Proceedings of GLOGIFT 08
June 14-16, 2008
Stevens Institute of Technology
Hoboken, NJ, pp. 710-724

KNOWLEDGE MANAGEMENT CAPABILITIES AND IMPACT ON KNOWLEDGE EFFECTIVENESS IN INDIAN ORGANIZATIONS

Sangeeta Shah Bharadwaj[*] and R K Bharadwaj[**]

ABSTRACT

This research paper focuses on the Knowledge Management practices in large Indian organization. Identifying knowledge as capabilities that can be built in an organization in terms of infrastructure and processes, the research focuses on the impact of knowledge capabilities on knowledge effectiveness. It explores whether knowledge management processes and infrastructure capabilities are resulting in any positive impact on knowledge effectiveness in an organization.

Keywords: *Knowledge culture, Knowledge structure, knowledge processes, knowledge effectiveness.*

Introduction

One of the most dramatic evolutions in business over the past decade is the dawn of the new economy i.e. the knowledge or knowledge based economy. The increasing global competition and growth of markets places has created a competitive incentive among many companies to consolidate and reconcile their knowledge assets as a means of creating value that is sustainable over time.

Business organizations are viewing knowledge as their most valuable and strategic resource to achieve sustainable competitive advantage (Davenport and Prusak, 2000, Skyrme, 1999, Teece, 1998). Thus organizations have initiated knowledge management projects and programs. They have started to recognize, create, transform and distribute knowledge and have a knowledge management system in place. Primary focus of many organizations has been to develop new applications of information technology to support the digital capture, storage, retrieval and distribution of organization's explicitly documented knowledge. Other organizations believe that most important knowledge is tacit knowledge which can be shared by creating a culture in the organization. Thus such organizations may not be equally predisposed for successful launch and maintenance of knowledge management system. Therefore, a key to understanding the success and failure of knowledge management within organizations is the identification and assessment of capabilities necessary towards successful knowledge management compatibilities to organizational performance. Utilizing this theoretical foundation, the objective of this research is to provide a definitional and empirical context for assessing key organizational capabilities both social and technical that directly impact an organization's drive toward successful knowledge management and relating the same with organizational knowledge effectiveness.

* Faculty, MDI, Gurgaon, India

* Director, IMS, Ghaziabad, India, director@ims-ghaziabad.ac.in

Therefore our research questions are:

1. What are the knowledge management capabilities of an organization that would impact knowledge effectiveness in the organizations?
2. Which capability is more critical in impacting the knowledge effectiveness? The knowledge infrastructure capabilities or the knowledge process capabilities?

This research paper thus first discusses the knowledge management capabilities as discussed by other researchers in section 2. Section 3 discusses the research methodology, section 4 discusses the results and section 5 concludes the research.

Knowledge Management Capabilities: Infrastructure and Process

To compete effectively, firms must leverage their existing knowledge and create new knowledge that favorably position them in their chosen markets. In order to accomplish this, firms must develop an "absorptive capacity"—the ability to use prior knowledge to recognize the value of new information, assimilate it and apply it to create new knowledge and capabilities. (Cohen,1990).

Gold et al (2001) have developed a model of knowledge management based on the capabilities perspective. They refer to three key infrastructure capabilities: *technical, structural,* and *cultural,* that enable maximization of social capital (intangible capital). In order to leverage infrastructure, knowledge management (KM) processes must also be present in order to *store, transform*, and *transport* knowledge throughout the organization (Nonaka and Konno 1998, Porter 1996, Spencer 1996, Szulanski 1996, Almeida 1996, Appleyard 1996, Grant 1995, Leonard 1995, Nonaka and Takeuchi 1995). These processes enable the organization to capture, reconcile, and transfer knowledge in an efficient manner. Together, the perspectives of infrastructure and process provide a useful theoretical foundation for defining important aspects of knowledge effectiveness in organizations as shown in figure 1. The following sections further develop the content and theoretical grounding of these capabilities.

Infrastructure Capabilities

Knowledge Culture

Organizational culture is very important in leveraging knowledge management. It has been considered both as a facilitator and a hurdle/barrier for effective knowledge management. Culture of an organization has key influence on knowledge management or on effectiveness of knowledge (Chase, 1997; Demarest, 1997; Davenport et al., 1998; Pan and Scarbrough, 1998; Holsapple and Joshi, 2000; Martensson, 2000; Davenport and Prusak, 2000; Nonaka and Takeuchi, 1995; Gold et al., 2001; Bose, 2004).

Tyler (1871) was first to provide a formal description of the term "culture". He defined the term as: that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society. Steven (1989) notes that the organizational culture is something akin to the culture of the society, in which the organization operates. This view considers the organizational culture as a micro culture within the culture of a given society or nation.

Since then many authors have defined organization culture

- Organization culture is the combination of value, core belief, behavior model, and emblem. It represents the value system of the company and will become the employees' behavior norm. Every organization's culture is an independent entity different than any other organization (Yeh et al 2006)

- Organizational culture is the sum of shared philosophies, assumptions, values, expectations, attitudes, and norms that bind the organization together. These cultural features of an organization may deviate from cultures of their respective societies. Lemken et al. (2000),

Since there is crucial role of organizational culture in knowledge management, therefore it is imperative to know how to influence and develop knowledge culture in organization.

