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Knowledge Management Performance Measurement: Systemization of Literature for Development of a Scale

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Abstract

Purpose: *This paper aims to address the lack of comprehensive studies for measuring the performance of knowledge management (KM) practices, factors and processes within an organization. It aims to propose an exhaustive knowledge management performance measurement (KMPM) model for the above stated purpose.*

Design/Methodology: *A review of literature on knowledge management has been conducted and analyzed to present a set of 13 constructs.*

Findings: *The proposed constructs can serve as a reference for KM researchersand create a useful survey instrument for assessing KM performance of an organization.*

Research limitations/implications: *The constructs have to be validated empirically.*

Practical Implications: *This study would provide better understanding on KMPM and also serve as a guideline to measure KM performance. Academicians can use it to create a measurement instrument and enhance its scope by applying empirical methods.*

Originality/ Value: *This study is an attempt to present a comprehensive evaluation model for KM in the Indian scenario. Limited amount of research, to our knowledge, has brought-out such an exhaustive list of constructs to measure KM performance.*

Keywords: Knowledge management, Performance measurement, Measures, Constructs.

Introduction

Organizational performance is dependent on a number of people and process factors acting within the organization.Theywork in tandem with each other in order to achieve desired organization goals. The people resource puts other resources to good use by developing and implementing ideas and practices within an organization. Also, proper storage, dissemination and usage of old successful business practices and knowledge attained, along with development of new knowledgeare also vital for the success of an organization. Knowledge, as an organizational resource,has emerged as an ineluctableimportant organizational resource and its importance has grown across various sectors and industries. In order to ensure success of KM in an organization, it is imperative to evaluate its performance so that decisions on what to keep, what to improve and what to discontinue can be taken (Andone, 2009).

KM is a widely used and researched concept. It has been widely investigated across contexts (Miozzo, et al., 2016), industries(Bigliardi Galati and Petroni, 2014) and countries (Mertins, Heisig

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and Vorbeck, 2001). However, KMPMis a complicated process and not easy to implement (Kluge et al., 2001). Even though various models have been proposed, none of them addresses the entire set of KM initiatives that an organization may adopt. Some focus only on KM practices while others discuss KM processes. Thus, the purpose of this study is to propose a KMPM model and present to the reader an exhaustive list of constructs and items for constructing a scale for measurement of the same.

The paper begins with an overview on KM and KMPM. The next section presents the KMPM model followed by the presentation of constructs and their items. The paper culminates with a discussion on the usage of these constructs and ends with a conclusion.

1. Introduction

The field of KM and OP has received attention from both researchers and practitioners alike in the last two decades. The contribution of the knowledge worker to the knowledge economy has fueled this interest. Knowledge is, now,recognized as a crucial resource for any organization.It is widely acknowledged as a tool for sustaining competitive edge. Developing and maintaining KM is considered important for long term survival and success of an organization. Organizations are implementing various KM initiatives to gain an advantage over competitors. Under conditions of fierce competition, globalization and rapid innovation, KM and its implications are vital for achieving success in business (Zack et al., 2009). KM has a profound effect on the various aspects of business performance. Generally knowledge can be divided into tacit and explicit. Explicit can be codified and shared, whereas tacit is informal and skill based which cannot be easily shared with others. This knowledge helps the organization to have business competitiveness and innovativeness. Hence it becomes imperative to measure the KM initiatives and their effect on business performance.

KMPM is vital after the implementation of KM initiatives as it enables organizations to keep track of where they are going and where they want to go. It helps top management in taking right decisions at the right time and also implement changes if required. It is through KMPM that managers get confidence that they are moving in the right direction (Wong, 2005; Chong et al., 2011).

Based on the review, it is argued that there is a need for a comprehensive KMPM model which covers majorly all the KM initiatives and organization can undertake so that a complete picture can be drawn. This paper will present an exhaustive list of KM constructs and items, drawn from literature,which will be extremely helpful in creating a scale for KMPM.

2. Research Constructs

Since the introduction of the concept of KM, numerous researches have been conducted and the concept per se has developed and diversified into different dimensions. Yet, KM practices remain vague and ambiguous. Different researchers have used different nomenclature to define and describe the KM constructs. A thorough literature review on this subject has shown that most of the research in this field can be categorized into three broad themes - knowledge resources, KM processes and KM practices.

