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Critical Role of 'T-Shaped Skills & Incentive Rewards' as Determinants for Knowledge Management Enablers: A Case of Indian Study

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1. Introduction

Knowledge management (KM) plays an important role for organisations. It involves activities such as creating, acquiring, sharing and managing knowledge at individual and organizational levels (Alavi & Leidner, 2001). Knowledge and knowledge management are both multi-faceted concepts and activities, and strongly related to cultural background (Bock et al., 2005). In this context, Srinivas (2009) indicates that the theories of knowledge management generated—based on western cultural background—are not necessarily applicable to eastern cultures such as India.

Currently, KM is providing a better understanding of its success factors; and KM approaches are more focused to address particular challenges such as securing knowledge from experts leaving an organisation (Heisig, 2009). However, issues and factors that enable or facilitate an organisation to further enhance its knowledge management are essential elements in the decision making process of managers and executives (Lee & Choi, 2003; Gan, 2006; Khalifa & Liu, 2003; Emelo, 2009). The enablers for organisations in implementing their knowledge management systems were proposed and discussed in the literature (Lee & Choi, 2003; Yu et al., 2004; Robbins et al., 2001). However, most of the studies focused on only few factors. Therefore, building a theoretical framework to understand these factors and their influences is necessary to form a new starting point for comprehensive understanding (Heisig, 2009). Additionally, researchers indicated that a majority of these factors/enablers were based on western countries—which is different from the Asian context (Chaudry, 2005; Srinivas, 2009). In a rapidly developing country such as India, where the management system in organisations is markedly different to that of western styles, the question of 'whether the enablers still influence the implementation of knowledge management systems in the same way?' is still under debate. This research issue is significant because cultural issues appear to influence aspects of management decision making. Our review of the literature also indicated there is very limited information regarding KM in the Indian context.

As the seventh largest country and the second most populous country in the world, economic reforms since 1991 have transformed India into one of the fastest growing economies (ERS, 2009). The Indian subcontinent is identified with its commercial and

cultural wealth in much of its long history (Oldenburg, 2007). Four major religions, Hinduism, Buddhism, Jainism and Sikhism originated here, while Zoroastrianism, Judaism, Christianity and Islam arrived in the first millennium CE and shaped the region's diverse culture. India is a republic consisting of 28 states and seven union territories, with a parliamentary system of democracy. It has the world's twelfth largest economy at market exchange rates and the fourth largest in purchasing power (2009). Long traditions, combined with an advanced educated pool of managers and strong yet conservative management practices, indicate that KM enablers might be different for India. Thus, this study posed the question, 'What are the enablers for implementing knowledge management systems in India?'

In this study, a theoretical model for KM enablers was constructed in order to reach a more comprehensive understanding of the research issue. This model is based on a review of the literature and a multiple case study with 80 organisations in four Indian cities. These cities are located in metropolitan and regional areas with various population sizes, social structures and history. Subsequently, the initial model developed was examined by a survey in the same cities with larger samples. This is explained further in the following sections.

2. Literature review[1]

The detailed literature review provided herein consists of three sections. In the first section, the basic concepts and definitions of knowledge, knowledge management, and knowledge management systems are provided. In the second section, the organisational outcomes that may be influenced by implementing knowledge management systems are presented. Subsequent to this, the enablers of knowledge management systems are gathered and discussed as the foundation for the theoretical model proposed in this study.

2.1 Knowledge management & KMS

Although knowledge and knowledge management are complex and multi-faceted concepts (Alavi & Leidner, 2001), knowledge management has become increasingly important in today's highly competitive business environment. For example, knowledge assets of organisations have played a crucial role in this shift and are viewed as being increasingly important in knowledge management (Yelden & Albers, 2004). Further, in the knowledge-based view of the firm, knowledge is the foundation of a firm's competitive advantage and, ultimately, the primary driver of a firm's value (Bock et al., 2005; Gan, 2006). Researchers have provided definitions to better understand the concepts of knowledge and knowledge management. For example, knowledge management has been defined as the process of capturing, storing, sharing, and using knowledge (Davenport & Prusak, 1998). KM is also the systematic and explicit management of knowledge-related activities, practices, programs and policies within the enterprise (KM, 1997), or the art of creating value to organisations by leveraging intangible assets (Sveiby, 1997). Accordingly, knowledge is defined as a justified belief that increases an entity's capacity for effective action (Alavi & Leidner, 2001; Huber, 2001). Knowledge can be further viewed as a state of mind; an object; a process; a condition of having access to information; or a capability (Alavi & Leidner, 2001).

