning, strategic planning and decision making.

Ebrahim *et al.* (2017) emphasized the importance of KM and linked it with innovation. They found that activities related to knowledge like knowledge gathering, managing, sharing, learning, reusing and retrieval play an important role in bringing innovation. Xue (2017) showed that KM is the main key for the organizations to stay competitive and innovative.

Valdez-Juárez *et al.* (2016) analyzed the influence of KM on SMEs in the sectors of construction, services, and trade in the region of Murcia, Spain upon innovation and performance. The results indicated that SMEs must continue with the establishment of policies and strategies, both in the acquisition and the use of knowledge and the deployment of an organizational culture, based on values to allow a further strengthening of innovation activities; and to increase the level of innovation and creativity, the business owners should consider implementing strategies focused on the development of new business models, new technologies, and the incorporation of open innovation.

Eugenie *et al.* (2016), through cross-sectional research design, examined the mediating effect of innovation between KM and business performance of SMEs in Rwanda and revealed that innovation had a positive effect on business performance. This implied that without innovation, SMEs may not achieve an improved business performance. By transforming knowledge resources into new products, new processes and new markets organizations can boost their business performance.

Abbas (2011), through the regression analysis on 500 SMEs from Pakistan, depicted that KM awareness, human capital, external capital, social capital, and organizational capital have positive relation with the sustainable growth of the firm in the case of SMEs.

Harsh (2010) stated that knowledge dissemination about availability of recent technologies, literature on modern machinery, contact details of suppliers of raw materials, buyers, etc., among SMEs is extremely essential to enhance their performance, growth and competitive advantage.

Iftikhar *et al.* (2010) focused on the status of KM in SMEs in developing countries and examined the factors that influenced the adoption of KM for SMEs in developing countries. The study further suggested that KM practices can create profitable prospects for SMEs in developing countries.

Rohana (2009) emphasized that in the wake of knowledge-based economy, tacit knowledge sharing was the best tool for SMEs in enhancing competencies and organizational performance. With the impact of globalization, SMEs have to find their own resources that suit their environment and their capabilities. It illustrated that sharing of the knowledge would help SMEs to be creative, innovative and enhance their performance. Further, the sharing and focusing on the tacit knowledge would lead SMEs to better performance and help in producing new products and services.

Emmanouil *et al.* (2009) proposed a research agenda on the relation between KM and SMEs. The research found that the effective implementation of a KM strategy was considered as a 'must' and as a precondition for success for contemporary enterprises in the era of knowledge economy.

Zanjani *et al.* (2009) concluded in their descriptive study that knowledge was the main resource in the SMEs. KM was important for SMEs to lead their efforts towards competitiveness. SMEs need to develop their understanding of KM as a key business driver rather than as a resource-intensive additional initiative.

Kureshi (2009) illustrated through a field survey on 107 SMEs in northern industrial belt of Pakistan that SMEs were resource-constrained by their very nature and KM can become a distinct source of competitive advantage among them. KM practices in SMEs lead to better decision making, faster response time, increased profit and improved productivity.

Chen and Huang (2009) confirmed with the regression analysis technique that KM capacity played a pivotal role in supporting and fostering innovation. The findings provided evidence that KM capacity played a mediating role between strategic human resource practices and innovation performance.

Kagiri (2008) showed through empirical study that KM strategy and organizational competence were very dependent on each other and a successful KM strategy was to a great extent dependent on the presence of organizational competence and vice versa.

Balestrin *et al.* (2008) in qualitative research discussed that small businesses have limited resources in terms of finance and human resources, so there has been considerable interest in linking them through a variety of networks and associations to share knowledge and encourage

innovation (Butler *et al.*, 2007; Mohannak and Hutchings, 2007; and Timonen and Ylitalo, 2007). They offered a more comprehensive approach towards the creation of organizational knowledge by shifting from an endogenous process of the individual firm to a multidirectional exogenous process within networks.