Knowledge resources are the knowledge assets owned by the company. It is with the help of these assets that an organization is able to create a unique position for itselfand enjoy an edge above itscompetition (Davenport et al., 1998). KM processes refer to the activities of acquisition, creation, utilization etc. KM practices such as culture, structure, strategy etc. are the factors which act as facilitators for enhancing KM activities within an organization.

After analyzing the literature for KMPM, a framework for has been created and proposed. Accordingly, when we talk about measuring performance, metrics need to be developed on the above mentioned framework. This section will present the measurement constructs of KM resources, KM processes and KM practices along with the items developed by the authors based on a comprehensive study of the literature.Inclusion and measurement of each construct will also be elaborated further.

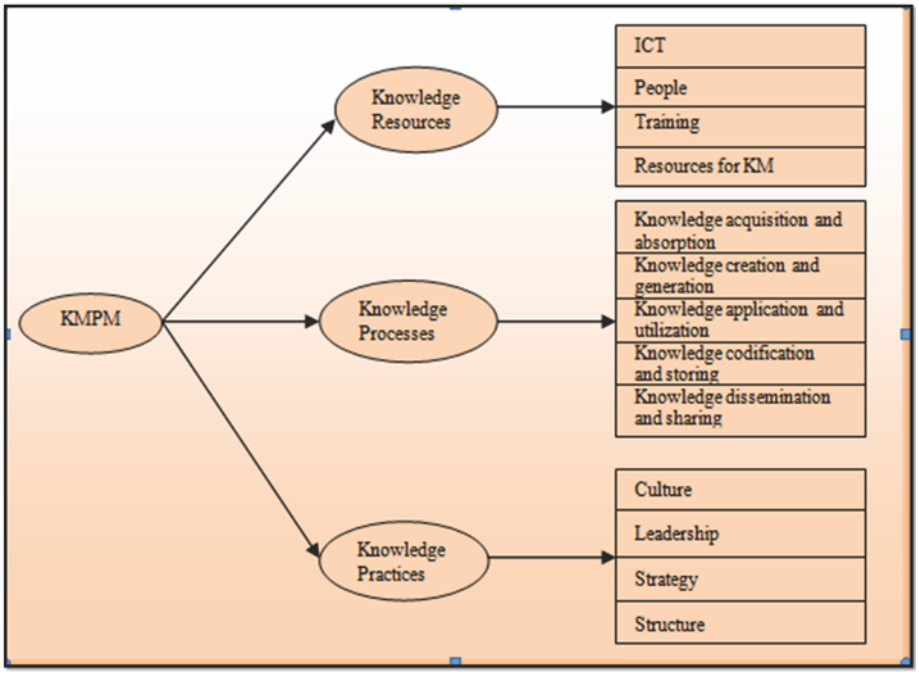

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Figure 1: KMPM model

2.1 KM resources

According to OECD (1993), these are the intangible assets of an organization. Davenport et al. (1983) states that these knowledge resources make an organization competitive and organizations should protect them in order to gain an edge over competitors.Knowledge resources refer to the knowledge assets that an organization possesses – it may be tacit or explicit, internal or external. Information and communication technology resources act as essential enablers for the development and sharing of important knowledge within and across systems(Alavi and Leidner, 2001; Gold et al, 2001; Hsieh et al., 2002; Lee and Choi, 2003; Moffett et al., 2003; Chong and Choi, 2005; Wong and Aspinwall, 2005; Zack et.al., 2009; Andreeva and Kianto, 2012**)**. We have classified Information and communication technology (ICT), People(Human Resource Management), Training, and Resources for KM under this head.'People' refers to the human resource in an organization. They are the knowledge resources as all the skill, talent, know-how and abilities lie in them; one of the most vital areas of KM is the management and proper utilization of this resource (Marques and Simon, 2006; Priesto -Pastor et al, 2010, Jain and Moreto, 2015)

2.1.1 Information and Communication Technology

ICT is an important enabler of organization knowledge processes. Since the beginning of KM systems, researchers have argued that ICT systems are an integral part of successful and effective KM systems. It has been written time and again that information and communication technology are crucial and achieving and maintaining sustainable competitive advantage. For creating a scale for measurement of ICT, constructs from items from Davenport and Klahr (1998), Greco (1999), Tynan (1999), Wenger and Snyder (2000), Choi(2000),Alavi and Leidner (2001), Gold et al (2001), Hsieh et al. (2002), Lee and Choi (2003), Moffett et al. (2003) were adopted to understand how organizations used ICT tool and what effect were these tools having on the business performance. Some items were inspired fromChong and Choi (2005),Wong and Aspinwall (2005), Zaim et.al. (2009), Valhoahmaddi, 2010 and finally Andreevaa nd Kianto (2012) was also referred to create the following:

