CHAPTER 2
REVIEW OF LITERATURE

In this chapter, earlier studies carried out by various researchers have been discussed under various categories in order to have a complete understanding about the subject and research carried out up to this time.

2.1 HISTORICAL PERSPECTIVE

Knowledge has been a part of this world since man’s inception. Ancient Greek and Hindu texts were the first evidence of codification of knowledge. In the area of management it was Fredrick Taylor (1911) who made an attempt to formalize workers’ experience and tacit skills into objective rules and formulae.

Schumpeter (1934) attributed the emergence of new products and processes to new recommendations of knowledge. Bernard (1938) extended the concept of scientific management by including Behavioral Knowledge in management process. Simon (1945) studied the nature of decision making while performing administrative functions. Further he recognized the limitations of human cognitive functioning and coined the term Bounded Rationality i.e. while traditional inputs of capital are limited by physical space/ monetary constraints; the intellectual capital generation may be limited by the collective Bounded Rationality of the organization.

Penrose (1959) took resource based view of the firm while emphasizing the importance of experience and knowledge accumulated in it. It was then that the organization came to be considered as a Knowledge Repository.
Polanyi (1966) distinguished between tacit knowledge and explicit knowledge. Tacit knowledge is personal, context specific, and therefore hard to formalize and communicate. It basically lies within the mind of an individual. Explicit knowledge refers to the knowledge that can be expressed in words and numbers but represents only the tip of the iceberg of the entire body of knowledge. In words of Polanyi, “we can know more than we can tell”. In traditional epistemology, knowledge derives from the separation of the subject and the object of the perception. Human beings are the subjects of perception who acquire knowledge by analyzing external objects. In contrast to this Polanyi argues that human beings create knowledge by involving themselves with the objects, that is through self involvement and commitment or what he calls is *indwelling*. This indwelling breaks the traditional dichotomies between mind and body, reason and emotion, subject and object and knower and the unknown. Therefore scientific objectivity is not a sole source of knowledge. Much of our knowledge is the fruit of our own purposeful endeavors in dealing with the world.

Nelson and Winter (1982) contended that knowledge is stored as regular and predictable behavioral patterns and routines. They also introduced Poliyani’s tacit-explicit distinction in their evolutionary theory of the firm. Later theories were developed in the field of strategy which proposed that firm level differences in knowledge do exist and these differences also play a large role in determining economic performance of a particular firm (Ansoff; 1965, Andrews; 1971,).

Brown and Duguid (1988) opine that knowledge does not flow easily inside the firms. Barriers appear to exist between departments and divisions, between inside and outside and among individuals. They pointed
out that knowledge often lies not with individuals but is distributed among an ensemble of people working together.

Peter Drucker (1988) states, “We are entering the knowledge society in which the basic economic resource is no longer capital or natural resources or labour but is and will be knowledge and where knowledge workers will play a central role”. He further suggests that one of the most important challenges for every organization in the knowledge society is to build systematic practices for managing the self transformation. “The organization has to raise the productivity of knowledge and knowledge workers to meet the challenge”. Introducing the term “knowledge society” in 1992 Drucker argues that in the future, knowledge will represent the primary resource for individuals and for the economy overall. Land, labor, and capital become secondary since, with specialized knowledge, organizations can easily obtain these resources.

Prahlad and Hamel (1990) talk about value creation. The ability to build and leverage the value of the intangible assets constitutes a core competency for organizations, especially those providing financial and professional services in these knowledge intensive organizations, processing knowledge is central to business success.

Quinn (1992) argues that successful companies of the 90’s – whether in manufacturing or services will derive competitive edge not from superior product but from deep understanding of a few highly developed knowledge and service based on Core Competencies. In the book entitled, “Intelligent Enterprise” Quinn also states that Intelligent Enterprise will derive sustainable advantage from knowledge and service based activities that leverage intellectual assets. They will increase value through technological sophistication, better knowledge bases, more creative customer responsiveness and unsurpassed management of human and intellectual capital that competitors cannot reproduce. The study concludes that managers can obliterate overhead costs, smash bureaucracies, motivate personnel and create greater value for customers and shareholders alike by designing and benchmarking their knowledge and service based activities to be the best in the world.
Shein (1998) predicts that in no uncertain terms the future belongs to people who use their heads instead of their hands. He points out how countries like Korea and Singapore are educating their workers to new standards and how international competition in near future will be defined in terms of advantage in knowledge, a nation creates.