Oliver and Kandadi have defined knowledge culture as: 'A way of organizational life that enables and motivates people to create, share and utilize knowledge for the benefit and enduring success of the organization.' The presence of a '*knowledge culture*' is critical to the success of knowledge management within an organization (DeLong and Fahey, 2000; Nahm et al., 2004) as it signals a managerial commitment to knowledge management initiatives and promotes sharing of tacit knowledge for higher quality decision-making

In KM literature, a wide array of factors and concepts are cited as influencing elements for the creation and development of knowledge culture. These include organizational structure, people, rewarding systems, leadership, business processes and information systems (DeLong and Fahey, 2000; Gupta and Govindarajan, 2000; Wenger et al., 2002).

Shaping culture is central in a firm's ability to manage its knowledge more effectively (Davenport et al 1996, Davenport 1998, DeLong 1997, and Leonard 1995). We discuss several variables studied in literature that build the knowledge culture in an organization.

- Interaction between individuals is essential in building innovative culture (Arrow 1962, Badaracco 1991, Leonard and Sensiper 1998]. Dialogues between individuals or groups are often the basis for the creation of new ideas and can therefore be viewed as having the potential for creating knowledge. Employee interactions should be encouraged, both formally and informally, so that relationships, contacts, and perspectives are shared by those not working side by side. This type of **interaction and collaboration** is important in shaping organizational culture conducive for knowledge management. Instances like sharing information freely, working closely with others and developing friends at work relate to interaction and collaboration also define interaction.. many authors define a form of interaction where experienced workers or manager transfer knowledge to new or less experienced workers as part of organization culture Oliver and Kandadi (2006). Al Alawi et al, (2007) refer to communication between staff measured by high level of face to face interaction, use of common language and team work discussion and collaboration as constituents of knowledge enhancing culture.
- Another important component of culture is **corporate vision** (D'Aveni 1995, Leonard 1995). A vision that permeates the organization can provide people with a needed sense of purpose that transcends everyday activities (Leonard 1995). Through an articulated and communicated vision, it is important to engender a sense of involvement and contribution among employees (Davenport et al 1996, O'Dell and Grayson 1998).
- A system of **corporate values** determines the types of knowledge that are desired and the types of knowledge related activities that are tolerated and encouraged (Leonard 1995, Levinthal 1998, Miles et al 1997). **Trust (**Oliver and Kandadi, 2006, Park et al, 2004, Al Alawi et al, 2007) **and Openness** are commonly cited as two of these explicitly stated values that promote knowledge management behaviors. Oliver and Kandadi (2006) refer to openness to change and to experimentation as important constituents.
- **Leadership at Various Level of Management (Oliver and Kandadi, 2006)** is also important constituent for developing knowledge culture in organizations. The attributes include

empowering employees and involving employees. Leadership is required to develop a desired culture and hence to develop knowledge culture as well. Important role is played by middle and front level managers in developing knowledge culture through the manifestation of various leadership characteristics. Senior managers need to understand the value of knowledge management and are willing to support and play aggressive role in decision making. At the same time Davenport et al (1980) concluded that one of the key successful factors is support of senior managers and it includes

- o Conveying the information that knowledge management and organizational learning are keys to the success of an organization
- o Providing financial and other resources to build the fundamental building blocks of knowledge management
- o Clarifying the kind of knowledge that is important to the organization**.**

Knowledge Structure

According to Gold et al (2001) structure is defined as the rules, policies, procedures, processes, hierarchy of reporting relationships, incentive systems, and departmental boundaries that organize design within the firm. 'Structure' is defined as the actual static or dynamic components plus the actual relations that take place between them' (Maturana and Varela: 1980).

According to Mintzberg (1994) organizations most frequently group their employees based on knowledge and skills, work process and function, time, output, client, or place.

An organisation's structure is largely determined by the variety one finds in its environment. Mintzberg identifies four types of organizational form, which are associated with four combinations of complexity: (Mintzberg 1994)

Organizational structure can be defined as the specification of jobs to be done within an organization and the ways in which those jobs relate to one another (Ebert and Griffin, 2005). According to Gold et al 2001, organization structure as the second most critical factor for successful KM implementation. Hasanali (2002), highlighted structure as one among five critical success factors for KM. Organizational structure has been identified as a major KM enabler by many researchers in literature (Skyrme and Amidon, 1997; Davenport et al., 1998; Liebowitz, 1999; Holsapple and Joshi, 2000; Chourides et al., 2003; Bose, 2004; Wong, 2005.)

Although intended to rationalize individual functions or units within an organization, structural elements have often had the unintended consequence of inhibiting collaboration and sharing of knowledge across internal organizational boundaries. It is important that organizational structures be designed for flexibility (as opposed to rigidity) so that they encourage sharing and collaboration.

Knowledge sharing is likely to occur within a larger group of individuals in more decentralized organizations. . Many authors have identified the rigidity in traditional organization structure and have emphasized on need of more flexible structure for facilitating knowledge management. Traditional organization structures are usually characterized by complicated layers and lines of responsibility with certain details of information reporting procedures.

Nowadays, most managers realize the disadvantages of bureaucratic structures in slowing the processes and raising constraints on information flow. In addition, such procedures often consume great amount of time in order for knowledge to filter through every level. Alawi et al, (2007). Syed-Ikhsan and Rowland (2004) argued that knowledge sharing prospers with structures that support ease of information flow with fewer boundaries between divisions.

