

MEASURING STRATEGIC VALUE OF KNOWLEDGE USING KNOWLEDGE LIFECYCLE MODEL: A CASE OF INDIAN BANKING

HimanshuDutt¹, VidhuShekharJha² & FurqanQamar³

Abstract: *Increasing commodification of intellectual capital has made knowledge management (KM) a crucial function. This has led organisations to rate strategic value of their knowledge. It is done by identifying what sort of knowledge they should look out for and how it should be obtained, used, learned, assessed, built, and divested. It determines what part of organisational knowledge and in what mix has helped the organisation yield competitiveness. The important knowledge thus, could be segregated from others in some order. This approach considers what factor contributestowards building knowledge and how much,using the knowledge lifecycle model.Indian commercial bankingsector has been taken as an example to find out contribution of knowledge lifecycle elements in banks that will enable them to analyze their composition of knowledge to meet their knowledge requirements and enhance/sustain competitiveness. The results provide learning for banks implementing KM, to improve their competitiveness, and serve as foundation for banks looking forward to implement KM.*

Keywords: Knowledge Lifecycle, Knowledge Management, Elements of Organisational Knowledge, Indian Commercial Banks, Confirmatory Factor Analysis, Strategic Value of Knowledge, Competitiveness

¹ Doctoral Research Student, Centre for Management Studies, Jamia Millia Islamia (Central University), Jamia Nagar, New Delhi – 110025, himanshudutt@gmail.com

² FurqanQamar, Ph.D, Vice Chancellor of Central University of Himachal Pradesh, Kangra, Himachal Pradesh., qamar.pc@gmail.com

³ Professor ,G D Goenka World Institute, Lancaster University(UK), Sohna Road, Gurgaon, vidhushekharj@gmail.com

Introduction

Increasing commodification of intellectual capital has made Knowledge Management (KM) a crucial function. This has led organisations to rate strategic value of their knowledge. It is done by identifying what sort of knowledge they should look out for and how it could be obtained, used, learned, assessed, built and divested. It is what they know about their customers, products, processes, mistakes and successes accumulated over a period of time that helps organisation become competitive in the marketplace. It determines what part of organisational knowledge and in what mix has helped the organisation yield competitiveness. The important knowledge thus, could be segregated from others in some order. This approach considers what factors contribute towards building knowledge and how much. Accordingly, the knowledge creation capabilities can be shaped and improved (Dutt, Jha and Qamar, 2010). In fact, it becomes more meaningful to measure knowledge because there is a difference in knowledge requirements, for example, between a consulting business and an organization selling physical product. Globalization and increased market competitiveness have required organisations to become knowledge-intensive. Organisations therefore, must find out their core knowledge activities which is evident in what they do and how (Zack, 2003). These activities reside in how products, processes, management and technologies interact and integrated within the organization, (King, Marks and McCoy, 2002) that help create strategically relevant knowledge (Hatten and Rosenthal, 2002). Identifying and successively building and measuring such knowledge require looking at the process of knowledge creation that is typically represented through *knowledge lifecycle*. In fact knowledge lifecycle is said to be the functional layer among the other two layers – cognitive and resource layers – of knowledge management that deals with creating, using and sharing knowledge (Abou-Zeid, 2000). This paper deals with measuring strategic value of knowledge as based on stages of knowledge lifecycle. Each stage contributes to building of knowledge in terms of its creation, share and use. Organisations become more competitive by using knowledge to reduce costs, increase speed, and meet customer needs (Ofek & Sarvary, 2001). Therefore, knowledge has strategic value and knowledge lifecycle can be seen as one formal approach towards measuring organisational knowledge. Let us describe it in detail through a model.

1. Knowledge Lifecycle Model

Knowledge is constructed through a systematic set of process defined logically, and stored as a codified object (Murray, 2002). But the challenge is, it is intangible and fragmented and therefore, difficult to locate (Davenport, Long & Beers, 1998). It is the 'meaning made by the mind' that easily becomes 'everything and nothing' (Despres and Chauvel, 1999). It has shorter life cycle due to continuous reduction in lead time for its creation, use and share (Birkinshaw & Sheehan, 2002). But biggest of all- it deals with how human understanding and mental models can be used in work to derive value (Wiig, 1999) to customers (Quinn, 1992) and improve organisational performance (Ulrich, 1999) through organisation learning that is capable of measuring, storing and capitalizing on the expertise of employees to create an organisation that is more than sum of its part (Senge, 1990). Its composition is agreed to be 'an organized combination of ideas, rules, procedures and information' (Bhatt, 2000). Epistemological dimension of knowledge suggest two views – 'knowledge as resource' that can be possessed, and 'knowledge as process' that helps leverage the knowledge between those who possess it and those who use or develop it to add value to it (Assudani, 2009). This paper attempts to analyse *knowledge as process* or the knowledge lifecycle and its contribution in building knowledge. It measures the (knowledge) elements that contribute the most (and the least) towards building knowledge at each stage of knowledge lifecycle. It is here therefore, will be significant to discuss the stages of knowledge lifecycle to better present the research model for this research.

Carrillo (2009) identifies two contrasting views of knowledge-based developments. One regards it as 'monetary mass resulting from technological-based productivity' and the other as 'equilibrium between social-cultural elements'. It means technology, social and cultural factors are among the elements of knowledge creation but certainly the list is not exhaustive. And, the complexity increases with scale and scope of their contribution affecting organization's effectiveness and competitive strength (Carlile and Reberich, 2003). It is therefore, important that an organisation must identify first its knowledge elements, to measure contribution of their strategic worth at each stage of the knowledge lifecycle.

Successful organisations manage a continuous cycle of creating, preserving and disseminating knowledge which defines their core-competency (Salisbury and Plass, 2001). Managing such a cycle requires an integrated process that can address the complexity of managing the knowledge. This integrated process broadly is referred to as knowledge lifecycle. First phase is knowledge creation which is when organisation solves a unique

problem or a big problem in parts. Second phase is preservation of knowledge that records the problem and its solution generated in the first phase as a new knowledge. Third phase is dissemination of the preserved knowledge that becomes the input for solving problems further. Each phase thus, is the input for another phase in a cyclical manner to build knowledge upon itself (Salisbury, 2003). This serves as one approach to measure knowledge in the organisations. It identifies high strategic value knowledge elements for each knowledge lifecycle stage based on their contribution towards building knowledge. Similarly, low-value knowledge elements for each stage of knowledge lifecycle either could be improved or dropped. Strategic value of knowledge thus, can be measured and segregated from highly contributing to least contributing element using the knowledge lifecycle model. This will help organisations to focus on improving competitiveness by augmenting their critical knowledge source(s), and improving the ones that have potential to contribute more. Let us discuss the relevant literature concerning knowledge lifecycle model to gain better understanding about knowledge creation as process.

Junnarker (1999) describes approach based on five-processes. These are: 1) process of connecting people to knowledgeable people; 2) process of connecting people to information; 3) process of converting the information into knowledge; 4) process of codifying knowledge for transfer and; 5) process of facilitating knowledge transfer across the organisation. Liebowitz (2000) prescribes nine-step approach that further refines it. Its stages are 1) transform information into knowledge; 2) verify it; 3) capture and secure it; 4) organize it; 5) retrieve and apply it; 6) combine it; 7) create new knowledge; 8) learn; and 9) distribute it. Again, this is based upon the knowledge lifecycle process. Sharp (2006) segregates these steps or processes under three categories of development as – one that emphasizes use of information technology; two as human function; and three as a process that bridges technology and human perspective together. Variety of approaches prescribed in the literature resemble the above steps of knowledge lifecycle. A detailed knowledge lifecycle model adapted from Bukowitz and Williams (1999) is presented in *figure 1*. This model serves as research base for the present paper that measures the strategic value of knowledge at each stage of knowledge lifecycle by identifying contribution of different knowledge elements in building knowledge.