Table I: ICT

IT and ICT support	Davenport and Klahr, 1998; Greco, 1999; Wenger and Snyder, 2000; Choi, 2000; Alavi and Leidner (2001),Gold et al, 2001; Hsieh et al., 2002; Lee and Choi, 2003; Moffett et al., 2003; Chong and Choi, 2005; Wong and Aspinwall, 2005; Andreeva and Kianto, 2012
KM system and Tools	
IT infrastructure	
IT integration with the KM strategy	

Source: Compiled by authors

2.1.2 People (Human Resource management)

Foot and Hook (2008) defined HRM as the management of organization's employees. It is about managing the Knowledge worker, hence the close association between HRM and KM. According to Hansen et al.(1999) and Hislop (2003), HRM policies play a significant role in aligning employee efforts with knowledge strategy of an organization.Human resource management (HRM) is a complex measure of smaller sub-constructs to create a complete picture of the construct 'people'. Lee and Choi (2003) and Marques and Simon, 2006 have discussed 'task orientation' as an important aspect of HRM. Based on conceptual frameworks from Bhatt (2000), Choi (2000), Binney (2001); Hall (2001), Ryan and Prybutok (2001), Moffett et al. (2003); Wong and Aspinwall (2004) ; Hung et al.(2005), Chong and Choi (2005); Hung et al, (2005) and Marques and Simon(2006), constructs on 'employee participation, empowerment and satisfaction' are created.Marques and Simon (2006), Valhoahmaddi (2010); Priesto - Pastor et al (2010), Jain and Moreto (2015) have studied the importance of rewards and knowledge processes into consideration, on the basis of whichconstructs have been drawn. Succession planning, training and skill orientation and lastly team work are the other sub-constructs based on Bontis (2000); Garavan et al.(2000), Mentzas (2001), Horak(2001), Yahya and Goh (2002), Hwang (2003), Moffett et al.(2003); Hung et al. (2005), Chong and Chong (2005), Wong and Aspinwall (2005), Akhavan et al. 2006; Chong (2006), Akhavan and Jafari (2006), Bozbura (2007), du Plessis (2007); Jafari et al.(2007); Priesto -Pastor et al, (2010).

Table 2: People (Human Resource Management)

Task orientation	Lee and Choi, 2003; Marques and Simon, 2006
Employee participation, empowerment and satisfaction	Bhatt, 2000; Choi, 2000; Binney, 2001; Hall, 2001; Ryan and Prybutok, 2001; Moffett et al., 2003; Wong and Aspinwall, 2004; Hung et al., 2005; Chong and Choi, 2005; Marques and Simon, 2006
Rewards and knowledge processes	Marques and Simon, 2006; ; Priesto- Pastor et al, 2010, Jain and Moreto, 2015
System of Mentoring, Training and Skill orientation	Bontis and Giradi, 2000; Garavan et al., 200 7; Mentzas et al., 2001; Horak, 2001; Goh, 2002; Yahya and Goh 2002; Hwang, 2003; Moffett et al., 2003; Hung et al., 2005; ; Chong and Choi, 2005; Wong and Aspinwall 2005; Akhavan et al. 2006; Chong 2006; Akhavan and Jafari 2006; Bozbura 2007; du Plessis, 2007; Jafari et al. 2007; Priesto -Pastor et al, 2010.
Succession planning	Bontis, 2000
Team workand collaborative problem solving	Chong, 2006, Geraint,1998; 1998; Ryan and Prybutok, 2001; Moffett et al., 2003; Choi, 2000; Chong and Choi, 2005; Civi, 2000;Haas and Hansen, 2005

Source: Compiled by authors

2.1.3 Training

As pointed out by Robbins, Judge and Campbell (2010), competent employees need continuous skill enhancement to remain competent. Training helps bridge the gap between present and required skill set of the employees, hence contribute to knowledge creation (De Winne & Sels, 2010) and enhancement of human capital (Capello-Medina et al., 2011). According to Jiang et al. (2012), training can help to enhance the creative thought process of employees. The measures for training and development have been selected after a careful analysis of research papers ranging from Greengard, 1998 to Kianto, Saenz and Aramburu, 2017.