‘O’ Dell and Grayson (1998) explore how organizations conduct successful internal benchmarking for making improvement in identifying, sharing and using knowledge and “best practices” inside one’s organization. They opine about three themes related to internal benchmarking and transfer efforts. Firstly, internal transfer is people to people process and relationship seems to precede and to be required for meaningful sharing and transfer. Secondly learning and transfer is as interactive, ongoing and dynamic process that can not rest on a static body of knowledge. Employees invent, improvise and learn something new every day so the well spring of best practices should never run dry. And thirdly specific skills and capabilities are needed as a foundation. This includes a process improvement orientation, a common methodology for improvement and change, the ability to work effectively in team, the ability to capture learning and the technology to support cataloging and collaboration. Above all, successful transfer of best practices is linked to personal and organizational willingness and desire to learn. A vibrant sense of curiosity and deep respect and desire for learning from others are equally important for this.

Dhawan (1999) presents the preview of the concept of Knowledge Corporation and how half a dozen pioneering CEOs in India are already building them. Discussing “Knowledge Corporation” as a company where
knowledge of every individual is systematically transferred to a common pool for the benefit of entire organization, she cites Anderson consulting undoubtedly as one of the largest knowledge corporations in the world. Over the past two decades Anderson Consulting has overhauled their loose networking to create a formal structure for flow of knowledge within the organization. Its knowledge exchange seeks to capture, store and spread the learning generated internally and externally by its 3300 consultants across 47 countries. The article further makes indicative reference to tasks of building a knowledge corporation initiated by Indian Organizations such as Wipro Infotech, Sun Pharmaceuticals, Informix, Aptech, Arvind Mills, Hughes Software Systems, Armtrex Appliances etc.

Millan (1999) contends that today’s competitive edge comes from intellectual capital. In this post-industrial knowledge intensive hyper competitive global market era, a company must be able to harness its intellectual capital to gain an edge on tough competition. The challenge for managers is to develop the core competencies of intellectual capital company wide.

2.2 KNOWLEDGE CREATION, TRANSFER AND SHARING

Nonaka and Takeuchi (1995) introduced the model of knowledge creation in their famous book ‘The Knowledge-Creating Company’, central to which is an epistemological distinction between two kinds of knowledge, tacit and explicit. Explicit knowledge is knowledge that is easy to articulate and express formally and in clear terms. Tacit knowledge, which is more
important in creating innovations, is "personal knowledge embedded in individual experience and involves intangible factors such as personal belief, perspective, and the value system". Another fundamental point in this model is an "ontological" framework of four levels of "entities" that operate in knowledge creation: the individual, group, organizational, and inter-organizational levels.

According to Nonaka and Takeuchi, knowledge is created and transformed in an ascending process, or spiral, from the individual level to the group and organizational levels, and finally between organizations. The dynamics of this model arise from interaction between tacit knowledge and explicit knowledge. A "knowledge spiral" is grounded in four complementary types of knowledge conversion: (a) from tacit knowledge to tacit knowledge, or socialization; (b) from tacit to explicit knowledge, called externalization; (c) from explicit to explicit knowledge, or combination; and (d) from explicit to tacit knowledge, or internalization.

The knowledge creation spiral starts from socialization, sharing tacit knowledge and experiences at the group level. In this phase, a close interaction and collaboration within a group is needed. The aim of socialization process is to create common understanding and trust within the group. The next phase, externalization, is the central one in knowledge creation. In this phase, tacit knowledge is explicated and conceptualized by means of metaphors, analogies, and concepts. In this model, the basic source of innovation is tacit knowledge, which needs to be explicated in order to be transformed into knowledge that is useful at the levels of the group and the whole organization. At the combination stage, units of already-existing explicit knowledge are combined and exchanged. Finally, to
have real effects in an organization, the explicit knowledge of the group or organization must be internalized by individuals and transformed into tacit knowledge and into action through "learning by doing."

After internalization, a new round of the knowledge spiral will begin. Various examples of the importance of externalization of tacit knowledge for innovation in Japanese firms have been given in the book. Personal hunches must be convertible to explicit knowledge and shared with others to be fruitful.

Nonaka and Takeuchi also describe the development of a new type of urban car by Honda. Characteristic of this process were slogans and phrases (such as "Theory of Automobile Evolution") that were a form of explication of the personal hunches of various people.