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[1] The theme of literature and methodology adopted in this study is similar to authors' previous publications in the KMS domain.

To manage knowledge assets more effectively, knowledge management systems are the IT-based platform designed for facilitating KM by providing larger databases, more powerful computation ability, higher performance data structures, and smarter query techniques (Weber et al., 2001). Knowledge management systems (KMS) refer to a class of information systems applied to managing organisational knowledge. It is defined as IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer and application (Alavi & Leidner, 2001; Li & Tsai, 2009). The main function of KMS is to guide employees in obtaining useful information from knowledge bases and make existing experiences freely available to other employees of an organisation (Abdullah et al., 2005). The final goals of KMS are to employ many different techniques to represent knowledge, with the aim of enhancing the decision-making capability of human decision-makers (Cowie et al., 2009). According to recent studies (Li & Tsai, 2009), KMS have proven to be efficient and effective in organising large volumes of high-complexity knowledge.

Some studies have explored various aspects of KMS. For example, several aspects of KMS should be taken into consideration in implementing KM in an organisation (Li & Tsai, 2009), namely: (1) how to transfer tacit knowledge to explicit knowledge; (2) how to retrieve desired knowledge from knowledge bases; (3) how to visualize knowledge; and (4) how to create more valuable knowledge by reuse. Furthermore, with the rapid development of wireless technologies, new research issues are gaining prominence. For example, in a mobile and networked environment, solutions regarding how to provide up-to-date, context specific information to whom and where, is appropriate (Cowie et al., 2009). Another example is how to use mobile clinical support systems to address different intelligent decision support such as knowledge delivery on demand, medication advice, therapy reminders, preliminary clinical assessment for classifying treatment categories and providing alerts regarding potential drugs interactions and active linking to relevant medical conditions (Cowie et al., 2009). These requirements, emanating from new technological developments, have fostered the study of KMS to a new stage. One important research issue is how knowledge management systems influence the outcomes of organisations.

2.2 KM and organisational outcomes

Knowledge management promotes efficiency and optimal use of resources to achieve organisational goals. This awareness is creating new interest in KM solutions that have the potential to improve business performance (Lamont, 2009). For example, there are numerous cases where international companies have demonstrated that by successfully applying KM it will improve organisational competitiveness and performance (Wong & Aspirwall, 2006). In a fast-changing environment, knowledge processes are the most precious resources in sustaining and enhancing long-term organisational competitiveness (Song, 2002).

Determining key outcomes of implementing KMS in organisations appears to be difficult. These outcomes include achieving organisational efficiency, competitive advantage, maximising organisational potential and better management of knowledge assets (Gan, 2006). The first organisational outcome which can be enhanced by implementing KMS is competitive advantage. A firm's competitive advantage depends first and foremost on its

knowledge: on what it knows, how it uses what it knows, and how fast it can know something new (Prusak, 1997). For example, to ensure continued competitive advantage, organisations need to fully understand both their customers and competitors (North et al., 2004; Al-Hawamdeh, 2002). Customers are an integral component of the organisation's intellectual capital and is the reason for the organisation's existence (Stewart, 1997). To ensure that an organisation effectively leverages this intellectual capital with regard to their customers, information technology solutions such as customer relationship management (CRM) are useful to manage whatever knowledge of customers the organisation possesses (Probst et al., 2000). Another organisational outcome that can be enhanced is to maximise organisational potential by implementing KMS. For knowledge-intensive organisations, the main driver in maximising the value of its research and development endeavours and investments is through recycling and reusing experiments and results obtained (Al-Hawamdeh, 2002). Companies such as 3M and BP maximised organisational potential from effective knowledge management to achieve successes in their respective competitive industries (Cortada & Woods, 1999).