Bogner and Bansal (2007) used regression analysis to analyze the data from 30,022 patent records from 42 firms and found that firms benefit from generating and building on knowledge. They confirmed that knowledge positively affects the overall firm performance and knowledge creation, knowledge transfer, firm level learning, and other similar approaches are at the heart.

Desouza and Awazu (2006) presented the findings from a nine-month investigation of KM practices at 25 SMEs and presented that managing knowledge was a critical capability for SMEs because it helped them leverage their most critical resource. Organizational knowledge was the most salient resource at the disposal of SMEs in terms of availability, access and depth. Successful SMEs were those that can leverage their knowledge in an effective and efficient manner, so as to make up for deficiencies in traditional resources, like land, labor, and capital.

Sharma (2006) concluded in the paper that KM was very attractive and provides huge business opportunities that should not be missed. It was an engine that transforms knowledge into business value. In SMEs, there was a need for customized KM packages as every enterprise has a thrust area in one or two modules of KM.

Harveston *et al.* (2005), through a series of case studies and qualitative interviews, explored that KM systems can lower costs tremendously by increasing communication and eliminating unnecessary steps in the SMEs. Establishing internal KM systems for organizational memory created opportunities to minimize knowledge isolation in functional departments and created a greater base for tacit learning to be leveraged.

Menkhoff *et al.* (2004) highlighted that as economies and businesses shift towards a new world configuration of digital information and knowledge-based work, SME owners need to find out how KM solutions can assist them. The findings described that by locating and capturing innovative ideas and other types of strategically important KM practices used by technicians to solve maintenance problems, SMEs can improve innovativeness, service quality and response time. The documentation of 'war stories', yellow pages and data mining were useful KM tools for locating and capturing knowledge. The sharing of knowledge and experiences about cost-effective procedures and operational approaches could lead to substantial savings for SMEs.

Wong and Aspinwall (2004) in their conceptual paper elaborated the great need for KM practices in SMEs due to pressures of competition, inadequacy of resources and time that constrain the operations of SMEs. KM contributed significantly to improving organizational performance. They categorized these reasons under the 'Pull' and 'Push' factors.

Feng *et al.* (2004) in their research analyzed the impact of Knowledge Management Systems (KMS) on the firms that adopted KMS with the data extracted from the COMPUSTAT. They

discussed that KMS improve organizational performance by significantly reducing administrative costs and improving productivity after adopting KMS.

The literature review reveals the following gaps: The KM literature is rich with large organization and very few works have been done to find the role of KM practices in SMEs. The research on the impact of KM practices on innovation in SMEs is still at nascent place. Therefore, this study makes an attempt to fill these gaps.

Data and Methodology

The present study sampled three states of north India, i.e., Punjab, Haryana and Himachal Pradesh. These states are characterized by high per capita income, considerable contribution to GDP and large number of SMEs. The major contributing industries in these states are textiles, software and pharmaceuticals. These industries are selected on the basis of production, size, growth rate and exports from the state. There are also major hubs of these industries in the selected states.

In Punjab, the prominent industry is the textiles industry. This industry produces around 70% of the best quality cotton in India. Textiles industry in Punjab is worth $2.34 bn. Ludhiana, the Manchester of India, produces 95% of the country's woollen knitwear and 85% of the country's sewing machines. Ludhiana has about 10,000 industrial units of textiles industry, comprising exporters, brand producers and nearly 99% of units in textiles industry in Ludhiana are small-scale.

The major industry in Himachal Pradesh is pharmaceutical industry. Baddi in district Solon of Himachal Pradesh is emerging as the pharmaceutical hub of India. More than half of India's pharmaceutical production and formulations originate from Himachal Pradesh. In the last few years, around 300 medium and large-scale units have come up in and around Baddi. It has attracted 75% of the ₹23,000 cr invested in HP in the last few years. Pharmaceutical industry is contributing 15.6% to the total exports from the state and generating huge employment to the people of the state.

Haryana has become a front-runner in the country in terms of software exports, with exports of software goods worth ₹21,000 cr during 2008-09. Gurgaon has contributed the most to the output of the Information Technology and Information Technology-Enabled Services (IT&ITES) industry in the state. Around 90% of the software units are located there and most of them are SMEs. Textiles industry is also a contributing industry of Haryana.