While the traditional orthodox organizational structure is inadequate for knowledge-based organization (Nonaka and Takeuchi, 1995), a new organic organization structure that encourages effective and efficient communication is required to foster knowledge creation and sharing. Often knowledge management models report the need for flatter organizational structures based on loosely coupled teams that form networks of functions for the organization. (Beveren J, 2003). For KM to work, the structure should not interfere with the flow of information and ideas across departments. A flexible structure would allow the formation of ad hoc cross-functional teams in which experts from different departments can be gathered to ease the flow of ideas across departments; or provide venues for employees to communicate informally. Conventional organizational structures need to be transformed to support the development of a knowledge culture (Oliver and Kandadi 2006.) Previous studies in this area have proposed the creation of several exclusive KM jobs, which include Chief Knowledge Officer (CKO), knowledge managers, portal managers, content managers and knowledge analysts (Davenport and Prusak, 2000; Gordon, 2002; Gray, 1998; Rastogi, 2000; Rumizen, 2002; Skyrme, 1999).

Various organization structures are recommended for successful KM implementation. Two distinct structures have received favorable discussion with respect to effective knowledge management, a modular organizational design combined with a modular product design can reduce the costs of coordination and adaptation, thereby increasing strategic flexibility. Nonaka and Takeuchi (1987) develop a new organizational structure, the hypertext organization that enables their five-stage process of knowledge creation to occur efficiently within the organization. This is a combination of a formal organizational structure and a non-hierarchical, self-organizing organizational structure. However, a similar effect can be achieved through maintaining the formal hierarchical structure and adding the dimension of flexibility Gold et al, (2001). Oliver and Kandadi, (-2007) have suggested hybrid organization structure for smooth KM implementation. In such a structure there are mixed positions with varying degree of KM and functional roles. Matrix structures and an emphasis on leadership facilitate greater knowledge sharing primarily by cutting across traditional departmental boundaries.

An organization structure that is demonstratively linked to the value chain increases the ability of the organization to deliver quality products and services to its customers in the most economical manner. An organization's overall knowledge management structure is the combination of KM structural dimensions, and organization's formal structure, and incentive systems.

As discussed earlier some of the constituents of organization structure are flexibility modularity policy and process like rewards and incentive systems etc.

- Studies have also proposed creation **several KM roles** (rather than exclusive KM Jobs) which include chief knowledge officer (CKO), knowledge programmers, portal managers, content managers and Knowledge analyst (Davenport and Prusak, 2000, Gordon, 2002, Gray, 1998, Rastogi, 2000, Rumizen, 2002, Skyrme, 1999). These authors are of the view that some specialist positions are necessary for developing knowledge structure in the organizations. There could be hybrid organization structure which is successful in developing knowledge management organizations by integrating KM activities with core business function e.g. "customer relations manager" (Oliver and Kandadi, 2006).

  These structures are sustainable because

- People in KM positions are also involved in core business activities
- Each functional division undertakes a part of KM costs with embedded KM roles.
- KM programs are integrated with functional divisions
- Another constituent of organization structure is importance given to **team work**. If the

organization structure is matrix based as opposed to bureaucratic hierarchical base, it is encouraging team work. In module and hypertext structure mention earlier team may be formed for specific objectives e.g. R&D and team members are hundred percent committed to such teams as long as working in such teams as opposed to matrix based structures where members of team may have dual line of control. A flexible structure would allow the formation of ad hoc cross-functional teams in which experts from different departments can be gathered to ease the flow of ideas across departments; or provide venues for employees to communicate informally.

- Many researchers have discovered **incentive and rewards** play a major role in activity of knowledge management (Davenport et al, 1998; Alavi and Lender, 2001;). Such initiatives not only improve the amount of support that employees are willing to give to activities of knowledge management (Yeh, Lai and Ho, 2006) but also enhance willingness to participate in knowledge creation and sharing. Chong (2006) refers to performance measurement as key KM component to successful KM implementation. Alawi et al, 2007 refers that managers must consider the importance of collaboration and sharing of best practices when designing reward system. Such rewards must be based on group/team rather than individual performance Syed-Ikhsan and Rowland (2004) say that employees need a strong motivator in order to share knowledge. Oliver and Kandadi, 2006 emphasize two points.
- Indirect rewards like appreciation and recognition play a greater role than the monetary incentives.
- Long term rewards such as profit sharing and employee share option (ESOPs) were observed as effective means when compared to short term incentives.

Walczak, 2005, refers that any knowledge that is externalized into explicit form or combined from one explicit encoding into more useful format becomes eligible for knowledge. Awards are also based on subsequent use of created knowledge by other people. Also teams can rewarded for creating and incorporating explicit and tacit knowledge from other knowledge teams and groups.

Information Technology

It is fundamental to establish the information and communication infrastructure to facilaitate knolwede management in organizations. According to Gold et al, 2001, technology comprises a crucial element of the structural dimension needed to mobilize social capital for the creation of new knowledge. “Technology is able to overcome the barriers of time and space that would otherwise be limiting factors in KM activities. It also serves as a repository in which knowledge can be reliably stored and efficiently retrieved” (Chua, 2004). The entire technology infrastructure used in Organizational Knowledge Management Systems (OKMS) is tangible and it acts as enabler for facilitating KM initiatives in the organizations.

According to Meso and Smith (2000), Technology infrastructure comprises the hardware, software, middle-ware and protocols that allow for the encoding and electronic exchange of knowledge. Three types of technology infrastructure are found in an OKMS:

- Knowledge oriented technologies, such as group-ware and Web browsers that directly process knowledge work and facilitate the sharing of knowledge within the organization.
- Function oriented technologies, such as office automation, robotics and desk-top computing technologies support operational level activities such as data processing, production, and service delivery while collecting the data.