From considering how automobiles (taken as living beings) would evolve emerged the concept of "Tall Boy" (a car that grows higher without becoming otherwise bigger) that provided a background for modern city cars. The slogans operated as ideals for the whole group of developers. In another example, an essential aspect of developing the automatic home bread-making machine was explication of the tacit knowledge of master bakers. Engineers and developers alone did not have success in constructing a machine that could bake tasty bread. To learn the skill of making bread, they apprenticed to a famous master baker. An important element of this process occurred when one of the developers was able to explicate a crucial aspect of baker’s kneading skill. After this explication, the knowledge could be built into the construction of the machine, although the effort was time consuming. The point is that explication of tacit knowledge was of crucial importance in the genesis of the innovation.
Boisot (1995, 1998) also points out that the knowledge creation process of a firm may be seen as a ‘social learning cycle’ (SLC) in which knowledge moves back and forth across three dimensions which make up the ‘information space’ of firms, and indicate the degree of abstraction, diffusion and codification of knowledge.

Amabile(1998) highlights that individual creativity efforts are strengthened by the presence of organizational system, procedures and processes that enable creativity. Few more experimental studies have found that more creative personalities produce more creative output than less creative personalities only when they were surrounded by an organizational context that facilitated creativity (Cummmnings and Oldham, 1997).

Von Krogh (1998) suggests that social processes make the task of knowledge creation a highly fragile process. He argues that untrustworthy behavior, constant competition, imbalances in giving and receiving information and ‘that’s not my job’ attitude are detrimental to sharing of tacit knowledge.

Li and Calantone (1998) tried to conceptualize knowledge creation in terms of market knowledge competence as a process that generates and integrates market knowledge. According to the author, market knowledge competence in new product development comprises of three processes including customer knowledge process, competitor knowledge process and marketing research and development interface.

A customer knowledge process refers to a set of behavioral activities that generate customer knowledge pertaining to customers’ current and potential need for new products.
A competitors’ knowledge process involves a set of behavioral activities that generate knowledge about competitors’ products and strategies.

The third process i.e. marketing - R & D interface refers to the process in which marketing and R & D functions communicate and cooperate with each other. They give a schematic model of market knowledge competence and new product advantage. The model consists of three dimensions: contributing factors to new product advantage, new product outcomes and environmental antecedents. It includes R & D strength as a secondary contributing factor to new product advantage because of its generally recognized role in new product development. The proposed relationships between the component of market knowledge competence and external and internal antecedents are based on the principle of co alignment between organizational behavior and environment. The model was tested on U.S. software industry. The study concludes that a customer knowledge process may help shorten product development cycle time. A customer learning process may offer firms a solution to the changing markets by collecting and processing information on the concurrent basis. Alternatively a competitor knowledge process may reduce cycle time by promptly generating information about competitions development speed and entry intentions. Such knowledge can also be used as a stimulus to motivate employees to beat the competition.

Tiwana (2001) has related the knowledge creation with the latest concept of CRM (Customer Relationship Management) in marketing with Knowledge Management and e-business. The author uses the term e-business because in today’s world business is all about interned facilitated
execution, coordination and management of business processes and activities.

Coining a new term KCRM (Knowledge Enabled Customer Relationship Management) Tiwana (2001) elaborates the concept of managing customer knowledge to generate value creating lock ins and channel knowledge to strengthen relationships and collaborative effectiveness. KCRM is more of a business model/strategy than a technology focused solution. Tiwana gives great emphasis on learning organizations. In KCRM context, the learning refers to learning involved in the business relationship with its customers. A learning relationship is one that gets smarter with each successive interaction. And eventually the relationship becomes so strong that cost of rebuilding it with another competitor makes it prohibitive for the customer to switch.

Delbecq and Mills (1985) found that in comparing innovation success with failures, failures were handicapped by lack of resources whereas successful projects had special innovation funds. In addition, literature on organizational context of creativity has identified several elements of the work environment like management practices, processes, use of teams, and organizational orientation as drivers of innovation (Ancona and Caldwell, 1992; Amabile and Conti, 1996; Sternberg et al, 1997).