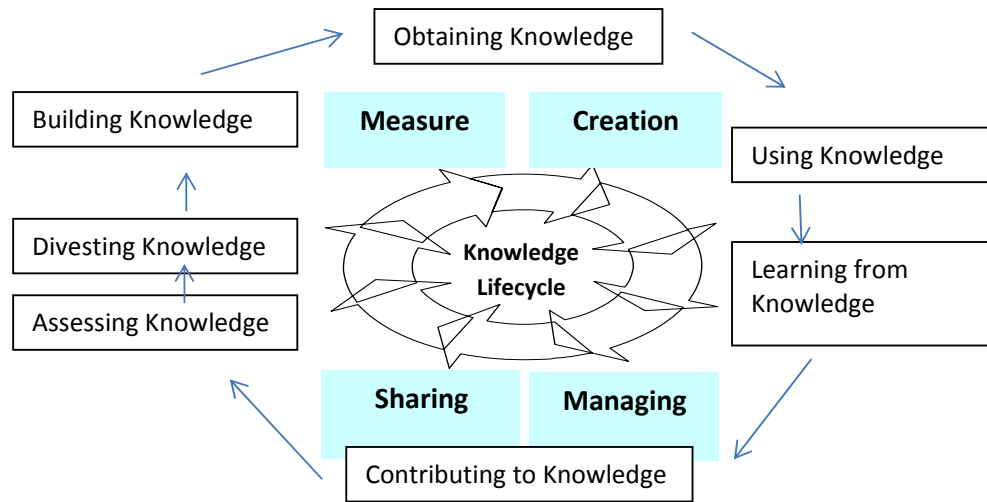


Figure 1: A Model of Knowledge Lifecycle

A knowledge lifecycle model serves adequately as a measurement criterion for evaluation of the strategic value of organisational knowledge. In fact, KM in its third and current generation is about knowledge creation with focus on content management and developing taxonomies for organisational learning than merely knowledge sharing (Vorakulpipat and Rezgui, 2008). That is how it can create and add more value to the task of value creation – converting the demand side (knowledge seekers) to supply side (knowledge creators) (Metaxiotis, Ergazakis and Psarras 2005). Knowledge lifecycle thus, can be characterized with KM which is a formal process of identifying the knowledge needs, and using it to organization's benefit and further devising ways to make it available to the concerned members (Singh, 2008). In other words, knowledge lifecycle is the manifestation of knowledge management framework. This idea has resulted in learning curves for organisations to adapt quickly, respond faster, and proactively shape their business.

It will be significant here to describe broadly the elements of knowledge lifecycle to understand what elements can be characterized with different stages of knowledge lifecycle. Having known the critical knowledge elements, organisations can fill the knowledge-based gaps, discover new arrangements to create its knowledge-mix and acquire knowledge at faster pace and at lesser costs. After an overview on knowledge lifecycle model and its significance as measurement tool to identify strategic knowledge, let us dig down to understand its elements in detail as based on the model in figure 1.

2. Elements of Knowledge Lifecycle

Recognizing meaningful knowledge is complex because it comes from cognitive structure of people in organizations who re-organize information to derive meaning for meeting business goals (Sussman and Seigal, 2003). This organizing of credible information as knowledge (Hult, 2003) using technologies, information-sharing culture, processes and management is labeled as knowledge management (Long and Seemann, 2000). This is based on the premise that value is extracted from the stocks of knowledge (Curado, 2008) that gets accumulated over a period of time. It is because knowledge is the driver of this value creation which is extracted externally and applied internally using knowledge management (Mahesh and Suresh, 2009). But how this value can be extracted rests upon the organisation's composition of knowledge lifecycle elements. Conceptually, knowledge cycle is composed of creating, managing and sharing of knowledge. Let us deal with each one of these three individually starting with managing the knowledge.

Managing Knowledge

Managing something as personal and intangible as knowledge is difficult. On one side it is largely cognitive and therefore, highly personal and on the other side top management requires taking control of it to systemize it (Lang, 2001). The notion upon which KM is based is the fact that humans inherently possess knowledge. This knowledge held by the individuals requires some structure to retain it (often termed as *organisational memory*). It is because '*a mass of knowledge goes right out of the door with the person*' when he leaves the organisation (Dunford, 2000). It is therefore, managing knowledge becomes important. To manage this knowledge, organisations use techniques and tools that are concerned with capturing explicit knowledge (documenting discussions and learned lessons in databases) or collecting the tacit knowledge (using artificial intelligence and expert systems that anticipates user's need of knowledge).

But managing knowledge is not free from barriers. Some of these barriers are summarised in figure 2 as given by Bollinger and Smith (2001). Humans have different diverse psychological needs; and therefore, vast information is stored in knowledge repositories. It needs continuously keeping a track of discussions and decisions, assessing the rationale and identifying the obsolete information. Too much information frustrates people and if they can be assisted with required information, there will be no reason why they will not use the KM. It is prescribed that people are motivated to share using rewards system for implementing

KM practice. However one drawback it has is that it increases the quantity of knowledge shared at the cost of quality of knowledge.

Organizational perspective	<ul style="list-style-type: none"> Time-consuming, labor intensive, costly to build knowledge base People are busy, and KM may involve additional work Limitations to KBS technology Temporary project teams difficult to track Information can be taken out of context Information overload Workers see no benefit to system Difficult to codify tacit knowledge Proliferation of jargon KM implies controlling people Strong positive culture is needed for care-why to exist Having a chief knowledge officer (CKO) sends the wrong message
Team/group perspective	<ul style="list-style-type: none"> Reward for individual effort will encourage hoarding of knowledge Fear of recrimination and criticism for peers and management Lack of respect for other disciplines Will subvert efforts if lack of respect, trust and common goals Additional work is required to document team processes
Individual perspective	<ul style="list-style-type: none"> Reluctance to share information knowledge is source of power, advancement, or reward/punishment Competition among professionals Rewarded for know-what Sense of worth and status because of expertise Fear of diminished personal value if give up know-how

Figure 2: Barriers to Effective Management of Knowledge

Another fact in managing knowledge is that it is seen as source of power or control. People with relevant knowledge are perceived as ‘*experts*’ and therefore gain status that comes from being ‘*owner of the knowledge*’. That is mainly the reason why people hoard knowledge – the fear of diminished personal value due to ‘*fear of losing one’s unique value*’ that is referred as ‘*social dilemma*’ in knowledge sharing (Lam and Lambermont-Ford, 2010). It has also been reported that experts are often too busy with their work to help due to intense professionalism. Culture, is another aspect that is very much needed to get people work together through a supportive environment where people can freely share knowledge without criticism of fear. People will not make use of knowledge if there is lack of openness, trust and respect within the organisation culture. Many organisations therefore have roles like - *Chief Knowledge Officers* or *Knowledge Managers, Specialists* etc. whose dedicated role is to convert knowledge into profit by leveraging the corporation’s intellectual assets and as part of this responsibility transform the organisation into learning organisation and develop a knowledge-supported infrastructure (Guns, 1998).

Let us now understand knowledge creation process that primarily deals with tacit-explicit based knowledge conversions.

Creating Knowledge

Knowledge may find many re-uses in different situations through combinations of new and existing knowledge and produces learning, with its diffusion at lower costs. This ability of an organization to create, apply and diffuse external knowledge is called '*absorptive capacity*'. It is mostly build on organization-specific experience and prior knowledge base by exploiting externally acquired or assimilated knowledge. It is therefore, can be justified that absorptive capacity of an organization depends upon both – interface of organization with external knowledge sources as well as the internal capability of the organization to combine old and new learning to build knowledge and its transfer across the organization vertically and horizontally.

Knowledge creates capabilities and thus, determines the ability to do things. However concern here is that knowledge can be located between the two extremes – tacit and explicit. The knowledge creation process therefore, in literature is characterized as continuous and dynamic interactions between tacit & explicit forms of knowledge (Sharma and Goswami, 2009). This knowledge creation process based on interaction between tacit and explicit knowledge have four knowledge conversion modes (Nonaka& Takeuchi, 1995). The model has been named as SECI (*Socialization, Externalization, Combination and Internalization*) named after these conversion modes (Hussi, 2004) and is shown as figure 3.