Sample Size and Sampling Design

To collect the data, the present study used judgmental-cum-convenience sampling where a sample of 300 respondents was collected from the SMEs of three states of north India, viz., Punjab, Haryana and Himachal Pradesh, in three industries: textiles, software and pharmaceuticals (Table 1). The top level managers like Chief Executives, Chief Knowledge Officers (CKOs), Chief Information Officers (CIOs), HR executives and other management experts of the organization were contacted to get the questionnaire filled.

Table 1: Sample Size and Response Rate			
S. No.	Industry	No. of SMEs	Response Rate (%)
1.	Textiles	100	90
2.	Software	100	80
3.	Pharmaceuticals	100	80

Out of the 300 SMEs of the sample, 260 responses were received. Out of the 260 responses, 10 responses were invalid as the questionnaires were incomplete. Finally, 250 responses were found to be usable. The overall response rate was 83%.

Research Instrument

The second section of the questionnaire (see Appendix) comprises the list of KM practices used by SMEs. The 12 items have been framed after an in-depth study of literature to access the level of adoption of KM practices by the SMEs. KM was divided into five processes, namely, knowledge capturing, knowledge sharing, knowledge transfer, knowledge storing and knowledge reuse. There were three items each for knowledge capturing and knowledge storing and two items each for knowledge sharing, knowledge transfer and knowledge reuse process (Table 2).

The third section of the questionnaire was designed to study the effect of KM practices on innovation. Six measurement items of innovation were selected (see Table 3). The responses to these items were obtained on a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1).

Table 2: Knowledge Management Practices		
Label	KM Process	Knowledge Management Practices
KM1	Knowledge Capturing (KC)	Captures external knowledge from industrial associations, competitors, clients and suppliers.
KM2		Captures knowledge from public research institutions, universities and government laboratories.
KM3		Has dedicated resources for acquisition and obtaining internal knowledge from experienced workers and managers
KM4	Knowledge Sharing (KS)	Encourages workers to participate in project teams with internal and external experts.
KM5		Has a culture intended to promote knowledge sharing.

Table 2 (Cont.)

Label	KM Process	Knowledge Management Practices
KM7	Knowledge Transfer (KT)	Problems, failures, experiences and method of working are discussed openly and avoid making similar mistakes in the future.
KM8		Regular meetings are conducted for discussion of professional projects.
KM9	Knowledge Storing (KST)	Databases of good work practices, lessons learned, skills and listings of experts are regularly updated
KM10		Written documentation of lessons learned, training manuals, good work Practices and articles is done.
KM11		The information systems and knowledge stored in the systems are constantly upgraded.
KM12	Knowledge Reuse (KR)	People are encouraged to access and use knowledge saved in systems.
KM6		Has policies intended to improve knowledgeable worker retention.

Table 3: Determinants of Innovation		
Construct	Innovation (IN)	
Label	Items	Outcome
IN1	Number of markets	Sharing of knowledge helps SMEs to be creative and innovative. KM helped SMEs in entering new markets, revitalizing existing product lines and identifying new business opportunities.
IN2	Client or customer relations	KM was one of the critical factors for success of CRM strategy with the aim of increasing service quality and decreasing service costs, and new product and services delivered to the customer.
IN3	New products or services	The transfer of tacit knowledge fosters innovative products, services and processes and provides the flexibility and innovative value for the organization.
IN4	Flexibility in production and innovation	
IN5	Adaptation of products or services to client requirements	KM leads to better quality of customer service. Customers were more likely to receive the right answers faster, if KM initiatives were properly applied.
IN6	Prevents duplication of R&D	Knowledge management techniques prevented the duplicate research and have a positive effect on the innovative performance of a firm.