A KMS also assists an organisation to manage knowledge assets in a comprehensive way. Knowledge has become a central focus of most organisations these days. As a result, managing knowledge assets—finding, cultivating, storing, disseminating and sharing them—has become the most important economic task of employees in any organisation (Stewart et al., 2000). Notwithstanding the above outcomes, studies increasingly indicate that organisational outcomes could be enhanced by implementing knowledge management systems (Lamont, 2009). Therefore, an understanding of the obstacles and enablers of implementing KMS may be helpful as the starting point in further understanding this issue.

2.3 Obstacles and enablers of implementing KMS

Previous studies indicated that when organisations implement their knowledge management systems, some obstacles and enablers exist in the process. For example, many firms actively limit knowledge sharing because of the threats associated with industrial espionage, as well as concerns about diverting or overloading employees' work-related attention (Constant et al., 1996). Once knowledge sharing is limited across an organisation, the likelihood increases that knowledge gaps will arise, and these gaps are likely to produce less-than-desirable work outcomes (Bock et al., 2005). Despite the fact that organisations may reward their employees for effective knowledge management practices, this may create obstacles for knowledge management. One example is that some organisations provide pay-for-performance compensation schemes, which may also serve to discourage knowledge sharing if employees believe that knowledge sharing will hinder their personal efforts to distinguish themselves relative to their co-workers (Huber, 2001). Further, there are major challenges in promoting the transfer and integration of explicit and tacit knowledge between channel members, including: lack of recipient's cognitive capacity; lack of the sender's credibility; lack of motivation of the sender or the recipient; the existence of an arduous relationship between the sender and recipient; and causal ambiguity due to the complexity of knowledge (Frazier, 2009; Szulanski & Jensen, 2006).

Recent studies have attempted to provide guidelines and successful experiences to reduce obstacles. For instance, there are four areas that need to be focused on when implementing knowledge management systems. These areas include (Emelo, 2009): understanding who

the knowledge sources are; measuring where and how knowledge flows; facilitating knowledge to flow more rapidly and freely; and reinforcing knowledge with supportive relationships. Additionally, a review of the literature reveals that there are many enablers that are known to influence knowledge management practices (Gan, 2006). These enablers can be broadly classified into either a social or technical perspective. The social perspective of knowledge management enablers plays an important role and has been widely acknowledged (Smith, 2004). These enablers are further discussed below.

One enabler is collaboration, which is considered an important feature in knowledge management adoption. It is defined as the degree to which people in a group actively assist one another in their tasks (Lee & Choi, 2003). A collaborative culture in the workplace influences knowledge management as it allows for increased levels of knowledge exchange—a prerequisite for knowledge creation. This is made possible because a collaborative culture eliminates common barriers to knowledge exchange by reducing fear and increasing openness in teams (Gan, 2006). Another enabler is mutual trust. It exists in an organisation when its members believe in the integrity, character and ability of each other (Robbins et al., 2001). Trust has been an important factor in high performance teams as explained in organisational behaviour literature. The existence of mutual trust in an organisation facilitates open, substantive and influential knowledge exchange. When team relationships have a high level of mutual trust, members are more willing to engage in knowledge exchange. A further important enabler is learning. It is defined as any relatively permanent change in behaviour that occurs as a result of experience (Robbins et al., 2001). In organisations, learning involves the dynamics and processes of collective learning that occur both naturally and in a planned manner within the organisation (Gan, 2006). In addition to the above, leadership is often stated to be a driver for effective knowledge management in organisations (Khalifa & Liu, 2003). Leadership is defined as the ability to influence and develop individuals and teams to achieve goals that have been set by the organisation (Robbins et al., 2001). Adequate leadership can exert substantial influence on organisational members' knowledge-creation activities. The presence of a management champion for the knowledge management initiative in order to set the overall direction for knowledge management programmes—and who can assume accountability for them—is crucial to effective knowledge management (Yu et al., 2004).