Socialization is *tacit-to-tacit* conversion; Externalization or articulation is *explicit-to-explicit*; Combination is *tacit-to-explicit* and; Internalization is *explicit-to-tacit*. Socialization is said to be easiest in all the four conversions. However it is be noted that before knowledge could be applied it is required to be turned into explicit or codified knowledge.

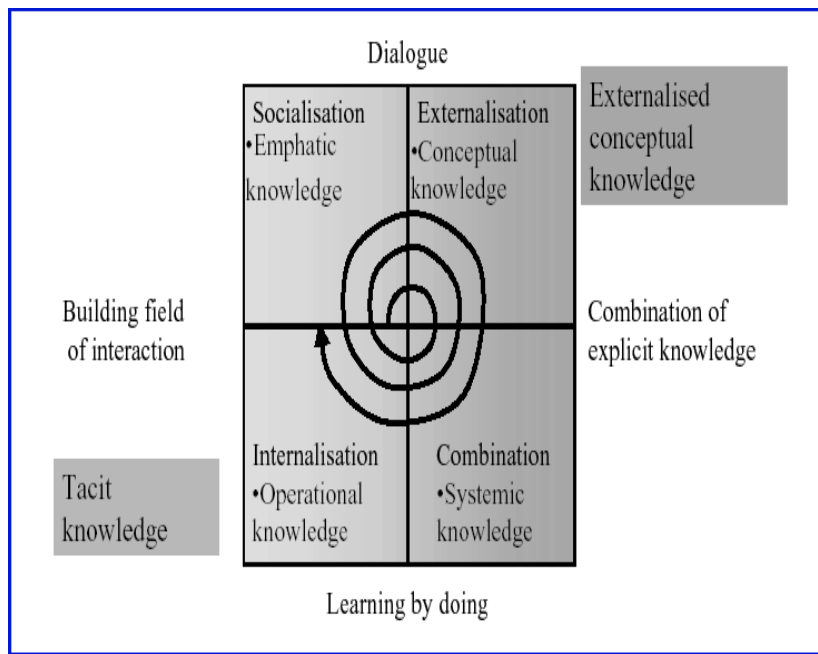


Figure 3: SECI Model for Knowledge Creation

While there are many methods to share explicit knowledge like through e-mail, forums, and knowledge repositories that reduce time and space between two units of an organization; few methods suggested to share tacit knowledge are apprenticeships, brainstorming camps, use of metaphors and analogies, social network, and learning by doing. Thus, knowledge is not only ‘quantifiable data’ or ‘processing objective info’ rather it is tacit.

Let us look at some methods of knowledge sharing that is dependent upon developing a learning culture and facilitating the use of technology, chiefly.

Sharing Knowledge

Knowledge sharing (or transfer) has been referred to as transmission of knowledge to the user and its absorption by him. This transmission is mostly facilitated using IT-tools that provides for exchange for both – tacit and explicit (codified) knowledge. The tacit is decoded by the human user for whose absorption the knowledge has been transmitted. The other way to share knowledge without having to use IT tools is through interactions or conversations, which is simplest as well. Knowledge sharing, thus, is largely dependent upon the interplay between culture and information technology (technical factors). It is here leadership (motivation) plays a crucial role in establishing the effective assimilation of KM practice. Without trust people are not motivated to share, and it is a leader's role to build trust to encourage people to share.

This sharing has to be on-going on regular basis because knowledge is dynamic and knowledge sharing is a process of continuous learning. It therefore, becomes imperative for an organization to track its ability to share knowledge and measure organizational learning with respect to knowledge management strategies (Vorakulpipat and Rezgui, 2008).

Success of knowledge sharing is based on organization's ability to share knowledge embodied and embedded (Madhvan and Grover, 1998) in routines and continuously improving the capabilities to respond quickly to change, innovate and achieve competitiveness (Jasimuddin, 2008). Creation and sharing of knowledge however must visualize 5-key questions (Eppler and Burkhard, 2007) before knowledge creation could take place. These are: 1) the type of knowledge required like – for example different knowledge will be required for knowing ‘*what*’ than ‘*why*’ or ‘*how*’. Knowing ‘*what*’ in fact represents the first step in visualization for knowledge sharing followed by why and how; 2) why i.e. the purpose and process; 3) for whom i.e. intended users; 4) context i.e. situations, participants, media and; 5) how to represent i.e. method and format. This is presented in figure 4.

KNOWLEDGE TYPE WHAT?	KM FUNCTION WHY?	TARGET GROUP FOR WHOM?	SITUATION WHEN?	VISUALIZATION FORMAT HOW?
Know-what	Creating	For oneself	In a paper report	Structured Text/Tables
Know-how	Codifying	For another person	In face-to-face dialogues	Mental Image/Stories
Know-why	Transferring	For a team	In a speech	Heuristic Sketch
Know-who	Identifying	Community of Practice	In a Mgmt-workshop	Conceptual Diagram
Know-where	Applying/Learning	For all employees	In an expertsystem	Image/Visual Metaphor
Know-what-if	Measuring/Assessing	Specific stakeholders	On the inter-/intranet	Knowledge Map
Normative K./Values	Signalling	For the public	In a virtual environment	Interactive Visualization

Figure 4: Model for Knowledge Sharing

But knowledge sharing has some barriers too. Riege (2005) has prescribed 3 categories of barriers: *individual barriers, organisational barriers and technology barriers*. Individual knowledge sharing barriers are: a) lack of time to identify those who need knowledge or for sharing knowledge; b) fear that sharing may reduce job security; c) unclear benefits of possessed knowledge; d) neglecting tacit side of knowledge; e) large hierarchies; f) different

education, g) experience, age, beliefs; h) less time for interaction between key knowledge sources and staff; and, i) lack of trust that their knowledge will be misused or due credit will not be given. Organisational knowledge sharing barriers are: a) lack of leadership and managerial direction to communicate benefits of sharing; b) shortage of formal and informal initiatives to share (absence of knowledge repository for knowledge access and sharing); c) culture that does not adequately support sharing practices; d) not giving priority to knowledge retention; e) lack of resources that makes sharing easier; f) no information exchange with external stakeholders; g) no internal competitiveness among functions, and a long hierarchy that makes sharing slow. Technology-based knowledge sharing barriers are: a) partial or non-integration of IT systems to communication mediums and work routines; b) lack of training and technical support, and compatibility issue between technology tools, platform to support individual's knowledge requirements. It is therefore knowledge sharing requires a mechanism to check the success of knowledge sharing. In fact without measuring all the stages of knowledge lifecycle (i.e. managing, creating and sharing knowledge) with respect to their functions as discussed in the subsequent sections above; the effectiveness of KM cannot be known. Measurement provides a yardstick to measure the knowledge gaps, number of knowledge assets developed and the overall benefits yield. Let us therefore, proceed further to understand how knowledge can be measured in general as the literature prescribes.

Measuring Knowledge

Tacitness serves as a barrier to measurement in terms of identification and evaluation of knowledge created by individuals. Most often knowledge is measured as development of new or differentiated ideas, objects or elaboration or enrichment of existing ones; method or means using which knowledge is created for a certain output; difference between what is known and what must be known. In nutshell it can be defined as any '*value-adding*' object to organizational performance. Mitchell and Boyle (2010) measure KM as – a process (*steps or activities to externalize knowledge*), as an output (*like a new idea*) and as an outcome (*a value-adding object like changed routine or product prototype*).

Knowledge audits to measure organisation's KM initiatives are normally carried out to assess the kind of knowledge is needed, available, missing, applied and contained within the organizations. This requires finding out source of knowledge, kind of knowledge its people possess and its quality, and the infrastructure that unites culture and business needs by identifying the processes KM should focus upon. It starts with finding out the knowledge

needed and how further could it be developed, transferred, used and measured (Levy *et al.*, 2010).