Reliability of the Instrument

The reliability test was carried out to determine the quality of the measurement items. Internal consistency reliability implies that multiple items measure the same construct, and inter-correlate with one another. Cronbach's alpha method was used to assess the reliability of the instrument. The statistics tests showed that Cronbach's alpha of the 'KM' and 'IN' constructs were 0.72 and 0.70, respectively, which indicates satisfactory internal consistency reliability.

Validity of the Instrument

Content Validity

In this analysis, content validity was ensured as the underlying variables were taken from literature and thoroughly reviewed by the researchers.

Construct Validity

Construct validity is the extent to which a set of measured items actually reflect the theoretical latent construct they were designed to measure. Convergent validity and discriminant validity were the two good ways to measure construct validity.

Convergent Validity

Convergent validity is the extent to which items of a specific construct 'converge' or share a high proportion of variance in common. To assess convergent validity of the scale, construct loadings, Average Variance Extracted (AVE) and reliability measures were examined (Table 4).

Table 4 represents that the standardized loadings estimate of all the items is higher than 0.5 and Average Variance Extracted (AVE) from the construct is greater than 0.5, suggesting adequate convergent validity.

Results and Discussion

Descriptive statistics (Table 5) and regression analysis were used to find out the impact of KM practices on innovation in selected SMEs. The six measurement items of innovation are 'Number of markets', 'Client or customer relations', 'New products or services', 'Flexibility in production and innovation', 'Adaptation of products or services to client requirements' and 'Prevents duplication of R&D'.

KM practices increased the innovation in software SMEs by preventing duplication of R&D (86.25%). 80% of the respondents found these practices to be useful for starting new products and services. 76% of the respondents related them with improvement in client or customer relations. 74% agreed that these practices provided flexibility in production and innovation. 69% believed that these practices helped in increasing their number of markets, but only 37.6% believed that KM practices helped in providing adaptation of the services according to the requirement of clients.

In pharmaceutical SMEs, KM practices promoted innovation by preventing duplication of R&D (92.5%) and providing relevant and timely knowledge in addition of new products

Table 4: Statistics for Convergent Validity				
	KM	IN	Item Reliability	AVE
KM1	0.90		0.81	
KM2	0.81		0.65	
KM3	0.78		0.60	
KM4	0.78		0.60	
KM5	0.83		0.70	0.68
KM6	0.86		0.74	
KM7	0.75		0.56	
KM8	0.91		0.83	
KM9	0.80		0.64	
KM10	0.90		0.81	
KM11	0.92		0.85	
KM12	0.62		0.39	
IN1		0.91	0.83	
IN2		0.76	0.58	
IN3		0.68	0.46	0.60
IN4		0.90	0.81	
IN5		0.47	0.22	
IN6		0.83	0.70	

(65%). 62.5% found KM practices effective in improving client or customer relations. Only 31% of the respondents agreed that KM practices in pharmaceutical SMEs had an effect on number of markets and provide flexibility in their production and innovation and nearly 43% respondents were uncertain about this statement. Further, only a few of the respondents (25%) agreed that KM practices were helpful in adaptation of products or services to client requirements.

67.8% of the respondents from textile SMEs agreed that KM practices prevented duplication of R&D. 59% said that the client relations improved with these practices and 52% believed that they assisted in production of new products. Further, 49% found that KM practices provided flexibility in production and innovation and had effect on the number of markets. Only 43% said that adaptation of products to client requirements was done with KM practices.

Regression Analysis

To find the impact of KM practices on innovation, the responses to the individual 12 KM items and 6 innovation items were summed and labeled as 'KM' and 'IN'. Simple regression