Organisational incentives and rewards that encourage knowledge management activities amongst employees play an important role as an enabler (Yu et al., 2004). Incentives are mechanisms that have the ability to incite determination or action in employees within an organisation (Robbins et al., 2001). Rewards, on the other hand, can be broadly categorised as being either extrinsic or intrinsic. Extrinsic rewards are positively valued work outcomes that are given to the employee in the work setting, whilst intrinsic rewards are positively valued work outcomes that are received by the employee directly as a result of task performance (Wood et al., 1998). Research supports the view that both intrinsic and extrinsic rewards have a positive influence on knowledge management performance in organisations (Yu et al., 2004).

Organisational structure plays an important role as it may either encourage or inhibit knowledge management. The structure of the organisation impacts the way in which organisations conduct their operations and, in doing so, affects how knowledge is created

and shared amongst employees (Lee & Choi, 2003). One enabler to KM is the level of non-centralisation. This refers to the degree to which decision making is non-concentrated at a single point, normally at higher levels of management in the organisation (Robbins et al. 2001; Wood et al. 1998). The concept of centralisation includes only formal authority—that is, rights inherent in one's position. An organisation is said to be highly centralised if the top management makes the organisation's key decisions with little or no input from lower level employees (Robbins et al., 2001).

Another structural enabler is the level of non-formalisation. It refers to the written documentation of rules, procedures and policies to guide behaviour and decision-making in organisations (Wood et al., 1998). When an organisation is highly formalised, employees have little discretion over what is to be done, when it is to be done and how they should do it, resulting in consistent and uniform output (Robbins et al., 2001). However, formalisation impedes knowledge management activities. This is because knowledge creation requires creativity and less emphasis on work rules, thus, the range of new ideas that emerge from a highly formalised structure is limited. Most teams are composed of individuals who operate from a base of deeply specialised knowledge (Davvy, 2006). These individuals need mechanisms to translate across the different 'languages' that exists in organisations (Ford & Staples, 2006). This brings rise to the need for employees with T-shaped skills—that is, skills that are both deep and broad (Leonard-Barton, 1995). Employees who possess T-shaped skills not only have a deep knowledge of a particular discipline (e.g. financial auditing), but also about how their discipline interacts with other disciplines (e.g. risk analysis, investment analysis and derivatives). Iansiti (1993) states that the deep knowledge in a particular discipline is aptly represented by the vertical stroke of the 'T', whilst knowledge of how this discipline interacts with other disciplines is represented by the horizontal top stroke of the 'T' (Iansiti, 1993).

Lastly, but no less important an enabler, is IT infrastructure. It plays an important role in knowledge management. Technology infrastructure includes information technology and its capabilities which are considered to assist organisations to get work done, and to effectively manage knowledge that the organisation possesses (Holsapple, 2005). The information technology infrastructure within an organisation can be broadly categorised into hardware technologies and software systems. It has been found that information technology infrastructure plays a crucial role in knowledge management as it allows for easy knowledge acquisition and facilitates timely communication amongst employees. Information technology infrastructure also speeds up the pace of knowledge creation and assists in the process of building organisational memory (Okunoye & Karsten, 2002). These aspects were investigated in this study for their applicability in the Indian context.

3. Qualitative phase of the study[2]

In this research study a qualitative data collection approach was used to explore the initial views and opinions of the Indian professional towards knowledge management and to complement the development of the instrument for the quantitative survey technique section of this research study. The specific qualitative technique adopted was a case study

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[2] Some findings of this research have previously been published by the authors.

approach to identify the enablers of knowledge management for businesses implementing KMS. While a common practice in an exploratory study is to adopt a mixed-method approach, as both (qualitative and quantitative) complement each other, it is a common strategy in the domain of information systems discipline as well. It is believed that such a strategy has strengthened the findings of this research study by reaffirming the findings of the qualitative approach. Findings of the qualitative approach have already been published previously by the authors.