Mostly, measuring the knowledge emphasizes on four areas – 1) top and down monitoring and facilitation of knowledge related activities; 2) creation and maintenance of knowledge infrastructure; 3) renewal, organisation and transformation of knowledge assets; and 4) leverage of knowledge assets for value (Ajmal, Helo and Kekale, 2010). Ambos and Schlegelmilch (2009) recommends measuring the usage of documents in knowledge repositories (like number of documents read or the adoption of content from documents); assessing the number of contributions and reviews; quality of stored objects; actions taken on knowledge shared and how it is used; and the return on investment in terms of revenue, time and cost saved.

Chua and Lam (2005) has given three criteria as measurement for knowledge. These are – 1) growth in the resources (multiplication in human capital, increase in knowledge assets); 2) growth in volume of knowledge content and usage (number of documents added, searched, discussed in the repositories); and 3) evidence of increase in financial returns. Thus, KM failure can be described as the practice that has few or none of the above characteristics. But the above criterion does not reflect upon causes of failure or how these factors have been measured to rate the impact in some order.

Gooijer (2000) has described some performance indicators to measure the knowledge management practice based on the link between knowledge management objectives and the performance policy framework. This has been presented in figure 5. These performance indicators have objectives to increase the collaboration and capacity, and building awareness about knowledge management tools, processes and practice. The objectives are achieved through formal and informal networks and the number of participants using these networking rooms (like CoP or the intranet). The organisation could monitor the increase in the size of the participants or in number of rooms. This is directly related to the use of knowledge management tools and adoption of KM as practice. This can be measured further as number of documents uploaded, read or commented as useful, increases in the number of the contributors and reviewers etc.

Key result area			
Objectives	Expected outcome	Initiatives	Performance indicators
<i>Stakeholders: relationships</i>			
To increase the capacity for integration and collaboration	Changed behaviours % increase in inter-organisational communications	Encourage more formal and informal networks using team rooms	No. of team rooms and participants in each
<i>Internal business processes: information infrastructure (technology and content)</i>			
To build awareness amongst all staff of knowledge management tools, processes and practices	Awareness and understanding All staff are familiar with the concepts and practices of knowledge management Use of tools, information, knowledge Increase in use of knowledge management tools and adoption of knowledge management practices	FAQ page on knowledge management is placed on intranet All staff attend awareness training in knowledge management tools Knowledge management team room is established and attracts growing number of members	Metrics on use of FAQ page and refreshment rate of its contents No. of staff trained No. of participants in and contributions to knowledge management team room discussions and documents

Figure 5: Knowledge Management Performance Indicators

After review of literature on the above 3 stages of knowledge lifecycle and brief discussion on various methods on measuring knowledge, next section presents an account of knowledge management in Indian commercial banks. It becomes significant to discuss knowledge-based developments in banking sector since this research uses Indian commercial banks as case to describe how banks can rate strategic value of their knowledge for improving their KM-based competitiveness. In other words, Indian commercial banking sector has been taken as an example to show how knowledge can be measured using knowledge lifecycle model.

3. Knowledge-based Development in Indian Banking

Information-based developments are pushing Indian economy to maintain competitiveness increasingly. Apparently, the role of knowledge application and its dissemination for commercial and social activities for national competitiveness has grown multifold. National policies centered on enhancing productivity and growth rate are demanding knowledge

intensive activities (Chandra and Khanijo, 2011). One such area is Indian commercial banking sector wherein financial reforms as a national policy has played key role in regulating the country's financial health and safety. In India, knowledge management-based development has primarily started with corporate (private) sector and now being adopted by the public sector increasingly. Technology and service – are recognized as its main drivers where multiple technologies are woven into different levels of management structures to create foundation for knowledge society. Knowledge is created into skill to initiate action which becomes a real capital.

Chattopadhyay, Krishna and Singh (2011) have highlighted that knowledge needs to be a part of dynamic system through networks (called as community of practices) that ensures linkages among the people who utilize this knowledge for organisation's development. This is how individuals in the communities are empowered to develop competencies to meet their personal, economic, social and environmental needs. But for such networks to work and linkages and become successful, 'self-organisation' will be important rather than relying upon technology alone. What should be shared and what should not, flexibility, greater tolerance for trial and error are deeper issues in knowledge management than use of hardware, software and technical knowledge. Such issues can be tackled by self-organisation promotion that requires understanding of cultural and social factors impacting knowledge networks (Sankaran, 2011).

For last two decades, Indian banks have been busy in computerizing their manual processes to meet international standards like BASEL norms as part of banking sector reforms. These reforms demand paradigm shifts in manpower policy, rationalization of business operations, and rapid use of technology (Mohan, George and Nedelea, 2006). This has resulted in creation of multiple information systems processing various data that has led to 'information overload' over a period of time. Banks therefore, require measuring their knowledge assets that differentiate them, yield competitive advantage and bring operational efficiency. Second, banks have learned that tangible assets can help up to a certain extent and realized that they need a broader range of resources to compete and succeed. That is why a number of organisations are now increasingly looking at exploring intangible assets that are mostly left idle, unexplored and unmanaged (Ali and Ahmad, 2006). Third reason is statutory obligations imposed on banks for compliance to risk management. Like every business, bankers are also under pressure to deliver. The enormous amount of responsibility (of economic reconstruction) that is entrusted upon banks makes it hard taking decisions of large financial

implications. Baruah (2008) suggests that the Indian banking need to explore knowledge on risk management while dealing with larger volume of business. Knowledge (management) while has eased this to a great extent; it has in other sense increased the knowledge level manifold complicating the knowledge needs of the banks. While knowledge is very essential, the positive application of knowledge management is most essential. KM in banks thus, can help them become competitive on products and pricing to attract new customers and retain existing, manage their financial resources and networks well for greater business value, and adapt fast to the changes in their regulatory environment for minimizing banking risks (Goyal, 2007).

In nutshell, banking has been deemed as riskiest business that has effects on economy while knowledge has been recognized as engine for growth. Through information, the banks mitigate risks, turning information into required knowledge using collection, compilation, analysis of its massive data. Analyzing volumes of data and information for new products, services and strategies for growth, knowledge management can help banks increasing their capacities. Creating, sharing and applying knowledge helps banks connect its knowledge sources.

The next section deals with a description of the methodology employed in this study to measure the elements of knowledge lifecycle for Indian banks.

4. Research Methodology

This study has been conducted as part of the doctoral research work in KM. The research centers around measuring the strategic value of knowledge based on knowledge creation abilities of Indian commercial banks. Knowledge has become more valuable than labour and capital (Kumar, Sinvhal and Nangia, 2011) and the transition is taking place from industrial to knowledge economy where knowledge assets derive sustainable business advantage (Prakash, 2011). This change is apparent because knowledge as human capital is being viewed as more an (intellectual) asset than labour or capital. Organisations have started looking at KM as a strategy for dealing with global competition. It is chiefly because knowledge has an important role in considering the direction in which the organisations and society should move.

In nutshell, an organisation must ask itself three questions:

1. What elements define knowledge in their organisation?

2. What is the contribution of each element in building knowledge?
3. And, how these elements must be arranged in order to meet strategic knowledge requirements?

These questions as to creation of knowledge and its management are debatable for long. This research attempts to examine these questions using Indian commercial banking sector as case example. The objective is to find out contribution of knowledge lifecycle elements in banks that will enable banks to analyze their composition of knowledge to meet their knowledge requirements and enhance/sustain competitiveness.