	Table 5: Descriptive Statistics					
						(in %)
Label		Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
IN1	Software	–	2 (3.8)	22 (27.5)	29 (36.2)	26 (32.5)
	Pharmaceuticals	–	21 (26.25)	34 (42.5)	20 (25)	5 (6.25)
	Textiles	5 (5.6)	14 (15.6)	27 (30)	38 (42.2)	6 (6.7)
IN2	Software	–	–	19 (23.8)	37 (46.2)	24 (30)
	Pharmaceuticals	–	5 (6.25)	25 (31.25)	35 (43.75)	15 (18.75)
	Textiles	4 (4.4)	14 (15.6)	19 (21.1)	43 (47.8)	10 (11.1)
IN3	Software	–	1 (1.2)	15 (18.8)	28 (35)	36 (45)
	Pharmaceuticals	–	5 (6.25)	23 (28.75)	29 (36.25)	23 (28.75)
	Textiles	1 (1.1)	8 (8.9)	34 (37.8)	41 (45.6)	6 (6.7)
IN4	Software	–	–	21 (26.2)	35 (43.8)	24(30)
	Pharmaceuticals	–	20 (25)	35 (43.75)	18(22.5)	7 (8.75)
	Textiles	5 (5.6)	14 (15.6)	27 (30)	38 (42.2)	6 (6.7)
IN5	Software	–	4(5)	46(57.5)	23(28.8)	7 (8.8)
	Pharmaceuticals	1 (1.25)	12 (15)	47(58.75)	20(25)	–
	Textiles	1 (1.1)	13 (14.4)	37 (41.1)	26 (28.9)	13 (14.4)
IN6	Software	–	–	11 (13.8)	37 (46.2)	32 (40)
	Pharmaceuticals	–	–	6 (7.5)	38 (47.5)	36 (45)
	Textiles	–	5 (5.6)	24 (26.7)	35 (38.9)	26 (28.9)

analysis was done to determine the effect of KM practices on innovation of the organization. The construct 'KM Practices' (KM) acted as independent variable and 'innovation' (IN) acted as dependent variable in regression analysis.

It is evident from Tables 6 and 7 that the calculated value of *t*-statistic (7.591) in software SMEs was significant at 0.00 level. The coefficient of KM practices is 0.685, meaning that for a one unit increase in KM practices, a 0.685 unit increase in innovation practices is expected. The R^2 of 0.425 meant that approximately 42% of the variance of innovation was accounted for by the KM practices that were acceptable. The adjusted R^2 value indicates that about 41% of the variability of innovation was accounted for by the model even after taking into account the number of predictor variables in the model. The effect of KM practices on innovation activities in software SMEs is derived from Equation (1).

<table>
<tr><td colspan="8" align="center">Table 6: Prediction Table for Innovation Based on
KM Practices in Selected SMEs</td></tr>
</table>

Industry	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Software	1 (Constant)	1.332	0.354		3.765	0.000
	KM Practices	0.685	0.090	0.652	7.591	0.000
Pharmaceuticals	2 (Constant)	2.392	0.446		5.361	0.000
	KM Practices	0.336	0.128	0.285	2.627	0.010
Textiles	3 (Constant)	9.816	3.008		3.263	0.002
	KM Practices	0.283	0.077	0.366	3.687	0.000

Note: Dependent variable: Innovation.

		Table 7: Model Summary		
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.652[a]	0.425	0.417	0.38920
2	0.285[a]	0.081	0.070	0.44556
3	0.366[a]	0.134	0.124	3.31803

Note: [a] Predictors: (Constant), KM Practices.

$$Innovation = 1.332 + 0.685\,KM\,Practices + e \qquad \ldots(1)$$

In pharmaceutical SMEs, calculated t (2.627) was also significant at 0.010 level (Tables 6 and 7). The coefficient of KM practices is 0.336, meaning that for a one unit increase in KM practices, a 0.336 unit increase in innovation practices is expected. The R^2 of 0.081 means that approximately 8% of the variance of innovation is accounted for by the KM practices in these SMEs. The adjusted R^2 value indicates that about 7% of the variability of innovation is accounted for by the model. The effect of KM practices on innovation activities in pharmaceutical SMEs is derived from Equation (2).

$$Innovation = 2.392 + 0.336\,KM\,Practices + e \qquad \ldots(2)$$

In textiles SMEs, calculated value of t (3.687) is significant getting $p = 0.000$. The coefficient of KM practices is 0.283, which signified that for a one unit increase in KM practices, only 0.283 unit increase in innovation practices in textiles SMEs is expected. The R^2 value of 0.134 meant that approximately 13% of the variance of innovation is accounted for by the KM practices that were acceptable. The adjusted R^2 value indicates that about 12% of the variability of innovation is accounted for by the model, even after taking into account the number of predictor variables in the model. The effect of KM practices on innovation activities in textiles SMEs is derived from Equation (3).