There were four Indian cities included in this study to collect the data, namely, Chennai, Coimbatore, Madurai and Villupuram. Based on the history and location of these Indian cities and their economic structure, population, history, culture and social values, organisations from these cities were subsequently selected. Both qualitative and quantitative data was collected only through the four studies mentioned above. This research adopted a five point Likert scale to measure the views and opinions of Indian businesses toward knowledge management systems. In this study, 100 participants were selected in each of the cities mentioned above, and participants were randomly selected through the managers' recommendations in the domain of KMS implementation with primary focus enablers of KMS. The next section of this paper provides the data analysis and discussion of the quantitative data collected through the survey technique.

3.1 The proposed theoretical model

Based on the literature review and the results of the Indian case study, the following theoretical model was constructed in Figure 1 for further investigation. The concepts of these factors have been discussed in Section 2.3.
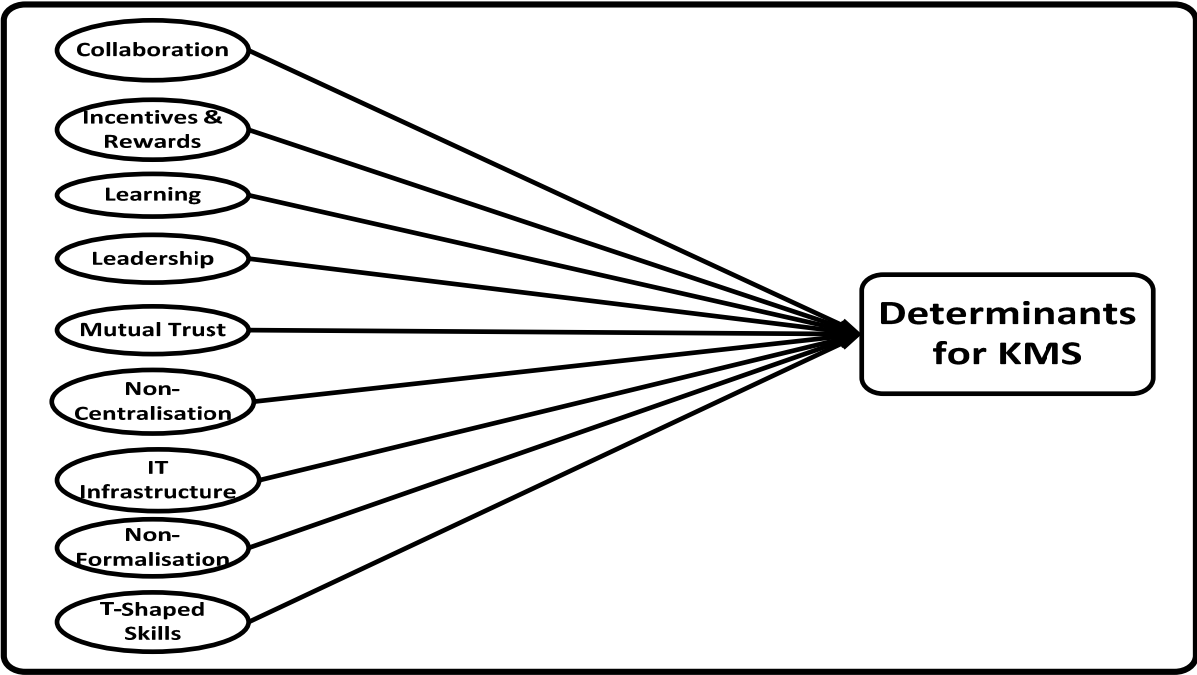

Fig. 1. Proposed theoretical model for the enablers of KMS in India

In order to understand the nine determinants identified through the literature review in the context of knowledge management, the Cronbach's Alpha reliability test was firstly conducted through SPSS for all the nine items used in the survey instrument. Table 1 below shows the value of 0.991, as per Hair et al. (2006); this represents a high level of reliability.