The research involved a quantitative research method empirical in nature where relationships are determined using numeric data that allow for presenting and interpreting it. Survey method is used to assist in determining the results. The survey was presented to experienced knowledge management professionals in commercial banks in India mostly at middle senior levels in commercial banks to reflect their attitudes and opinions. 5 point based Likert-type rating scale was used to specify the level of importance against each item on the questionnaire. Likert-type attitude scale is a valid and reliable survey instrument for the measurement of attitudes and consists of a series of declarative statements. It is relatively uncomplicated method of obtaining data on people's attitudes, lets the respondents give self-reported behaviours. As per the requirement of this research, 5-point based interval measurement scale has been designed which denote scores between 1 and 5, where 1=strongly disagree, 3=slightly disagree, and 5= strongly agree. The respondents were asked to rate their opinion on the survey items/ statements. The survey had 7 items and 30 statements that represent knowledge lifecycle. The survey questionnaire is adapted from *Knowledge Management Fieldbook* by Wendi and Bukowitz (1999), and *OECD Knowledge Management Project*. The survey items and the scale of questionnaire have been generalized as per the requirements of study. All survey items were validated in the light of the Indian banking sector using sigma 2-tailed correlations and negative correlations were removed before proceeding to Confirmatory Factor Analysis (CFA) to quantify the contribution of each manifest variable/survey item through path-scores. The data collection took place in the second quarter of year 2010. The survey instrument was mainly administered electronically using survey link and wherever required, personally as well. Request through e-mails were sent to the banks on their corporate websites/e-mail to participate in the survey along with the survey-link followed by reminder e-mails first after 10 days and then again after 5 days.

Respondents were also requested to give references to collect more samples of banking professionals in KM roles. 360 respondents in about 26 different banks were contacted for response out of which only 164 qualified responses were received with validity to proceed for data analysis. Qualified response means survey questionnaire duly filled with the all information required except wherever indicated optional. As per the research ethics complete anonymity was maintained about the respondents and therefore, both name of the respondents and the banks were kept optional. Further all the elements of biasness were observed while collecting and tabulating data for error-free results.

Banks have been considered as a case example for the purpose of this study for primarily 3 reasons. First, with computerization of banks as part of financial reforms and its integration towards core banking solutions; banking has come a long way that manages a volume of codified knowledge on its multiple products, services and customers across different service channels. Second, with international norms like BASEL the demand for better technological infrastructure to meet the competitiveness in financial services industry is rising upwardly. Third, risk management is another area that has statutorily required banks to document its processes (service point interactions) and systems (technology, software etc.) for compliance management.

5. Research Question

Based on the research model described as in figure 1, research question can be summarised as below.

To examine the knowledge lifecycle that is the contribution of obtain, use, learn, share, assess, build and divest in developing knowledge in the banks.

The associated hypotheses to the research question can be stated as below:

H₀₁: Each element of knowledge lifecycle has contribution in developing knowledge in banks.

H₀₂: Each element has an equal contribution in developing knowledge in banks.

Hypotheses assume that every element of knowledge lifecycle i.e. obtain, use, learn, share, assess, build and divest contributes in developing knowledge in the banks and that these elements contribute proportionally equal in the development of knowledge. A null hypothesis describes 'no significant relationship' exists between the variables of the study. If proves true, it would mean that elements of knowledge lifecycle have no contribution in developing knowledge in banks. However, this acceptance or rejection of hypothesis can only said to be

valid for Indian commercial banks and only for the present study and may not hold true for other sectors/ organisations.

A qualified sample of 164 respondents is obtained from 26 commercial banks mostly comprising of foreign-private and Indian private banks. All respondents are knowledge management professionals however with different functions and roles. 47% respondents have KM role with 21% in Information Technology (IT) profile, 37% respondents are Knowledge Managers, followed by 35% that are Group or Dept. Head/ Mgr. positions and 17% with KM role but not at managerial level. The total population size considered for the study was a total of 3 public sector banks, 14 private and 9 foreign banks who are implementing knowledge management – fully or partially (say for a specific function/group/activity). The quantity of sample was decided based on data analysis requirements for Confirmatory Factor Analysis (CFA) in Structural Equation Modeling (SEM) using Lisrel software. Use of CFA is justified because research variables are latent in nature. Latent variable means its measurement cannot be done directly but through some indicators. Indicators are *observed variables*, or commonly called as *manifest variables*, that are listed as items on survey instrument. These are shown in the *annexure*. Measures of fit taken are *Chi-square* value, *P-value*, and *Root Mean Square Error of Approximation* (RMSEA). Small chi-square corresponds to good fit and a large chi-square to bad fit (Jöreskog and Sörbom, 1989). RMSEA is a measure of discrepancy per degree of freedom, which is calculated using this equation:

$$\varepsilon = \sqrt{\frac{\hat{F}_0}{d}} \quad \text{where } \hat{F}_0 = \text{Max}\left\{\hat{F} - \frac{d}{N-1}, 0\right\}$$

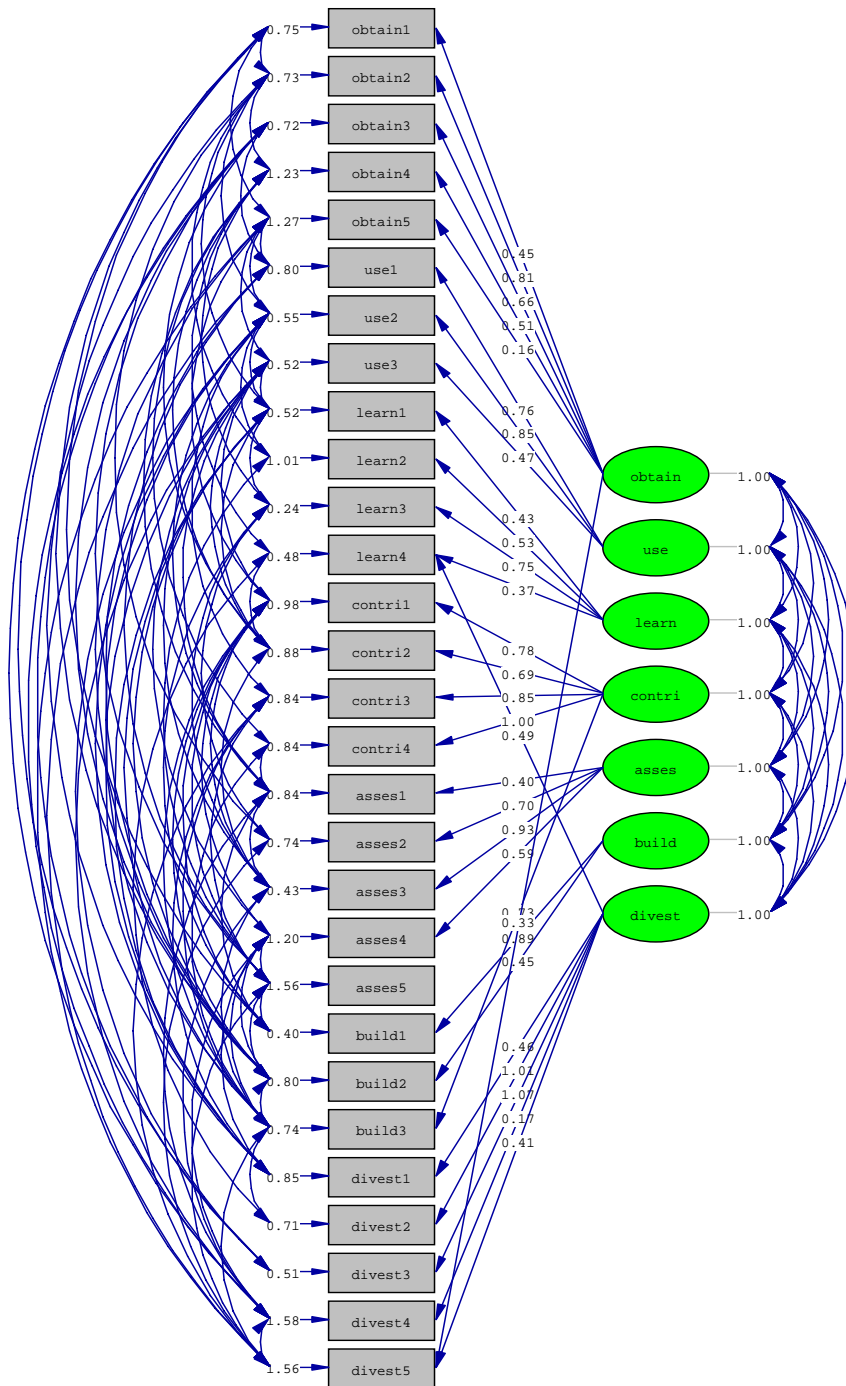
\hat{F} is minimum value of the fit function and d is degree of freedom. RMSEA value of $\varepsilon \leq 0.05$ indicates a ‘close fit’, while values up to 0.08 indicate ‘reasonable’ errors of approximation in the population however RMSEA values of 0 indicate perfect fit. P-value is another fit of measure. Value above 0.05 indicates good measure. Perfect measure is obtained when p-value is 1.0000.