Table 3: Training

Formal training methods	Cohen and Backer, 1999; Choi, 2000; Garavan et al., 2000; Horak, 2001; Mentzas et al. 2001; Yahya and Goh, 2002; Hwang, 2003; Moûett et al., 2003; Moffett et al., 2003; OECD research, 2003; Chong and Choi, 2005; Wong and Aspinwall, 2005; Chong, 2006; Hung et al., 2005; Marques & Simon, 2006; Bozbura, 2007; Valhoahamaddi, 2010; Robbins, Judge and Campbell,2010; Gilbert, De winne&Sels, 201; Campello-Medina et al., 2011, Rahman et al. 2013, Donate and Gaudamillas, 2015, Kianto, Saenz & Araburu, 2017.
Informal training methods	
Competence Development	
Continuous Development	
Training on KM systems and tools	

Source: Compiled by authors

2.1.4 Resources for KM

According to Wong (2005), the availability of resources in an organization is important as it governs the quality and quantity of efforts which can be spent on KM. Lack of resources can

become an obstacle for achieving effective KM.Dedicated set of resources in terms of financial, human and time are inevitable for successful KM implementation.

Table 4: Resources for KM

Financial resources	Holsapple and Joshi, 2000; Davenport and Volpel, 2001; Wong and Aspinwall, 2004; Chong, 2006; Valhoahmaddi, 2010
Human resources	
Technical resources	

Source: Compiled by authors

2.2 KM processes

KM processes have been introduced and implemented in organizations for a long time. This has interested researchers and many KM processes have thus been identified and studied. These processes try to relate the two types of knowledge - tacit and explicit (Nonaka and Takeuchi, 1995; Davenport and Prusak, 1998; Civi,2000).

Knowledge acquisition and retrieval is the process of obtaining knowledge essential to perform the job duties and responsibilities. It can be obtained from knowledge repositories of the organization. Employees may also acquire knowledge by attending seminars, workshops etc.

Knowledge internalizationrefers to the process of imbibing the acquired knowledge and converting it into tacit form. Knowledge creation and generation occurs when employees not only learn to apply these skills in their regular day to day activities and duties, but also develop new knowledge in the form of patents and development of best practices. When this knowledge is applied in the form of implementation of best practices and new product development, it gives the organization a competitive edge. The process of codifying this set of knowledge and storing it in the form of databases, repositories, archives etc. that can be easily accessed by employees is the next step. Knowledge dissemination and sharing takes place when employees start transferring knowledge to each other through seminars, workshops, mentoring programs etc. Table V provides the list of authors whose studies have been referred to in order to understand the development and nomenclature of the KM processes.

Table 5: KM Processes

Knowledge acquisition and retrieval	Arora, 2002; Lee et al.,2005; Shannak, 2009; Andone,2009; Liao and Wu, 2009; Kuah and Wong,2011
Knowledge internalization	Ahn and Chang,2004; Lee et al., 2005
Knowledge creation and generation	Azzone et al.,1991; Kaplan and Norton, 1998; Martin, 2000;Arora, 2002; Ahn and Chang,2004; Chen and Huang, 2009, Kuah and Wong, 2011
Knowledge application and utilization	Lee et al., 2005; Andone, 2009; Liao and Wu,2009; Kuah and Wong, 2011.
Knowledge codification and storing	Arora, 2002; Jennex and Olfman, 2004;Lee et al. 2005; Andone, 2009; Kuah and Wong, 2011
Knowledge dissemination and sharing	Gooijer (2000); Arora (2002); Ahn and Chang (2004); Lee et al. (2005); Shannak (2009); Liao and Wu (2009); Kuah and Wong , 2011

Source: Compiled by the authors

2.3 KM practices:

KM is a step by step process; it starts with an organization's long term vision. In order to make the KM resources, processes and practices effective, systems and processes have to be compiled to capture and apply knowledge from internal or external stakeholders. These systems need to be in place and it can be achieved by adopting the right measures for culture, leadership, strategy, structure, assessment of KM initiatives and knowledge from, for and about the customer.