Trust in team orientation; trust in technical competence, information redundancy and rich personal interaction are important process variables for effective and efficient creation of new knowledge (Madhavan and Grover, 1998). The objective of their study was to develop (using the distributed cognition framework) some propositions on how team should be created and managed to efficiently and effectively create knowledge by combining
disparate bodies of knowledge. Authors have emphasized the difference between tacit and explicit knowledge as a basis for developing the construct of embedded knowledge and establishing the importance of embedded knowledge in New Product Development (NPD) team content. In-depth interviews were conducted with managers and team members involved in five separate NPD projects in five different industries that included traditional manufacturing, telecommunications, distribution, chemicals and electronics. Four of these were large Fortune 500 companies, three of which had global network and one was a regional firm. Each team was developing a different product with varying level of innovation. In all approximately 30 in-depth interviews were conducted with individual team members. Various proportions regarding variables have been presented. Exogenous variable include T-shaped skill, A shaped skill, shared mental models, and endogenous variables included trust, extent of personal interaction. Information redundancy and moderating variable included inherent innovativeness of the product, stage of new product development, and information use. The study presented various managerial implications e.g.

1. Screen NPD team member for T-shaped skills, broad set of professional and personal interest, variety of experiences, rich network of contacts

2. Screen NPD managers for A-shaped skills (leadership, knowledge in various fields etc.)

3. NPD team members should be screened for extent of shared mental models (dispersion of knowledge across organization
employing people from same college so as to reflect similar mental setup

4. Preserve NPD routines in NPD teams (need for managerial processes that preserve and make these available across project in spite of inevitable team turnover, to ensure that new project teams are seeded with members from successful past teams.

5. To include supernumerary team members whose primary task is to learn from effective teams rather than contribute directly to the current task and who then become the primary members of subsequent teams,

6. To appoint members of past successful teams as members to new team.

7. To ensure that the entire membership of team does not change simultaneously.

8. Design immediate team goals with purpose of building trust in technical competence. Importance of performance feedback in building team members’ trust in one another’s competence.

9. Evaluate the impact of currently popular ‘virtual office’ practice on the efficiency and effectiveness of knowledge creation.

10. Train NPD team members on knowledge management and distributed cognition ideas.

The article concludes that a knowledge creation activity should emphasize cognitive team processes rather than purely social processes.
Kumar and Mulchandani (2005) have attempted to capture the innovation initiative launched by one of the leading information technology companies in India, Wipro. Their paper details the thought process behind the launch of the initiatives, the organizational preparations that preceded this launch and the structure and processes that were laid down for the pursuit of this initiative. Ten significant aspects of Wipro’s experiences with the innovation initiative, highlighting areas of congruence with and departure from the existing knowledge in this domain are also discussed.

A structured programme of innovation was conceived with focus on four major themes: home networking, mobile networking, collaboration and knowledge management and content commerce. Each theme was headed by a business manager and was expected to run multiple projects aligned with them. Innovation initiative was organized under an innovation council which owned the initiative and served as venture capitalist. The key responsibilities of innovation council included to define the innovation process, encourage idea generation, evaluate and approve project ideas, provide funding for developing the idea, monitor the progress of the projects, decide to determinate the projects that did not meet goals, maintain a technical cell with experts in chosen innovation themes, facilitate cross learning across projects, analyze new trends and discuss new project ideas etc. Once the structured innovation process was put in place, Wipro followed a Stage Gate process that consisted of 6 gates wherein market validation was the requirement at every gate prior to movement to the next stage. This process defined how ideas for innovation were to be generated, evaluated and supported through different stages of evolution till they reach the state of commercialization. It also specified the rewards and incentives for those who generated the ideas as well as those who worked on ideas in their
subsequent stages of evolution. E.g. they were given some percentage of the revenue generated in first 18 months from the date of idea acceptance.

This ensured that the team would work passionately on the project till completion. In addition to this, project team members also got to share a percentage of the revenue generated in next 12 months. All the efforts in identified themes were directed towards creation of intellectual property that could be sold as products/services. While preparing road maps for these, existing products in the market place were evaluated to understand the current state of market offerings. Business managers used to interact with potential clients to better understand their requirements. The progress on the projects was continuously reviewed by chairman, CEO and by board meetings and feedback was provided both formally as well as informally.

After Wipro’s experiment with innovation programme for two years and internalizing significant learning from it, it was realized that if company was to result in sustained innovation capability in the long run, the innovation initiative should be broad based and involve all business units. It was felt that stressing on a few large themes might make the innovation initiative risky.