Cronbach's Alpha	N of Items
.991	9

Table 1. Reliability Statistics for nine determinants of KM

Once the reliability of all the determinants was ascertained, a correlation analysis among the nine determinants was conducted to further understand the relationship among these determinants of KM. A Pearson Correlation indicated a moderate level of significant correlation for all the determinants; and the values of r ranged from 0.27 to 0.50 for the enablers of KM. Furthermore, to understand the associations of each enabler of KM in the Indian environment, multiple regression analyses were conducted between the independent variables, Collaboration, Mutual Trust, Learning, Leadership, Incentive Rewards, Centralisation, T-Shape Skills, and ICT. In the equation, the variable 'Enablers of KM' was considered a dependent variable. Multiple regression analyses showed that the nine determinants have the potential to explain the phenomena of knowledge sharing in the Indian business environment (R = 0.62, and R2 = 0.39, df = 6.4, p < .05). However the 'Beta' and 't' values indicated that only the variables 'Incentive Rewards' and 'T-Shape Skills' were significant (p < .05), and all other variables were not significant (p > .05). The initial model in Figure 1 was refined as per the multiple regression analysis and is shown in figure 2 below.
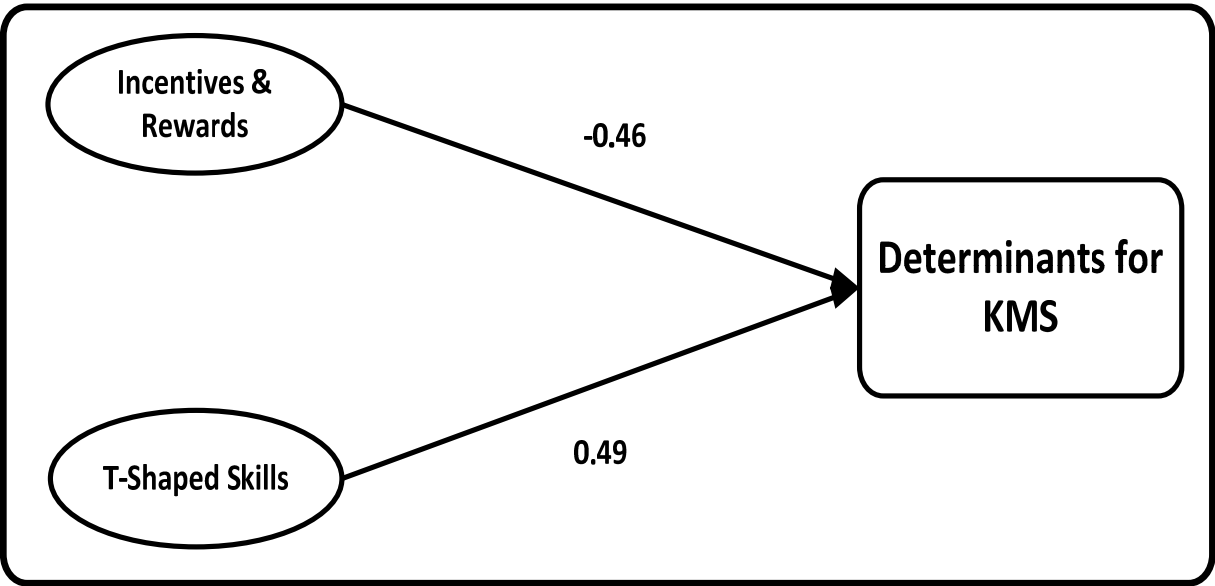

Fig. 2. Summary of direct effect on determinants of KMS

The above analysis showed that Indian business environment determinants such as 'Incentive Rewards' and 'T-Shape Skills' were considered critical variables in determining

the process of sharing knowledge. However, other variables such as Collaboration, Mutual Trust, Learning, Leadership, Centralisation, and ICT were not considered important contributors to the sharing of knowledge in the Indian business environment. This aspect of the Indian executive is yet to be further researched to understand the phenomena behind this philosophy.