- Specialty oriented technologies support highly specialized functions within the firm. Usually these are those functions that require high levels of know-how. Examples of these technologies include computer-aided design and manufacture (CAD/CAM) software, and expert systems software (Davenport et al., 1998; Hibbard, 1997).

Technology infrastructure provides the base or platform upon which KM solutions are built. It consists of repositories for unstructured data (document and content management) and structured data (data warehousing, generation and management). Groupware is also part of infrastructure as it supports the collaboration needed for knowledge sharing (Duffy J, 2001)

According to Yeh, Lai and Ho, 2006, IT that supports and coordinates knowledge management are: databases, knowledge platforms, performance evaluation management system and integrated performance support system.

Information technology and knowledge management are closely tied together as it helps in propagation of structured knowledge vertically as well as horizontally within the organization. They also make searching and using knowledge much easier.

Zack (1999) believes that information technology plays four different roles in knowledge management

- Obtaining knowledge
- Defining g, storing , categorizing , indexing and linking knowledge related digital items
- seeking and identifying related contents and
- Flexibly expressing the content based on the various utilization back ground

The technological dimensions that are part of effective knowledge management include **business intelligence, collaboration, distributed learning, knowledge discovery, knowledge mapping, opportunity generation, as well as security**. The technology-centered organization knowledge management system (OKMS) in use today are employing one technology or a combination of several key technologies like groupware, messaging, web browsers, document management, search and retrieval, data and text mining, visualization, push technology, group decision support, and intelligent agents. Knowledge portals (internet and intranet) are most common infrastructure and play an important role in KM (Kondai and Kandadi, 2006)

Process Capabilities

According to several researchers the phenomenon of knowledge management is investigated by elaborating distinctive phases that elaborate knowledge exploitation. In a business environment these activities have a wider web of interrelationship, politics, attitudes etc.

The other facet is that knowledge exploration promotes the realization of a reusable knowledge artifacts. The knowledge processes promote a structure for meaningful knowledge construction.

In today's globally competitive environment, knowledge-intensive organization gain knowledge and wisdom through their business activities. However knowledge is not created as a strategic asset. The adherence of organizations to inflexible, ad hoc and indirect approaches can enable organization build an environment facilitating knowledge management but have limited contribution towards facilitating knowledge as a strategic asset and thus a big corporate challenge. These soft parameters are really worthy in the case of knowledge management where communication, the exchange and the diffusion of knowledge require a context that promotes the knowledge management culture. Thus we look at knowledge management processes that would help us build knowledge as a strategic resource which along with infrastructure capabilities will drive

knowledge effectiveness and organizational performance.

Distinct knowledge processes are modeled in a life cycle model which permits further analysis of requirements for the support of KM activity in each process. The processes of KM lifecycle approach relate to the fact that organizations utilize internal and external sources of knowledge. This knowledge has to be made available to concerned people in the organization. Thus a KM cycle starts with creation and/or acquisition of knowledge which has to be organized, mapped and/or formalized to transform it in reusable form. It has to be made accessible to people, or disseminated and /or shared with everyone in the organization. Finally it has to be applied, used, reused and / or exploited for achieving the organizational benefits.

Gold et al 2001 have grouped them into four broad dimensions of process capability-acquiring knowledge, converting it into useful form, applying or using it, and protecting it. We identify acquisition, storage, dissemination and application as dimensions of process capability.

Acquisition Process

Acquisition-oriented knowledge management processes are oriented toward obtaining knowledge. However prior to acquisition an organization must know the knowledge it has within the organization in some form or other and the knowledge gaps. This sub process is called knowledge audit. It includes know what, know who, know how and know why and it should be made explicit. Along with knowing the current position an organization should make efforts to acquire knowledge, create new knowledge by using processes and tools for the same. Many terms have been used to describe these processes: acquire, discover, seek, generate, create, capture, and collaborate. All of these terms have a common theme—the accumulation of knowledge. Innovation, another aspect of acquisition, is the creation of new knowledge from the application of existing knowledge. This requires concerted effort and a high degree of experience in recognizing and capturing new knowledge (Drucker 1993). Improved use of existing knowledge and more effective acquisition of new knowledge is also a key aspect of acquisition (Inkpen and Dinur 1998, Thurow 1996). These process take place simultaneously rather in a sequential manner

Acquisition of relevant knowledge can happen if the organization has identified the important lever of knowledge for their organizations through knowledge audit processes.

The creation of organizational knowledge requires **collaboration** of personal experiences (Inkpen and Dinur 1998). Collaboration takes place at two levels within the organization; between individuals and between the organization and its network of business partners. Collaboration between individuals brings together individual differences (e.g., cognitive style, preferred tools, backgrounds, experiences etc) and can be used to create knowledge (Leonard 1995). This assumes that interaction between the individuals will promote learning (Teece 1998). Collaboration between individuals is also the basis for the socialization of knowledge (Nonaka and Takeuchi 1995).

Collaboration between organizations is also a potential source of knowledge (Dyer 1997, Inkpen 1996, Inkpen and Beamish 1997, Inkpen and Dinur 1998,). Core capabilities are increasingly based on an organization's ability to find and create knowledge (Leonard 1995). Collaboration with other firms is critical to knowledge acquisition [Grant 1995, 1996, Kimberly 1981, Kogut and Zander 1992,). Technology sharing, personnel movement, and linkages between the organization and alliance partners or joint venture partners have all been shown to assist with the accumulation of knowledge (Inkpen 1996, Inkpen and Dinur 1998). However, the ability to acquire knowledge is partly based on an organization's absorptive capacity (Cohen and Levinthal 1990). This is because all the necessary skills for innovation may not be found within

a single organization (Inkpen and Beamish 1997, Leonard 1995).