Thus a portfolio based approach that encompassed a spectrum of varied opportunities was also considered more desirable. Wipro also got to know the potential for a conflict with customers and partners if a commercialization of IP as products/service was done. This learning also resulted into further course corrections. In 2003 the innovation initiative (now more broad based) had an impact on different aspects: the process, type of ideas, approach to selection of ideas, organizational mechanisms, organization expectations etc.
In case of more emphasis on creation of IP in previous phase, solution-based ideas that addressed problem in a specific industry were also included (an approach closely aligned with business strategy of Wipro’s industry faced vertical business units). With the charter for building a portfolio of ideas, there emerged an enhanced set of criteria, which would guide and balance the portfolio. These included – nature of opportunity (short/long term), strategic value (future potential to grow), potential return (high/low) and of investment (big/small). The innovation process also changed. The business units with centre of excellence functioning under them became the nodal points for action by generating ideas, ensuring that different groups owned the responsibility of taking the innovative ideas to the market. Also various initiatives identified by different groups came to be evaluated, prioritized and funded by Innovation Council with assistance from Innovation Champions, whose role was also identified to ensure constant flow of new ideas in business unit. They worked with vertical head to ensure the generation of new idea and evaluated the ideas to ensure that these meet the qualifying criteria and had revenue generation potential. They along with innovations council monitored the progress of each idea on monthly basis and discussed with idea owners the approach, which could make their idea more marketable and successful.

The study reaches the conclusion at two crucial aspects of managing innovations in organization, i. e. institutional leadership and process for innovation. Throughout this effort, Wipro’s top management played a key role in creating and articulating the strategic rationale for innovations. Also intense preparations prior to launching an innovation initiative provide the all important clarity and focus, which proved to be very crucial at the inception stage. The process was resilient enough to make necessary mid-
course corrections in a large functioning organization adapting in the, light of experience and changing business needs. Wipro experience makes it clear that each organization has to uniquely address its needs of innovation and there are no ready templates of successful innovation programmes that would fit the bill for all.

Motwani et al. (2005) conducted a study on different patterns of knowledge acquisition among Indian and US managers. The study compared information acquisition behavior of managers in US and India. Data was collected by means of a questionnaire. US data was collected by administering the questionnaire to a sample of 156 whereas in India usable sample size was of 117. Sample comprised of services and manufacturing firms both domestic and international. t-test was applied to analyze the findings. Some of the interesting results were:

1. Source of knowledge information for Indian managers were periodicals, newspapers, company libraries etc whereas most of the US managers relied upon their peers as source of information. Authors opine that a possible reason for this difference is that Indian business culture tends to the less trustworthy of peers.

2. There is a greater degree of formality and structure in Indian organizations than in their US counterparts. The informal free flowing structures of many US organizations promote constant and continuous interaction among employee which in turn promotes information sharing. Also US is far ahead of India in I.T. sector. The abundance of industry specific data allows US managers to access this in timely and cost effective manner, whereas there is a dearth of such data in India.
3. U.S. market is very dynamic and competitive whereas Indian market in contrast was a protected market till 1991 (till economic liberalization). It is only recently that Indian business has faced competition. Thus Indian managers perceive their industry environment less uncertain than their US counterparts.

4. The study also found support for greater sharing of information among US managers as compared with their India counterpart. Knowledge management has greater acceptance in US than in India. This in turn very likely reiterates the importance of sharing information among peers as a prelude to creating a knowledge database.

5. Knowledge is regarded as a critical organizational resource in the US that leads to an advantage in the market place, whereas India is behind on the learning curve in this regard.

Leiponen (2006) in her study conducted on 167 business service firms, has built a typology of organizational knowledge in business services and empirically examined the effects of knowledge on innovation performance. The study suggests that firms differ with respect to their knowledge creation approaches and that these approaches have implications for firms’ innovation activities. In the study a conceptual framework of knowledge assets with degrees of tacitness and collectiveness as the principal axis has been used to ground the empirical analysis. The study includes data from 167 business service firms and supplementary case study evidences from 16 other firms. It is found that business service improvements and new service introductions are significantly associated with collectively held knowledge, such as codified service solutions or team
based competence and procedure. In contrast, relying solely on tacit knowledge to hold by individuals may hamper innovation. The results also suggest that tacit collective knowledge is more closely associated with new service introductions, whereas explicit collective knowledge is associated with service improvements. Tacit collective knowledge is thus conducive. A managerial implication is that new service introductions necessitate team competences and routines, whereas incremental service improvements are more likely if procedures are in place to codify services into explicit solutions or technologies. The knowledge management approach therefore should depend on the strategic orientation of the service firm toward continuous improvement of exiting services or development of new services.

Akbar and Mishra (2005) have identified the knowledge assets employed by highly successful firms by conducting case based research of 10 medium size enterprises. By studying the knowledge generation process in various firms they have devised a knowledge conversion process model in which there are four levers i.e. knowledge inputs, transform constructs, projected outcomes (product facing and market related)and process embededness.