The multiple regression analyses conducted above clearly showed only two variables, 'Incentive Rewards' and 'T-Shaped Skills' that directly contributed towards the knowledge management enablers. However, there is a real possibility that the remaining seven variables might have indirectly contributed towards determining the enablers of the knowledge management. The multiple regression analyses has this limitation and is unable to reveal the interrelationship among the independent variables. To understand this, structural equation modelling was conducted to explore such a relationship (see Figure 2 below). Researchers used the AMOS 18 software application to complete the structure equation modelling.

Figure 3 shows the fit indices for the data and the interrelationship of the variables through good fit and the proposed model for the production of the 'KM Enabler' through the KM determinants. The above SEM model was the output produced by Amos and the entire path, in terms of interrelationship among the variables, was found to be significant ($p < .05$). The analysis of various indices associated with the model also showed a fit between the data and the model for each of the variables. For example, the indices of the above model are summarised as follows:

NO	Indices	Value
1	CMIN/DF	1.9
2	P Value	.004
3	RMR	.004
4	GFI	.92
5	IFI	.99
6	TLI	.98
7	CFI	.99
8	NFI	.98
9	RFI	.96
10	REMSEA	.095

Table 2. Summary of Indices

The above table shows various indices. The indices 'Goodness of Fit' (GFI) value is higher than the acceptable value espoused in the literature (≥0.9)(Hair et al., 2006; Joreskog & Sorbom, 1993). Furthermore, the value of 'Root Mean square Residual' (RMR) (0.004) in the above table is above the benchmark recommended by literature (≤ 0.05),(Hair et al., 2006; Wu et al., 2008; Wu et al., 2007; Hu & Bentler, 1995). The above table and the value of indices
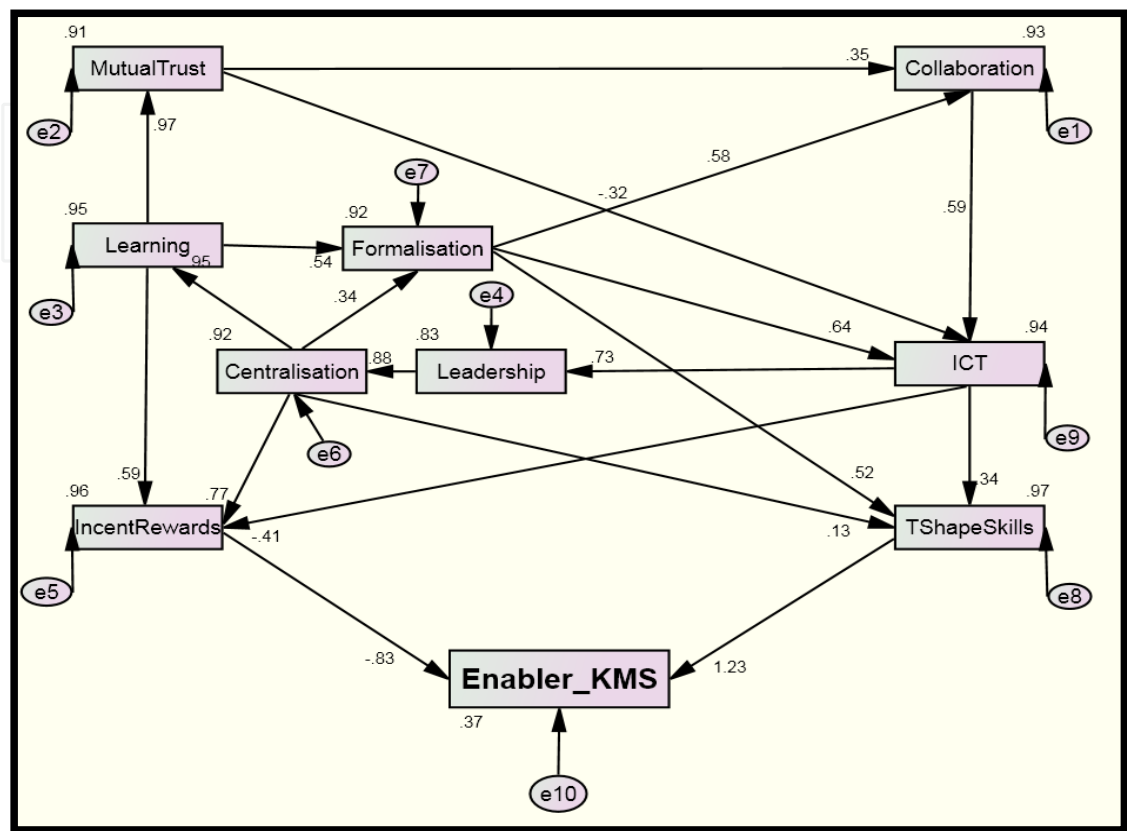
Fig. 3. SEM model through AMOS