Measuring and recognizing contribution to knowledge databases such as through best practices awards etc help to integrate and reinforce these processes with the company strategy.

Storage Process

Storage knowledge management processes are oriented towards making existing knowledge available at a central location, easily accessible by everyone. Some of the processes that enable knowledge conversion are a firm's ability to organize (Davenport and Klahr 1998 O'Dell and Grayson 1998), integrate (Grant 1996), combine, structure, coordinate (Miller and Friesen1984, Moore 1996, Sanchez and Mahoney 1996).and store knowledge (Davenport et al 1996, 1998, Zander and Kogut 1995). An organization must develop a framework for organizing or structuring its knowledge (Davenport and Klahr 1998 O'Dell and Grayson 1998). Without common representation standards, no consistency or common dialogue of knowledge would exist. This would make the asset difficult to effectively manage. Knowledge about a particular subject may reside in different parts of the organization or in different systems within the organization. Combining or integrating this knowledge reduces redundancy, enhances consistent representation, and improves efficiency by eliminating excess volume (Davenport and Klahr 1998, Grant 1996). The different knowledge of many individuals must be integrated to maximize efficiency.

Thus, a primary goal of any organization should he to integrate the specialized knowledge of many individuals (Grant 1996). Four commonly cited mechanisms for facilitating integration are rules and directives, sequencing, routines, and group problem solving and decision-making. Also important is storing the knowledge in user friendly easily accessible form. Explicit knowledge can be stored as best practices, lessons learned databases. For tacit knowledge, the conversion process makes available corporate portals for accessing expertise locator system.

Dissemination Process

Knowledge dissemination process refers to the process of sharing among the employees in an organization. Many organizations may just hoard the knowledge thinking that people will access the same and use it. Effective retrieval mechanisms allow for quick and easy access and sharing of knowledge. As knowledge resides in tacit and explicit form, different means are required for disseminating knowledge. For explicit documented knowledge web portals and organization intranet can play a crucial role. Explicit knowledge can be stored as best practices, lessons learned databases which are part of knowledge conversion but using text mining techniques to mine relevant knowledge is characteristics of knowledge dissemination. Using intelligent agents to actively build user profiles and push appropriate lessons learned and material to user is another way of knowledge dissemination. Chat rooms, bulletin boards, online communications, communities of practices etc on organization intranet also facilitate knowledge sharing.

However for tacit knowledge sharing knowledge conversion process makes available corporate portals for accessing expertise locator system but dissemination process should facilitate frequent get together like knowledge fairs, seminars and informal gatherings.

Another important aspect is to make sure these processes are implemented in the organization and to have measurement system to know the extent of implementation. Aligning rewards and recognition to support sharing knowledge and linking with performance evaluation would complete the process of integrating sharing knowledge into the business strategy.

Application Process

Knowledge application processes are processes oriented towards the use of knowledge. Having a comprehensive knowledge management system is of no utility if employees of the organization are not using the same and organization is able to see the impact of the same in its business performance. Hence it is important to know what are the objectives of knowledge management and how those objectives are met through KM Capabilities.

The KM objectives are stated as not to reinvent the wheel in organization and reduce redundancy of knowledge-based activities by successfully leveraging existing knowledge assets, to continuously innovate new knowledge that can be exploited for creating value and to continuously increase the competence and skills of knowledge assets in the organization.

It is important that knowledge management has helped the organization to use knowledge to adjust strategic direction, solve new problems, and improve efficiency. It is important to keep on reviewing the knowledge to know what has worked well during the lifecycle of knowledge management and what has not worked well. These processes also enable the organization to replace knowledge that has become outdated. **W**hat new knowledge should be gathered thus in a way the KM cycle is completed with knowledge review process.

Knowledge Management Effectiveness

Measuring KM effectiveness and its contribution to organizational performance is key concern of many organizations. As knowledge is an intangible strategic asset of an organiztion, measuring it is a challenge. Several approaches have tried to measure this intangible asset but contribution to business performance is still a major research agenda. In our KM model we propose that a good KM infrastructure and process would improve KM effectiveness and would lead to better organization performance. Thus an organization may invest in knowledge management systems but organizational performance would depend on the effectiveness of KM systems, which in turn depend on infrastructure and process capabilities of an organization. Anantatmula (2007) have defined the KM effectiveness in terms of the useful outcome of KM such as Improved communication, Enhances collaboration, Improved employee skills, Better decision making and Improved productivity

Anantatmula (2007) research has shown that the attributes of KM effectiveness can lead to improvements in performance such as customer satisfaction through better product or service quality. This is possible due to a learning environment, employee development, effective communication tools, and knowledge sharing.

In this paper our research question is whether infrastructure knowledge capabilities and process capabilities both positively impact KM effectiveness.

Thus our research hypothesizes are

Research Hypothesis 1: There is no significant impact of Organization infrastructure capabilities on knowledge management effectiveness

Research Hypothesis 2: There is no significant impact of Organization KM Process capabilities on knowledge management effectiveness

Research Methodology

Instrument Development and Data Collection

The unit of analysis in this study is the organization. We wanted to measure the knowledge management practices of large Indian Organization and the latest list of large Indian organization was available in ET 500, 2007. The literature related knowledge management capabilities was

reviewed in order to specify the measures. Data was gathered through a survey that tapped responses from ET 500 companies in India. We have received 52 filled questionnaires, a response rate of 10.04% (52/500).