2.3.1 Culture

Culture as a construct has been studied by various researchers over the last two decades. Organizational culture can be defined as a shared set of assumptions that an organization has leant while adjusting in its environment to solve problems posed by its external environment and internal conditions whichare passedfrom old employees to new ones. Each organization has itsunique culture, which has developed over a long period of time. Culture explains the knowledge that should be valued and kept in an organization. This construct has been studied for a long time and hence the numbers of studies conducted on culture are numerous (Gold et al., 2001; Lee and Choi, 2003; Anantamulla, 2007; David and Fahey, 2000; Appelbaum et al. , 2014; Lee, Shiue and Chen, 2016).It is a complex and multifaceted construct to study hence it has been divided into sub- constructs i.e. support and collaboration, trust, focus on learning and innovation, benchmarking and knowledge sharing, open and improved communication, social aspects of culture and approach towards knowledge elaborated in Table 6.

Table 6: Culture

Collaboration, Alliances and Support	Skyrme and Amidon, 1997; Davenport et al., 1998; Greco, 1999; Liebowitz, 1999, APQC, 1999; Ryan and Prybutok, 2001; McDermott and Dell, 2001; Wild et al., 2002; Hassanali, 2002; Moffett et al., 2003; Lee and Choi, 2003; Wong and Aspinwall, 2005; Al-Busaidi and Olfman, 2005; Hung et al., 2005; Akhavan et al., 2006; Chong, 2006; Bozbura, 2007; du Plessis, 2007; Anantamulla, 2007; Basu and Ray, 2014; Appelbaum et al. , 2014, Jain amd Moreno, 2015, Lee, Shiue and Chen, 2016
Faith, Trust and Social Capital	Davenport et al. 1998; Greco, 1999; David and Fahey, 2000; Ryan and Prybutok, 2001; Wild et al., 2002; Moffett et al., 2003; Bozbura, 2007; Hung et al, 2005; Appelbaum et al. , 2014; Gold et al., 2001, David and Fahey, 2000; Shu Mei Tseng, 2010; Basu and Ray, 2014
Learning, Development and Autonomy	Skyrme and Amidon, 1997; Davenport et al., 1998; Greco, 1999; Liebowitz, 1999, APQC, 1999; Ryan and Prybutok, 2001; McDermott, 2001; Wild et al., 2002; Hassanali, 2002; Moffett et al., 2003; Lee and Choi, 2003; Wong and Aspinwall, 2005; Al-Busaidi and Olfman, 2005; Hung et al., 2005; Akhavan et al., 2006; Chong, 2006; Bozbura, 2007; du Plessis, 2007; Basu and Ray, 2014; Marques and Simon, 2006; Zaim, 2009; Appelbaum et al. , 2014; Basu and Ray, 2014; Lee, shiue and chen, 2016
Knowledge Sharing and Benchmarking	David and Fahey, 2000; Wong and Aspinwall, 2005; Anantamulla, 2007; Shu Mei Tseng, 2010
Open and Improved communication	David and Fahey, 2000; Wong and Aspinwall, 2005; Anantamulla, 2007; Shu Mei Tseng, 2010
KM orientation	Gold et al., 2001, Lee and Choi, 2003; Anantamulla, 2007; David and Fahey, 2000; Appelbaum et al. , 2014; Lee, shiue and chen, 2016

2.3.2 Leadership

According to Asoh et al. (2002), leadership is a critical success factor for KM success. They also suggested that Leadership in an organization should support Knowledge sharing, learning environment and employee development. Similar to this study, other research studies (Di Tienne et al., 2004) have stated that KM has shifted its focus from technology to people and good leadership can help focus on creating a culture of trust, collaboration and knowledge sharing (Hasanali, 2002; Liebowitz, 1999; Holsapple and Joshi, 2000; Choi, 2000; Civi, 2000; Ryan and Prybutok, 2001; Pemberton et al., 2002; Kalling, 2003; Moûett et al., 2003; Ribiere and Sitar, 2003; Chong and Choi, 2005; Hung et al, 2005). For the same reason, leadership has been considered as an important attribute and included in the study. Table 7 provides a list of key items used to measure the construct leadership and its support to the KM initiatives of an organization.