show that the final model depicted in Figure 2 has the ability to facilitate a KMS environment in the Indian business environment. The composite variables 'Incentive Rewards and T-Shaped Skill' have a direct effect on KM due to their ability to facilitate the implementation of a knowledge sharing environment as enablers of KM. Therefore, it can be summarised from Table 2 that various indices such as the GFI, RMA, RMSEA and Chi-Square values were not only significant, but their values were also within the acceptable range. Such a model is not only able to predict the interrelationship among the variables but is also able to provide information about the strength of that relationship. Such information provides valuable insight for managers and individuals responsible for the development and implementation of a knowledge sharing culture in the Indian business environment. All the paths in the path diagram, Figure 2, were statically significant (p < 0.05), even though some of them were not directly influencing the variable 'Enabler of KM'. Data analysis and the discussions presented above not only help researchers understand the knowledge economy in the Indian business environment, but also provide an initial insight role of various determinants of knowledge management and their association in promoting a knowledge sharing environment.

4. Conclusion and limitations

This research study is the first of its kind to explore the knowledge management philosophy in the Indian business environment. The findings of this study also highlight the perceptions of the Indian business community towards knowledge management and knowledge sharing. The findings of this study indicate that variables such as 'Incentive Rewards' and 'T-Shaped Skills' are directly related to the enablers of knowledge management. It also provides evidence that in the Indian business environment, all the variable are significant; however, the variables 'Incentive Rewards' and 'T-Shaped Skills' have a direct effect on the environment of knowledge sharing and knowledge building. Nonetheless, there is a need to conduct further research in this domain before generalising the findings of the study, as the data collected in this project was limited to only four cities in India.

5. Acknowledgement

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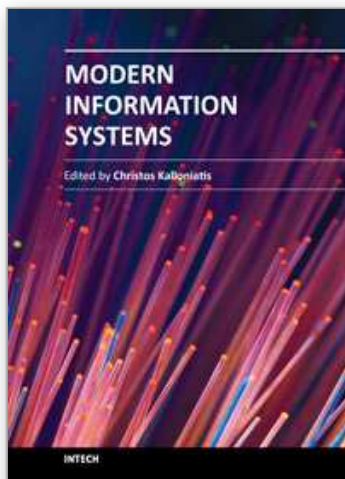
Modern Information Systems

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The development of modern information systems is a demanding task. New technologies and tools are designed, implemented and presented in the market on a daily bases. User needs change dramatically fast and the IT industry copes to reach the level of efficiency and adaptability for its systems in order to be competitive and up-to-date. Thus, the realization of modern information systems with great characteristics and functionalities implemented for specific areas of interest is a fact of our modern and demanding digital society and this is the main scope of this book. Therefore, this book aims to present a number of innovative and recently developed information systems. It is titled "Modern Information Systems" and includes 8 chapters. This book may assist researchers on studying the innovative functions of modern systems in various areas like health, telematics, knowledge management, etc. It can also assist young students in capturing the new research tendencies of the information systems' development.

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