Data Analysis and Results

The results of reliability are given in Table 1. Internal consistency as measured by Cronbach'a alpha for all the variables ranges from. 0.696 for knowledge application processes to .888 for knowledge effectiveness.

Table 1: Correlation coefficients and Cronbach's Alpha

	Culture	structure	Technology	acquisition	storage	dissemination	Application	Effectiveness
Culture	*0.762#*							
structure	.792(**)	*0.847#*						
Technology	.519(**)	.554(**)	*0.771#*					
acquisition	.833(**)	.810(**)	.727(**)	*0.795#*				
storage	.759(**)	.678(**)	.656(**)	.815(**)	*0.859#*			
dissemination	.731(**)	.648(**)	.556(**)	.765(**)	.788(**)	*0.741#*		
Application	.786(**)	.811(**)	.622(**)	.788(**)	.793(**)	.838(**)	*0.696#*	
Effectiveness	.560(**)	.586(**)	.561(**)	.550(**)	.218	.303	.449(**)	*0.888#*

Table 2: Results of regression analysis

Variables	**Infrastructure Capabilities**	**Process capabilties**
Knowledge Effectiveness		
R Square	0.408	0.095
F	19.322*	2.825
?Beta	0.827	0.342
t	4.396*	1.681
		*?<.001,

Table 2 shows the correlation between the various variables. Correlation is primarily concerned with finding out the extent to which two variables are correlated. It also determines the magnitude and direction of the same. It is seen that most of the factors are highly correlated with KM effectiveness. However knowledge storage and knowledge dissemination are not significantly correlated with knowledge effectiveness.

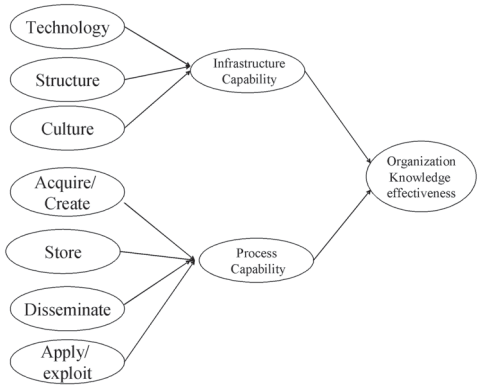

Figure 1: KM Capabilities and Organization effectiveness

Regression between infrastructure capabilities and knowledge effectiveness and process capabilities and knowledge effectiveness is carried out and the results are shown in table 2. Table 2 shows that infrastructure capabilities have positive impact on knowledge effectiveness with R square value equal to 0.408 ($F=199.322$, $p < .001$) and beta value = 0.827 ($t=4.396$, $p< .001$). However the impact of knowledge process on Knowledge effectiveness could not be significantly proves with the available data.

Conclusion

As illustrated in table 2, the regression between infrastructure capabilities and knowledge effectiveness is positive and of high magnitude. Again, this implies that this capability contribute uniquely to the achievement of organizational knowledge effectiveness. However regression between process capabilities and knowledge effectiveness is not that significant. One of the limitations of this paper is poor response rate and responses are the perception of knowledge officers. In many organizations senior officers of It department have answered the questionnaire.

It is important to note that the mathematical manifestation of first relationships is consistent with developed theoretical perspectives outlined in the opening sections of this paper but is not consistent in case of second relationship. Gold et al 2001 shows significant relationship for both the relationships in their paper. However we can not yet conclude that process capabilities are significantly not related to knowledge effectiveness. One of the reasons could be these capabilities are not well developed in organization and hence there impact is not seen on knowledge effectiveness. Even large Indian organizations have a long way to go to develop process related knowledge management capabilities.

Though Gold et al 2001 shows the importance of social capabilities and knowledge integration capabilities needed to facilitate knowledge effectiveness. However in large Indian organization culture, structure and information technology infrastructure support knowledge effectiveness but knowledge management process are not well developed so as to support the knowledge effectiveness. In this paper, we have focused on the discussion and analysis of knowledge management to core capabilities that are needed to facilitate its success. We believe this to be a very important distinction because many organizations tend to launch programs of knowledge management without due consideration of the firm's capabilities to guarantee any measure of success Our research also imply that process capabilities of acquisition, conversion, application, and protection form an operational perspective for the framework of knowledge management cycle

Together, these results suggest that theories of knowledge capabilities provide a rich resource for developing empirically based studies and that capabilities can provide a useful benchmark for managing knowledge management within the firm.

References

- Alawi A, Al-Marzooqi & Mohammed Y (2007), 'Organizational culture and knowledge sharing: critical success factors', *Journal Of Knowledge Management,* 11(2), 22-42,
- Almeida, P. (1996), 'Knowledge .sourcing by foreign multinationals: patent citation analysis in the U.S. semiconductor industry'. *Strategic Management Journal* 17 15, 5-165.
- Appleyard, M.M. (1996), 'How does knowledge flow? Inter-firm patents in the semiconductor', *industry. Strategic Management Journal.1*7, 137-154.
- Anantatmula Vittal S. (2007), 'Linking KM effectiveness attributes to organizational performance,', *VINE,* 37(2),
- Arrow, Kenneth J. (1962), 'Economic welfare and the allocation of resources to invention,' in Nelson.