6. Research Analysis

To analyse the research question it is first required that we validate each element of Knowledge Lifecycle for the banks using measure of ‘goodness of fit’ that are *chi square*, *p-value* and *RMSEA*. To represent the analysis, the model validation for elements of knowledge lifecycle is given in figure VI. From the figure, it is clear that P-value is 0.057 which indicates

a good measure of fit to the model. RMSEA is 0.03 that is lower than 0.05, which indicates close-fit to the model. It means that the model overall fits well to the data. In other words, all the 7 items grouped under 30 statements used on the survey questionnaire are valid elements of knowledge lifecycle (*see annexure*) for banking.

As based on *P-value* (0.05) and *RMSEA value* (0.03), CFA proves that all manifest variables are valid measurement (good measure of fit) to the main (independent) variable *Knowledge Management*. The path coefficient shows contribution of each manifest variable in developing knowledge management model for banks. It can be interpreted, as for an example, that *Obtaining Knowledge* in banks is composed of manifest variables - *obtain1* (0.45), *obtain2* (0.81), *obtain3* (0.66), *obtain4* (0.51) and *obtain5* (0.16) and the contribution of the manifest variable *obtain2* is the highest which means *banks' employees routinely document and share information about their expertise*. It means obtaining knowledge in banks depend upon documenting and sharing their expertise with each other. And increasing every one unit of *obtain2* will increase 0.81 units in 'obtaining knowledge' for banks and thus, contributes in developing knowledge management model. Accordingly, the banks can decide which component to develop, drop or re-structure. Similarly, the path coefficient values for other latent variables show their respective contribution in developing KM model for Indian commercial banks.



Chi-Square=303.32, df=266, P-value=0.05744, RMSEA=0.030

Figure 6: Model Validation for Knowledge Lifecycle Elements

The highest contributor in *Using Knowledge* is *use2* (0.85) which means *banks involve customers (knowledge) in developing new products/ services*. In the same way, *learn3* (0.75)

contributes highest to *Learning from Knowledge* that confirms the Banks' use of knowledge (*as in use2*) mostly includes *gathering feedback from customers as part of learning process*. Thus, knowledge use and learning from knowledge greatly involves customers in case of banks. Increment of one unit each will increase the contribution of *Using Knowledge* and *Learning from Knowledge* by 0.85 and 0.75 units respectively. It is also that *learn4* contributes to '*Divesting Knowledge*' as per the coefficient path, and therefore is a manifest variable of *Divesting Knowledge*.

In the similar way, the score for *contri4* (1.0) in *Contributing to Knowledge* is the highest. It denotes that *electronic tools are seamlessly integrated into work activities of people for contributing to the knowledge*. This is followed by *contri3* (0.85) that reflects *knowledge seeking (or sharing) behavior is linked to the performance appraisal system* which contributes to the knowledge in banks. For *Assessing Knowledge*, *asses3* (0.93) contributes highest which means *people understand what measures are used to monitor the knowledge and its results*. This is in line with the point above and supports the argument that the contribution to knowledge majorly takes place when linked to appraisal system. And for that to happen, people must know how their knowledge will be monitored and what results to expect for sharing their knowledge.

In *Building Knowledge*, the highest contributor is *build3* (0.89) which confirms that banks have *experts appointed to lead knowledge management effort*. However *build3* (0.73) is manifest variable not just for *Building Knowledge* but for '*Contributing to Knowledge*' also as the path coefficient shows. In fact similar results are shown by *divest5* which is the last component of the KM process (or knowledge lifecycle). It also contributes (0.33) in *Obtaining Knowledge* besides contributing (0.41) to *Divesting Knowledge*. But, *divest1* (0.46) has the highest contribution that denotes banks *acquire knowledge based on how much can be leveraged*. This point in turn supports the fact that – 1) only meaningful information can be taken as knowledge; and 2) simply piling up the information without use will not build the knowledge, and in the absence of 'no knowledge', contribution to knowledge cannot be made and hence, the impact on performance appraisal.

Decision towards the hypothesis can be tested based on p-value from the data analysis of elements of Knowledge Lifecycle which means our first hypothesis - *each element of knowledge lifecycle has contribution in developing knowledge in banks* – stands accepted.

But the other hypothesis - *each element has an equal contribution in developing knowledge in banks* – will be rejected.

7. Concluding Results

This section lists down what the results mean for Indian banking, particularly for those deciding to implement knowledge management. One layer of knowledge management practice is knowledge lifecycle and each stage contributes to organisational performance. Successful organisations manage a continuous cycle of creating, managing and sharing knowledge. This cyclical loop or process broadly is referred to as ‘knowledge lifecycle’. As a process it helps leverage the knowledge between those who possess it and those who use or develop it to add value to it.

Results conclude that to obtain knowledge, banks routinely document and share information, involve customers in developing new products or services, and learn by gathering feedback from them. To contribute to knowledge, knowledge seeking and sharing behaviour is linked with performance appraisal system. Experts that are appointed to lead the knowledge management efforts help in building knowledge in banks. The decision to acquire knowledge is based on how much a bank could leverage it. Further, its implications on the banks implementing KM as in case of this research and for banks that are interested in implementing KM is discussed in the section further. Accordingly, the banks could measure their strategic worth of knowledge. For example, *obtain5* with path coefficient score 0.16, contributes least in *Obtaining Knowledge* for banks while *obtain2* contributes the highest at 0.81. Interpreting it would mean that ‘*employees routinely document and share information about their expertise*’ contributes highest towards organisational knowledge in ‘obtaining knowledge’ stage of knowledge lifecycle while ‘*employees can quickly contact subject matter experts who play a role in identifying important information and tools for people to work*’ contributes the least. Hence, strategic worth of *obtain2* is higher than *obtain5*. Adding every one unit of *obtain5* will donate 0.16 units to obtaining knowledge stage of knowledge lifecycle, while every one unit of *obtain2* will just donate 0.81 units. This is how strategic worth of knowledge can be measured using knowledge lifecycle model. Now, if this fact is known to the banks, they would know which knowledge element at what knowledge lifecycle stage contributes more comparatively in building their organisational knowledge. Banks could therefore, know which knowledge elements to augment or drop or improve. Based on this, a

model could be prepared that segregates highest, medium and least contributing knowledge elements for each lifecycle. This has been shown in table 1 below.

Table 1: Rating Strategic Value of Knowledge (Elements) for Banks Using Knowledge Lifecycle Model

Knowledge Lifecycle Stages	High Strategic Value	Medium Strategic Value	Least Strategic Value
Obtaining Knowledge	Employees routinely document and share information about their expertise.	Information is easy to identify because everyone knows where to look for it.	Employees can quickly contact subject matter experts who play a role in identifying important information and tools for people to work.
Using Knowledge	Involve customer (knowledge) in developing new products/ services.	We give all promising ideas thorough consideration, no matter who they come from.	Mostly knowledge is used is to improve the value to the customer.
Learning from Knowledge	Our learning process often includes gathering feedback from customers.	Lessons learned (success or failure) from work experiences are documented to establish (or discard) practice.	People have some overlapping responsibilities, so that it is easier to learn from one another.
Contributing Knowledge	Electronic tools are seamlessly integrated into work activities of people for contributing to the	Knowledge seeking (or sharing) behavior is built into the performance appraisal system.	Organisation acknowledges individual contribution by linking name of the

	knowledge.		original author to the content, to publicly recognize.
Assessing Knowledge	People understand what measures are used to monitor the knowledge and its results.	Senior management assesses what knowledge needs to be developed.	We recognize customer knowledge as major strategic asset.
Building Knowledge	We have expert(s) appointed to lead our knowledge management effort.	It does not matter which group came up with an idea or technology, everyone collaborates to build it.	We find ourselves increasingly teaming up with other organizations to bring new/innovative products to market.
Divesting Knowledge	We routinely examine whether we are supporting non-strategic knowledge at the expense of strategically critical knowledge.	We evaluate strategic importance of knowledge in financial projections.	We outsource skills and expertise that do not support our core competencies.