Table 7: Leadership

Top Management as role model	Skyrme and Amidon, 1997; Davenport et al., 1998; Abell and Oxbrow, 1999; American Productivity & Quality Center (APQC), 1999; Hasanali, 2002; Liebowitz, 1999; Holsapple and Joshi, 2000; Choi, 2000; Civi, 2000; Ryan and Prybutok, 2001; Pemberton et al., 2002; Kalling, 2003; Moûett et al., 2003; Ribiere and Sitar, 2003; Chong and Choi, 2005; Hung et al, 2005; Wong and Aspinwall, 2005; Al-Busaidi and Olfman, 2005; Chong, 2006; Akhavan and Jafari, 2006; Akhavan et al., 2006; Jafari et al. ,2007; du Plessis, 2007; Chong, 2006; Anantamulla, 2007; Donate and Pablo, 2014
Management support to KM initiatives	
Managers tolerance for mistakes	
Documentation of KM policy and rules	

Source: Compiled by authors

2.3.3 Strategy

Liebowitz (1999) said that one of the means for driving the success of KM is to have a clear and well-defined strategy. This would provide a foundation for an organization to deploy its resources and capabilities in the correct direction. There is a clear agreement in the literature that KM initiatives in the organization should be drawn from and well connected to enterprise business strategy.

Table 8: Strategy

Aligning with organizational strategy	Skyrme and Amidon (1997), Davenport et al. (1998), Liebowitz (1999), (APQC) (1999), Zack (1999), Wong and Aspinwall (2005), Akhavan et al. (2006),du Plessis (2007)
Common Vision	
Clarity of objectives	

Source: Compiled by authors

2.3.4 Structure

Though there is no specific structure suggested for KM, some scholars suggest a complete re-design for KM (Malhotra, 2000), whilemajorly don't think it necessary. However, there is an

agreement on low on centralization and formalization for a structure if KM needs to effective. KM literature clearly points that instead ofhighly centralized and controlled rigid hierarchy, flexible and decentralized organizational structures are recommended in the KM literature. Structure is an essential part to study the organization's value creating process. Our study includes three key structural factors i.e. centralization, formalization and integration.Table IX presents a set of items to measure appropriateness of structure of an organization.

Table 9: Structure

Centralization and empowerment	Davenport and Klahr, 1998; Greco, 1999;Tynan, 1999; Choi, 2000; Wenger and Snyder, 2000; Hsieh et al., 2002; Moffett et al., 2003; Gold et al, 2001; Lee and Choi, 2003; Chong and Choi, 2005; Hung et al, 2005; Zaim et al, 2007
Formalization and team spirit	
Integration	

Source: Compiled by authors

3. Conclusion

From the literature study on measurement tools and techniques developed for KMPM, we find that the early measures aimed at measuring knowledge resources more than other elements. Slowly diversification occurred in the process and KM processes were included. Number of researches held in this filed also increased, new theories were introduced, but here doesn't exist a standard format for KMPM, the performance areas that are evaluated depend mostly on the scope of research and ability of the model created.

Many researchers have used qualitative case analysis for understanding the effect of KM implementation in an organization. Qualitative techniques give freedom to the researcher to conduct an in-depth study of certain variables. Quantitative analysis uses statistical or mathematical models. This kind of analysis provides high level of precision in measurement. In our view, both the analysis should be used as both have their own advantages and can lead to better analysis.

During the review another point that has been noted is that very few techniques have the ability to measure KM performance both within the organization and also in comparison to the industry. We have seen that benchmarking the performance of an organization against its competitors in not viable due to the use of different techniques. In the absence of a standard universal measurement tool, no comparison in the effectiveness of KM can be performed across organizations.

The above presented framework has been generated after a critical analysis of the KM literature and this paper is believed to be a comprehensive study that covers most of the important KM measures and tools.Through the development of the above, we have tried to provide the KM researchers with a comprehensive and exhaustive list of measures for resources and practices to help create an instrument for study. This above developed framework can be used to create a standard questionnaire which can be tested for reliability and validity as the coverage of KM resources, KM processes and KM practices along with their sub-constructs and items is quite extensive.

This framework has both managerialand theoretical implications. It can help managers create a measurement instrument customized to their needs. For academicians, it furnishes a strong foundation for KMPM and enriches their knowledge to comprehend specific areas of KM in a better manner.

Finally, knowledge and its management have been given a lot of importance in the Indian scenario. The country has been laying stress on the importance and benefits of knowledge and its application for the development and betterment of the society at large. So this study becomes more relevant for developing countries like India that have put knowledge on the forefront in order to attain a position for themselves in the world economy.

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