- Beveren J, (2003), 'Does health care for knowledge management?' *Journal of Knowledge Management*, 7(1), 90-95
- Bose, R. (2004), 'Knowledge management metrics', *Industrial Management & Data Systems*, 104(6), 457-68
- Chase, R. (1997), 'The knowledge-based organization: an international survey', *Journal of Knowledge Management*, 1(1), 38-49.
- Chourides, P., Longbottom, D., Murphy, W. (2003), 'Excellence in knowledge management: an empirical study to identify critical factors and performance measures', *Measuring Business Excellence*, 7(2), 29-45
- Chua A (2004), 'Knowledge management system architecture: a bridge between KM consultants and technologists', *International Journal of Information Management*, 24(1), 87-98
- Cohen, W. and Levinthal, D. (1990), 'Absorptive capacity: a new perspective on learning and innovation*,' Administrative Science Quarterly,. 35.* 1
- D'Aveni. R. (1995), '*Hypercompetitive Rivalries*,' New York: The Free Press.
- Davenport T, and Klahr P, (1998), 'Managing customer support knowledge,'*California Management Review,* 40, 3 195-208.
- Davenport, H.T. and Prusak, L. (2000), '*Working Knowledge: How Organizations Manage What They Know*,' Harvard Business School Press, Boston, MA.
- Davenport, T.H., De Long, D.W., Beers, M.C. (1998), 'Successful knowledge management projects,' *Sloan Management Review*, 39(2), 43-57
- Davenport, T.H., Prusak, L. (1998),*'Working Knowledge: How Organizations Manage what they Know*, Harvard Business School Press, Boston, MA,
- Davenport, T; DeLong. D and Beers, M. (1998), 'Successful knowledge management projects,' *Sloan Management Review.* J9 43-57.
- Davenport. T; Jarvenpaa, S.; and Beers, M. (1996), 'Improving knowledge work processes,'. *Sloan Management Review. 37* 53-65.
- De Long, D. W. and Fahey, L. (2000),'Diagnosing Cultural Barriers to Knowledge Management,' *The Academy of Management Executive* (14:4), 113-127
- DeLong. D. (1997),'Building the knowledge-based organization: how culture drives knowledge behaviors,' Working paper, Ernst & Young's Center for Business Innovation, Boston,
- Demarest, M. (1997), 'Understanding knowledge management,' *Long Range Planning*, 30(3), 374-84
- Drucker P, (1993), ' *Post-Capitalist Society,'* New York: Butterworth Heineman.
- Duffy J, (2001), 'The Tools and technologies needed for knowledge management,' *The Information Management journal,* January, 64-67
- Dyer J. (1997), 'Effective inter-firm collaboration: how firms minimize transaction costs and maximize transaction value,'. *Strategic Management Journal, IS, 1* 535-556.
- Gold A.H.; Malhotra, A.: and Segars, A.H. (2001), 'Knowledge management: An organizational capabilities perspective,' *Journal of Management Information Systems, 18, 1*, 185-214
- Gordon, J.R. (2002), '*Organizational Behavior: A Diagnostic Approach*,' 7th ed., Prentice Hall, Upper Saddle River, NJ.
- Grant. R. (1995), 'A knowledge-based theory of inter-firm collaboration,' *Academy of Management Best Paper Proceedings* 17-21
- Grant. R. (1996), 'Toward a Knowledge based theory of the firm,'. *Strategic Management Journal, /*7, 109-122
- Gray, J.A.M. (1998), 'Where's the chief knowledge officer?', *British Medical Journal*, 317(7162), 832-40
- Gupta A.K., Govindarajan V. (2000), 'Knowledge flows within multinational corporations,' *Strategic Management Journal*, 21: 473-496
- Hasanali, F. (2002), "Critical success factors of knowledge management", available at: www.kmadvantage.com/docs/km_articles/Critical_Success_ Factors _of_KM.pdf (accessed November 20, 2003)
- Hibbard, J. (1997), 'Knowing what we know,', *Information week*, 20 October, 46-64.