8. Conclusion &Repercussions on Banking Sector

Staff in the banks obtains knowledge by routinely documenting and sharing their expertise and best part is people know where to look for this information. It proves that documenting and sharing (i.e. managing knowledge) isn't enough, people should also know where and how to retrieve it (i.e. sharing and creating knowledge). This reflects that banks have a value system intended to promote knowledge sharing. Alternatively the banks have also appointed the experts to lead their knowledge management efforts and staff can contact these experts for the information required but they don't seem to contact experts for help in identifying the information or tool they need. It is because banking staff believes that real experts are always too busy to help. Hence, in such a case it becomes responsibility of the bank staff to take ownership of their own learning and demonstrate it through sharing it which is not really

much evident in banks. For this to happen, staff must have appropriate technological skills and sufficient expertise so that staff could identify information by searching for it over a wide variety of applications and databases.

Mostly the use of knowledge involves customers to develop new products and services for them which should rather be focused around improving the value to the customer (and not just introducing the new products or service). In fact, using customer knowledge to develop new product or services can be seen as a subset of customer value. In other words, improving value to customers (high customer value) automatically increases the customer satisfaction that causes increment in the number of products and services. Learning from knowledge in banks often includes gathering feedback from customers but generally do not involve applying the ideas developed in the past to new situations. That means knowledge developed in the past remains un-used which is contrary to the principal of knowledge management that bars organisations from 're-inventing the wheel'. Not applying the practices learned in the past would mean not using the best practices in work routines and more liable to repeat mistakes of the past. Also stocking the information that remains un-used (for long) will be a cost burden and therefore the assessment of right knowledge makes good sense not just for the banks but for all. Not all the knowledge can be used and it is therefore banks first assess their use of knowledge depending upon how much of it can be leveraged by them. But to assess it right, banks must have clear understanding of its knowledge orientation.

Banks have electronic tools integrated seamlessly to their staff work activities that contributes to knowledge. This contribution to knowledge in banks has been linked to performance appraisal system of the staff to inculcate the knowledge sharing behaviour. Like for example, banks measure the increment in the ability of the people to capture, use and share knowledge vertically and horizontally. The staff knows how their contribution will be monitored and what will be its results. Ironically, the banks do not seem to place much emphasis on having written policies and strategies for knowledge sharing. One step in this direction could be measuring the increment in employee satisfaction with KM use. It becomes difficult when staff sees KM as an additional function separate from work.

These repercussions as an outcome of the results provide learning for banks implementing KM, to improve their competitiveness, and serve as foundation for banks looking forward to implement KM.

References

- Ajmal, Mian; Helo, Petri and Kekale, Tauno (2010), Critical Factors for Knowledge Management in Project Business, *Journal of Knowledge Management*, 14(1),156-168.
- Abou-Zeid, El Sayed (2002), A Knowledge Management Reference Model, *Journal of Knowledge Management*, 6(5),486-499.
- Ali, HafiziMuhamad and Ahmad, Nor Hayati (2006), Knowledge Management in Malaysian Banks: A New Paradigm, *Journal of Knowledge Management Practice*,7(3)Accessed Online <http://www.tlainc.com/articl120.htm> on May 5, 2011.
- Ambos, Tina C. and Schlegelmilch, Bodo B. (2009), Managing Knowledge in International Consulting Firms, *Journal of Knowledge Management*, 13(6), 491-508.
- Assudani, Rashmi H. (2009), Dispersed Knowledge Work – Implications for Knowledge Intensive Firms, *Journal of Knowledge Management*, 13(6), 521-532.
- Baruah, Samir (2008), Managing Knowledge in Banks: An Introspection Based Experience, *Cab Calling*, October-December, 30-33.
- Birkinshaw, J. and Sheehan, T. (2002), Managing the Knowledge Life Cycle, *MIT Sloan Management Review* (Fall), 75-83.
- Bhatt, Ganesh (2000), Organizing Knowledge in the Knowledge Development Cycle, *Journal of Knowledge Management*, 4(1), 15-26.
- Bollinger, Audrey S. and Smith, Robert D. (2001), Managing Organizational Knowledge as a Strategic Asset, *Journal of Knowledge Management*, 5(1), 8-18.
- Bukowitz, Wendi R. and Williams, Ruth L. (1999),*The Knowledge Management Fieldbook*, Financial Times Prentice Hall, London.
- Carlile, P. R. andRebentisch, E. S. (2003), Into the Black Box: The Knowledge Transformation Cycle, *Management Science*, 49(9),1180-1195.
- Carrillo, Francisco Javier (2009), Demarcation and Levels of Analysis in Knowledge Based Development, *Journal of Knowledge Management*, 13(5),208-213.
- Chandra, Ashoka and Khanijo, M.K. (2011), *Knowledge Economy: The Indian Challenge*, Third Printing, Sage Publications,New Delhi.
- Chattopadhyay, Arundhati, Krishnan, G.S. and Singh, U.S. (2011), *International Networking for Knowledge Management*, In: Chandra, Ashoka and Khanijo, M.K. (2011), *Knowledge Economy: The Indian Challenge*, Third Printing, Sage Publications,New Delhi.
- Chua, Alton and Lam, Wing (2005), Why KM Projects Fail: A Multi Case Analysis, *Journal of Knowledge Management*, 9(3), 6-17.
- Curado, Carla (2008), Perceptions of Knowledge Management and Intellectual Capital in the Banking Industry, *Journal of Knowledge Management*, 12(3), 141-155.
- Davenport, Thomas, Long, David De and Beers. (1998), *Successful Knowledge Management Projects*, *Sloan Management Review* (Winter), 43-56.
- Despres, Charles and Chauvel, Daniele (1999), Knowledge Management(s), *Journal of Knowledge Management*, 3(2), 110-120.
- Dunford, Richard (2000), Key Challenges in the Search for the Effective Management of Knowledge in Management Consulting Firms, *Journal of Knowledge Management*, 4(4), 295-302.
- Dutt, Himanshu, Jha, VidhuShekhar and Qamar, Furqan, (2010) Critical Analysis of Knowledge Constituents and Impact on Organizational Knowledge Orientation - An Exploratory Study, *IIMS Journal of Management Science*, 1(2), 93-105.
- Eppler, Martin A. and Burkhard, Remo A. (2007), Visual Representations in Knowledge Management: Framework and Cases, *Journal of Knowledge Management*, 11(4), 112-122.
- Goyal, O.P. (2007), *Knowledge Management: Analysis and Design for Indian Commercial Banking System*, Kalpaz Publications, India.

Guns, Bob (1998), The Chief Knowledge Officer's Role: Challenges and Competencies, *Journal of Knowledge Management*, 1(4), 315-319.

Hatten, K. J. and Rosenthal, S. R. (2002), Knowledge Management: Creating a Knowledge Culture, *Ivey Business Journal*, September-October, 1-5.

Hult, G. and Thomas M. (2003), An Integration of Thoughts on Knowledge Management, *Decision Sciences*, 34(2), 189-195.

Hussi, Tomi (2004), Reconfiguring Knowledge Management – Combining Intellectual Capital, Intangible Assets and Knowledge Creation, *Journal of Knowledge Management*, 8(2), 36-52.

Jasimuddin, Sajjad M. (2008), A Holistic View of Knowledge Management Strategy, *Journal of Knowledge Management*, 12(2), 57-66.

Jöreskog, K.G. and Sörbom D. (1989), LISREL 7-A Guide to the Program and Application, SPSS Publication, Chicago.

Junnarker, Bipin and Brown, Carol V. (1997), Re-assessing the Enabling Role of Information Technology in KM, *Journal of Knowledge Management*, 1(2), 142-148.