$$Innovation = 9.816 + 0.283\,KM\,Practices + e \qquad \ldots(3)$$

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Structural Equation Modeling

The path model was developed to determine the effect of five processes, i.e., Knowledge Capturing (KC), Knowledge Sharing (KS), Knowledge Transfer (KT), Knowledge Storing (KS) and Knowledge Reuse (KR) on Innovation (IN). The single-headed arrows represented linear dependencies. The arrow leading from knowledge capturing to innovation indicated that innovation scores depend, in part, on knowledge capturing process and so on. The variable error was enclosed in a circle because it was not directly observed. Error (ER1) represented much more than random fluctuations in innovation scores due to measurement error. The double-headed arrows in the path diagram connected the five processes that might be correlated with each other. The model had 27 parameters to be estimated and 28 sample moments. This left degrees of freedom to be equal to 1 (Table 9). Figure 1 represents the path diagram of the model.

Figure 1: Path Diagram for the Model
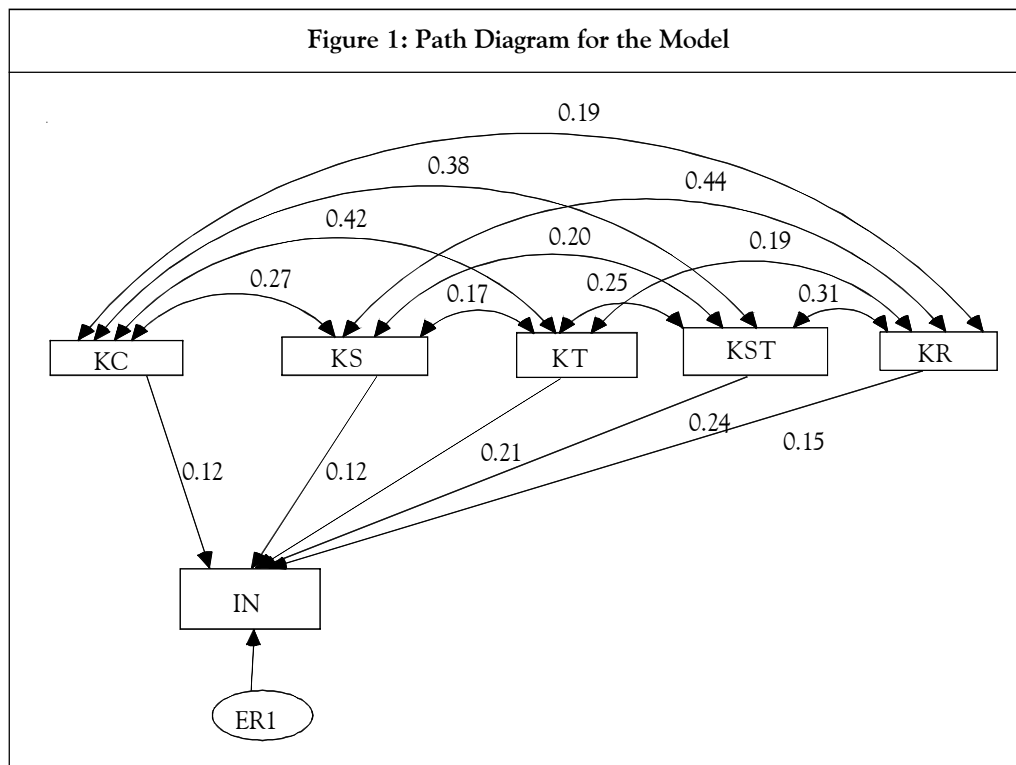
Path Loadings of the Model

In the structural model, path loading represents the predictive links among constructs. It shows significance relationship fit between variables and its indicators. These path loadings of the models and the probability level are summarized in Table 8.