- Holsapple, C.W., Joshi, K.D. (2000), 'An investigation of factors that influence the management of knowledge in organizations,' *Journal of Strategic Information Systems*, 9(2/3), 235-61
- Inkpen A (1996), 'Creating knowledge through collaboration,' *California Management Review 3,* 1, 123-141
- Inkpen A., and Beamish, P, (1997), ' Knowledge, bargaining power, and the instability of international joint ventures,*' Academy of Management Review, 22* 1, 177-202
- Inkpen, A., and Dinur A. (1998), 'Knowledge management processes and international joint ventures,' *Organization Science, 9,* 4 454-468
- Kimberly. R. (1981), Managerial innovation. In P Nystrom and W. Starbuck (eds.). *Handbook of Organizational Design,* vol. 1, New York: Oxford University Press, I98I, 84-104
- Kogut. B. and Zander, U, (1992), Knowledge of the firm, combinative capabilities, and the replication of technology, *Organization Science, 3,* 3 383-397
- Krogh. G. Von (1998), 'Care in knowledge creation,' *California Management Review*, 40(3), 133-153
- Lemken, B. H. Kahler and M. Rittenbruch (2000), ' Sustained knowledge management by organizational culture,' Proceedings of the 33rd *Annual Hawaii International Conference on System Sciences*, 2000, 64
- Leonard, D. (1995), '*Wellsprings of Knowledge: Building and Sustaining the Source of Innovation*,' Boston: Harvard Business School Press
- Leonard. D and Sensiper S, (1998), 'The role of tacit knowledge in group Innovation,' *California Management Review. 40.* 3 112-132
- Levinthal, D. (1998), Surviving Schumpeterian environments: an evolutionary perspective, in 79. Matusik. S. and Hill. C. The utilization of contingent work, knowledge creation, and competitive advantage. *Academy of Management Review, 23,* 4, 680-697
- Levinthal D, and March, J. (1993), 'The myopia of learning' *Strategic Management Journal*, 95-112
- Liebowitz, J. (1999), 'Key ingredients to the success of an organization's knowledge management strategy', *Knowledge and Process Management*, 6(1), 37-40
- Long, D.D. (1997), "Building the knowledge-based organizations: how culture drives knowledge behaviors", working paper of the Center for Business Innovation, Ernst & Young LLP, Cambridge, MA,
- Long, L. (1994), '*Introduction to Computers and Information Processing*,' 4th ed., Prentice-Hall Inc, Upper Saddle River
- Martensson, M. (2000), 'A critical review of knowledge management as a management tool,' *Journal of Knowledge Management*, 4(3), 204-16
- Maturana, H., and Varela, F. (1980), *Autopsies and Cognition: The Realization of the Living*, Dordrecht: D. Reidel
- Meso P, Smith R, (2000), 'A resource-based view of organizational knowledge management systems, *Journal of Knowledge Management*,' 4(3), 224-234
- Miles. R, Snow. C, Matthews, J, Miles. G.: and Coleman, H. Jr (1997), 'Organizing in the knowledge age: anticipating the cellular form,' *Academy of Management Executive*, pp 7-24
- Miller D and Friesen P, (1984), ' *Organizations: A Quantum view,'.* Englewood Cliffs NJ: Prentice Hall
- Mintzberg, H. (1994), '*The Rise and Fall of Strategic Planning*,' Free Press, New York, NY
- Moore. J. (1996), '*The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems*'. New York: HarperCollins
- Nahm, A.Y., Vonderembse, M.A., Koufteros, X.A. (2004), 'The impact of organizational culture on time-based manufacturing and performance,' *Decision Sciences*, 35(4), 579-607
- Nonaka L. and Takeuchi, H (1995), '*The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation,'* New York: Oxford University Press.
- Nonaka. L, and Konno. N. (1998), 'The concept of "ba": building a foundation of knowledge creation,' *California Management Review, 40,* 3 40-54.
- O'Dell, C, and Grayson, C. (1998), 'If only we knew what we know: identification and transfer of internal best practices,'. *California Management Review, 40, 3* 154-174

- Oliver S and Kandadi, K (2006), 'How to develop knowledge culture in organizations? A multiple case study of large distributed organizations,' *Journal of Knowledge Management*, 10(4), 6-24
- Pan, S.L., Scarbrough, H. (1998), 'A socio-technical view of knowledge-sharing at Buckman Laboratories,' *Journal of Knowledge Management*, 2(1), 55-66
- Porter-Liebskind J, *(*1996), 'Knowledge, strategy, and the theory of the firm,' *Strategic Management Journal, 17* 93-107
- Rastogi, P.N. (2000), 'Knowledge management and intellectual capital: the new vir· t u o u s reality of competitiveness,' *Human Systems Management*, 19(4), 39-49
- Rumizen, M.C. (2002), '*The Complete Idiot's Guide to Knowledge Management*,' CWL Publishing, Madison, WI.
- Sanchez. R. and Mahoney J, T. (1996), Modularity, flexibility and knowledge management in product and organization design. *Strategic Management Journal 17* 63-76
- Skyrme, D., Amidon, D. (1997), 'The knowledge agenda,' *Journal of Knowledge Management*, 1(1), 27-37
- Skyrme, D.J. (1999), '*Knowledge Networking: Creating the Collaborative Enterprise*,' Butterworth Heinemann, Oxford.
- Ott, J. Steven (1989), '*The Organizational Culture Perspective*,' Pacific Grove, CA: Brook/ Cole Publishing Company
- Syed-Ikhsan, S. and Rowland, F. (2004), 'Knowledge management in public organizations: a study on the relationship between organizational elements and the performance of knowledge transfer," *Journal of Knowledge Management*, 8(2), 95-111
- Szulanski G. (1996), 'Exploring internal stickiness: impediments to the transfer of best practice within the firm,' . *Strategic Management Journal, 17* 27, 3
- Teece D. (1998), 'Capturing value from knowledge assets: the new economy-markets for know-how and intangible assets,' *California Management Review, 40,* 3 55-79
- Thurow, L. (1996), '*The Future of Capitalism,'* . London: Nicolas Brealey
- Tyler, E.B. (1871*),' Primitive Culture: Researchers into the Development of Mythology, Philosophy, Religion, Art and Custom,'* John Murray, London, Vol. 1.
- Walczak S, (2006), 'Organizational knowledge management structure, *The learning Organization*,' 12(4), 2005, 330-339
- Wenger, E., McDermott, R., Snyder, W.M. (2002), '*A Guide to Managing Knowledge: Cultivating Communities of Practice*,' Harvard Business School Press, Boston, MA,
- Wong, K.Y. (2005), 'Critical success factors for implementing knowledge management in small and medium enterprises,' *Industrial Management & Data Systems*, 104(9), 735-43
- Yeh, Y.J., Lai, S.Q. and Ho, C.T. (2006), 'Knowledge management enablers: a case study", *Industrial Management & Data Systems*,' 106(6), 798-810
- Zack, M. (1998), 'An architecture for managing explicated knowledge,' *Sloan Management Review*, September.
- Zack, M.H.(1999), 'Developing a Knowledge Strategy,' *California Management Review* 41 (1999): 125-145.
- Zander U and Kogut B. (1995), 'Knowledge and the .speed of the transfer and imitation of organizational capabilities: an empirical test,' *Organization Science 6,* I 76-92