King, W. R.; Marks, P. V. and McCoy, S. (2002), The Most Important Issues in Knowledge Management, *Communications of the ACM*, September, 45(9), 93-97.

Kumar, Vinod; Sinval, Harsha and Nangia, Vinay K. (2011), Mapping the Directions of Transition from Industrial Economy to Knowledge Economy, In Chandra, Ashoka and Khanijo, M.K. (2011), *Knowledge Economy: the Indian Challenge*, Third Printing, Sage Publications, New Delhi.

Liebowitz, J. (2004), A Knowledge Management Strategy for the Jason Organization: A Case Study, *Journal of Computer Information Systems (Winter)*, 1-5.

Lam, Alice and Lambermont-Ford, Jean-Paul (2010), Knowledge Sharing in Organisational Contexts: A Motivation-based Perspective, *Journal of Knowledge Management*, 14(1), 51-66.

Lang, Josephine Chinying (2001), Managerial Concerns in Knowledge Management, *Journal of Knowledge Management*, 5(1), 43-57.

Levy, Meira; Hadar, Irit; Greenspan, Steven and Hadar, Ethan (2010), Uncovering Cultural Perceptions and Barriers During Knowledge Audit, *Journal of Knowledge Management*, 14(1), 114-127.

Long, L. D. and Seemann, P. (2000), Confronting Conceptual Confusion and Conflict in Knowledge Management, *Organizational Dynamics*, 29(1), 33-44.

Madhvan, R. and Grover, R. (1998), From Embedded Knowledge to Embodied Knowledge: New Product Development as Knowledge Management, *Journal of Marketing*, 62 (October), 1-12.

Mahesh, Kavi and Suresh, J.K (2009), Knowledge Criteria for Organization Design, *Journal of Knowledge Management*, 13(4), 41-51.

Metaxiotis, Kostas; Ergazakis, Kostas and Psarras, John (2005), Exploring the World of Knowledge Management: Agreements and Disagreements In the Academic/Practitioner Community, *Journal of Knowledge Management*, 9(2), 6-18.

Mitchell, Rebecca and Boyle, Brendan (2010), Knowledge Creation Measurement Methods, *Journal of Knowledge Management*, 14(2), 67-82.

Mohan, K.; George, Babu P. and Nedelea, Alexandru (2006), A Study of E-enabled Knowledge Management in Selected Indian Banks, *The Annals of the Stefan cel Marie*, 1(1), 42-53.

Murray, P. (2002), Knowledge Management as a Sustained Competitive Advantage, *Ivey Business Journal*, March-April, 71-76.

Nonaka, Ikujiro and Takeuchi, Hirotaka (1995), *The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, USA.

OECD Knowledge Management Project accessed online from

http://www.oecd.org/document/16/0,3746,en_2649_39263294_2756624_1_1_1_1,00.html on 14, April, 2007.

Ofek,

Ofek, E. and Sarvary, M. (2001), Leveraging the Customer Base: Creating Competitive Advantage Through Knowledge Management, *Management Science*, 47(11), 1441-1456.

Prakash, Ravi (2011), Knowledge Management in Manufacturing Organisation, In Chandra, Ashoka and Khanijo, M.K. (Eds.), *Knowledge Economy: The Indian Challenge*, Third Printing, New Sage Publications, Delhi.

Quinn, J.B. (1992), *Intelligent Enterprise*, Free Press, New York.

Riege, A. (2005), Three Dozen Knowledge Sharing Barriers Managers Must Consider, *Journal of Knowledge Management*, 9(3), 18-35.

Salisbury and Plass. (2001), A Conceptual Framework for Knowledge Management System, *Human Resource Development International*, 4, 451-464.

Salisbury, Mark W. (2003), Putting Theory Into Practice to Build Knowledge Management Systems, *Journal of Knowledge Management*, 7(2), 128-141.

Sankaran, K. (2011), Sensitivity to Self-Organization and Effectiveness of IT Networks in the Social Sector, In Chandra, Ashoka and Khanijo, M.K. (2011), *Knowledge Economy: The Indian Challenge*, Third Printing, Sage Publications, New Delhi.

Senge, Peter (1990), *The Leader's New Work: Building Learning Organizations*, *Sloan Management Review*, 32, 7-23.

Sharma, N.L and Goswami, Susobhan (2009), The Nuances of Knowledge Creation and Development in Indian Pharmaceutical Industry, *Journal of Knowledge Management*, 13(5), 319-330.

Sharp, Peter (2006), MaKE: A Knowledge Management Method, *Journal of Knowledge Management*, 10(6), 100-109.

Singh, Sanjay Kumar (2008), Role of Leadership in Knowledge Management: A study, *Journal of Knowledge Management*, 12(4), 3-15.

Sussman, S. W. and Seigal, W. S. (2003), Informational Influence in Organizations: An Integrated Approach to Knowledge Adoption, *Information Systems Research*, 14(1), 47-65.

Ulrich, D. (1998), Intellectual Capital = Competence x Commitment, *Sloan Management Review* (Winter), 15-26.

Vorakulpipat, Chalee and Rezgui, Yacine (2008), An Evolutionary and Interpretative Perspective to Knowledge Management, *Journal of Knowledge Management*, 12(3), 17-34.

Wiig, Karl M. (1999), What Future Knowledge Management Users May Expect, *Journal of Knowledge Management*, 3(2), 155-165.

Zack, M. H. (2003), Rethinking the Knowledge-Based Organization, *MIT Sloan Management Review* (Summer), 67-71.

Annexure –Elements of Knowledge Lifecycle Model Used for Research

Survey Items	Statements
1.	Obtaining Knowledge:
obtain1	Employees provide complete explanations when they make information requests.

obtain2	Employees routinely document and share information about their expertise.
obtain3	Information is easy to identify because everyone knows where to look for it.
obtain4	Employees can search for information across a wide variety of applications and databases.
obtain5	Employees can quickly contact subject matter experts who play a role in identifying important information and tools for people to work.
2.	Using Knowledge:
use1	We give all promising ideas thorough consideration, no matter who they come from.
use2	Involve customer (knowledge) in developing new products/ services.
use3	Mostly knowledge is used is to improve the value to the customer.
3.	Learning from Knowledge:
learn1	People apply the ideas they developed in past work situations to new ones.
learn2	Lessons learned (success or failure) from work experiences are documented to establish (or discard) practice.
learn3	Our learning process often includes gathering feedback from customers.
learn4	People have some overlapping responsibilities, so that it is easier to learn from one another.
4.	Contributing Knowledge:
contri1	Dedicated roles, such as knowledge manager or coordinator, support the knowledge sharing.
contri2	Organisation acknowledges individual contribution by linking name of the original author to the content, to publicly recognize.
contri3	Knowledge seeking (or sharing) behavior is built into the performance appraisal system.

contri4	Electronic tools are seamlessly integrated into work activities of people for contributing to the knowledge.
5.	Assessing Knowledge:
asses1	We recognize customer knowledge as major strategic asset.
asses2	Senior management assesses what knowledge needs to be developed.
asses3	People understand what measures are used to monitor the knowledge and its results.
asses3	We rely on experts, such as knowledge manager or knowledge coordinator, who has expertise to assess our knowledge-based assets and its results.
asses4	We have been practicing knowledge management without calling it that.
6.	Building Knowledge:
build1	It does not matter which group came up with an idea or technology, everyone collaborates to build it.
build2	We find ourselves increasingly teaming up with other organizations to bring new/innovative products to market.
build3	We have expert(s) appointed to lead our knowledge management effort.
7.	Divesting Knowledge:
divest1	Our decision to acquire knowledge is based on how much we can leverage it.
divest2	We evaluate strategic importance of knowledge in financial projections.
divest3	We routinely examine whether we are supporting non-strategic knowledge at the expense of strategically critical knowledge.
divest4	We outsource skills and expertise that do not support our core competencies.
divest5	We regularly review our promotion practices to make sure that we are not losing people with strategically important knowledge.