Table 8 reveals that most of the paths are significant at 0.01 and 0.05 levels. In model 1, the highest value of path loading was for knowledge storing (IN = 0.236) which meant that

Table 8: Path Loading and Probability Level of the Models			
Model	Path	Path Loading	Probability Level
1	IN ← KC	0.120	0.056
	IN ← KS	0.122	0.043
	IN ← KT	0.206	***
	IN ← KST	0.236	***
	IN ← KR	0.151	***
Note: *** represents non-significant values.			

the relevant and timely storage of knowledge led to increased organizational performance, competitiveness and employee retention rate and sparked the innovation practices of the organization.

Overall Model Fit

The last step involved was to test the model fit. Overall goodness-of-fit was assessed to ensure that the model was correctly specified. Model fit determines the degree to which the sample data fits the SEM model. Model fit criteria commonly used are chi-square, Root Mean Square Error of Approximation (RMSEA), Root Mean Residual (RMR), the Goodness-of-Fit Index (GFI), the Adjusted Goodness-of-Fit Index (AGFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Incremental Fit Index (IFI) and Tucker-Fit-Index (TFI).

The chi-square test is considered to be an absolute test of model fit. If the probability is below 0.05, the model is accepted. The other measures of fit are descriptive. The recommended value of RMSEA is less than or equal to 0.08. The smaller the value of RMR, the better the fit is. GFI varies from 0 to 1, and value greater than 0.90 indicates a good fit. AGFI is a variant of GFI, which uses mean squares instead of total sums of squares in the numerator and denominator of 1. The AGFI varies from 0 to 1. NFI values vary from 0 to 1, with 1 equal to perfect fit. CFI close to 1 indicates a very good fit and values above 0.90 are considered to be an acceptable fit. Goodness-of-fit measures and their acceptable levels for SEM are provided in Table 9.

The overall model fit is calculated for all the three industries. GFI of the model in all the industries is above the acceptable value. The other model fit measures are also within the acceptable level.

Implications

The firms that participated in the survey confirmed that KM deals with the effective transfer, sharing and reuse of knowledge and best practices with employees, customers, markets,

Table 9: Goodness-of-Fit Measure for Structural Equation Modeling			
Goodness-of-Fit Measure	Model 1		
	S	P	T
Degrees of Freedom	1		
P-level (Probability Level)	0.061	0.136	0.868
Chi-square	3.504	2.218	0.028
RMSEA	0.178	0.124	0.000
RMR	0.177	0.268	0.047
GFI	0.988	0.992	1.00
AGFI	0.657	0.780	0.998
CFI	0.991	0.986	1.00
NFI	0.988	0.980	1.00
Note: *S, P, T stands for Software, Pharmaceuticals and Textiles industry, respectively.			

competitors and experts and it is one of the facilitators of organizational growth. KM practices allow SMEs to store, analyze, interpret and share knowledge as part of their daily business processes. KM practices lead to improved productivity and client and customer relations. The organizations are adopting these practices in order to achieve better organizational performance, innovation and competitiveness and to deepen and enrich their knowledge pool.

KM practices affect the innovation of SMEs by increasing the market share through product innovations and market originality. KM practices enable them in reducing cycle time for new services by preventing duplicate activity and by providing collaborative environment for teams. This approach leads to savings and reduces costly mistakes that are linked with strategic objectives of the SMEs.

KM practices enhance the adaptation of new products and prevent duplication of R&D and hence improves creativeness and innovation of the SMEs. KM practices also facilitate communication, knowledge exchange and sharing of experiences across different organizational entities in SMEs that provide flexibility in innovation. Promoting innovation and creativity further leads to intangible benefits to the firm. The effect of such organizational synergism ensures an environment of openness to new ideas, and increased enthusiasm to share ideas.

Recommendations

There is a general lagging trend towards KM practices among the SMEs due to time and resource constraints. But to stay ahead in the ideas and competition, SMEs should manage the flow of knowledge transfer and effective practices to enhance knowledge creation and

reuse of knowledge. For this, KM is spreading as an effective coping strategy. SMEs need to introduce KM methodologies into their daily activities to add value to the organization and to convert knowledge residing in employees' minds (tacit knowledge) into explicit knowledge. KM practices must be interwoven into daily activities and must be synchronized with business strategy and planning. It should focus on knowledge creation, capture, organization, renewal, sharing and use to have the best possible knowledge available and used at each point of action.

The organizational infrastructure should be flexible where employees are free to share and transfer their ideas and knowledge. Managers should prepare a path to enable employees to acquire and integrate different sources of knowledge from external and internal stakeholders. The communication infrastructure should enable knowledge to be shared and transferred from the organization to an individual, from an individual to an individual, and from an individual back to the organization. With proper facilitation, the employees will be able to use and apply the knowledge to improve efficiency and solve problems.

The successful implementation of a KM system needs to ensure that the participants in KM process have the necessary understanding, skills and expertise to use the IT tools and that the culture is favorable to technology adaptation. IT should be aligned with the business goals. The different units of organizations using different software or technologies restrain the data sharing between tools. Therefore, an overall IT strategy is needed. The key to success is the ability to articulate more explicitly how IT delivers value to business across all levels of the organization.

Also, a clear set of metrics needs to be developed to allow a better understanding of how the specific knowledge programs and activities are progressing. The metrics should be related to business objectives rather than internal to KM. The intermediate measures should also be used to get an early reading on implementation results and impact of KM programs.

Conclusion

The findings provide a framework for measuring an organization's KM capability and its effect on innovation strategies. To stay ahead in the competition, SMEs should manage the practices that enhance knowledge capturing, sharing and reuse to have the best possible ideas available and used at each point of action. For this, KM is emerging as the effective solution. KM is a beneficial framework to help SMEs in managing their practices and administering quality care to their customers and employees with low development cost. KM practices could increase the innovation in SMEs by reducing duplication of R&D. These practices were helpful for starting new services and for improvement in customer relations. These practices also provide flexibility in production and innovation, thereby increasing the number of markets.

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Appendix

Questionnaire

Section I

Demographic Profile

Name of the Organization _____

Name of the Respondent _____

Gender:	☐ Male		☐ Female
Age: (in years)	☐ 25-45		☐ 45-65
	☐ Above 65		
Educational Qualifications:	☐ Graduates		☐ Postgraduates
	☐ Professionally Qualified		
Turnover:	☐ Up to ₹ 20 lakh		☐ ₹ 20 lakh-60 lakh
	☐ ₹60 lakh-1 cr		☐ ₹ 1 cr and above

Section II

Please rate the extent to which each statement is accurate about the KM practices in your organization.

S. No.	Statement	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
1.	The organization actively captures external knowledge from industrial associations, competitors, clients and suppliers.					
2.	The organization captures knowledge from public research institutions, universities and government laboratories.					
3.	Has dedicated resources for acquisition and obtaining internal knowledge from experienced workers and managers.					
4.	Encourages workers to participate in project teams with external experts.					
5.	Has a culture intended to promote knowledge sharing.					
6.	Has policies or programs intended to improve knowledgeable worker retention.					

S. No.	Statement	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
7.	Problems, failures, experiences and method of working are discussed openly and avoid making similar mistakes in the future.					
8.	Regular meetings are done for discussion of professional projects.					
9.	Databases of good work practices, lessons learned, skills and listings of experts are regularly updated.					
10.	Written documentation of lessons learned, training manuals, good work practices and articles is done.					
11.	The information systems and knowledge stored in the systems are constantly upgraded.					
12.	People are encouraged to access and use knowledge saved in company systems.					

Section III

Please indicate the level of effectiveness you attribute to the given results for the KM practices in your organization.

S. No.	Statement	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
1.	Increased our number of markets (more geographic locations).					
2.	Improved client or customer relations.					
3.	Helped us add new products or services.					
4.	Increased flexibility in production and innovation.					
5.	Increased adaptation of products or services to client requirements.					
6.	Prevented duplication of research and development.					

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