As explained through the model, the core team of the enterprise enters into business with prior experience and has strong opportunity identification with on ‘idea’ as an asset. With a strong foundation of ‘Human capital’ the core team goes about building capabilities in the area of process knowledge, market knowledge and distribution network while at the same time investing in skill augmentation of the entire organization. In due course of time social networks are created, new relationships, credibility in the product, finance and labour mills are built. This is necessary because for a
growing concern, requirements of finance and skilled manpower keep on growing with time. Performance of the firm in the product mill helps it attract cheaper finance and talented employee resources. All these form a part of the social capital.

Having attracted right resources and augmented capabilities in house, firm expands its organizational capital by investing in R & D activities, ploughing back part of the earnings to generate patents, new products and brand awareness. The firms then intermesh its organizational capital with its social capital by (networks and credibility assets) to create joint ventures and global expansion. Each of these intellectual activities have the potential to affect the outcome along two dimensions: market facing (competitive environment) and product facing (internal competitiveness of the (firm) e.g. creation of brands and differentiation is focused towards influencing decisions in competitive market place whereas patents and research and development help to sharpen the internal competencies of the firm. Each of these modes has the potential to be a deterrent to external competition. Both have potential to improve the performance of the firm in the long run.

The model further explains that similarly capability building (process knowledge and technical skill), technology tie-ups, joint ventures and mergers and acquisitions (M & A) in complementary technologies focus on improving the internal competitiveness while market and channel knowledge, M & A for market access and expansion through global operations is a mode of impacting external environment. For every company, one of these modes dominates and determines whether the company is predominantly a market focused or a product focused company.
Two more dimensions have been added to this model i.e. organization dynamism and process embeddedness. The human capabilities are least embedded as their movement is fluid and multidimensional. This corresponds to the degree of tacit ness of knowledge as more explicit the knowledge, easier it becomes to capture and embed it in organizational process. As small firms are more chaotic, process embeddedness is more pronounced in larger firms whose organizational structure is designed to achieve managerial efficiency. In the same time, larger firms are more prone to suffer from strategic inflexibility, partially due to lack of creative environment. The 2nd dimension is of dynamism. Small firms tend to be much more dynamic in response to their environmental needs, (as hub of knowledge creation is contextually linked with human capital) while it gets marginalized in larger firm where process form the core of manageability and efficiency. Smaller firms are innovation driven and infused by dynamism. The study concludes that a strong foundations knowledge asset is a precursor to a strong knowledge asset composition (intellectual capital of the firm) for a strong foundation.

Successful KM practice should prepare participants to transfer learning into practice (Keys et al. 1996). It is the difficult task of overcoming cultural barriers, especially the sentiment that holding the information is more valuable than sharing it (Anthes, 1998). This is further supported by a study conducted by Reynolds. H. in the Delphi group in Boston which shows that corporate culture was the biggest obstacle while deploying KM application as it was cited by almost 53 percent of respondents (Cole Gomoiki 1997).
Similar findings were reported by other studies on knowledge transfer (Ernst and Young 1999; KPMG, 1998). Ernst and Young had found that culture is the biggest barrier to knowledge transfer followed by other factors like failure of top management to signal importance to knowledge management, lack of shared understanding of strategy, organizational structure and lack of ownership of the problem.

Ahuja et al (2004) have coined the idea of causal loop diagram. They have discussed organizational flexibility index and identified 11 flexibility variables – 6 of these are enablers (these include virtual networks, interactive technologies, loosely coupled structures, intellectual and service capabilities, trust and problem seeking culture) while 5 are the results (these are knowledge sharing, knowledge transfer, knowledge integration, knowledge capabilities and value added products and services). Some other variables are gaps in knowledge sharing/integration/capacities/ transfer etc.

The framework recognizes that there have to be good enablers for better results. Organization has to ensure that loosely coupled structures are designed so that individuals and groups who need to interact and work together have similar knowledge capacities. In this way, knowledge can be transferred effectively from source to the recipient. Trust is related to learning, so members of a dispersed organization do well to be flexible, adapting readily to rapid change and innovation.

Dixon (2000) while classifying the knowledge transfer, has divided it into five categories:
Category 1- Serial transfer: what the knowledge team has gained from doing its task in one setting is transferred to the next time that team does the task in a different setting. The receiving team (which is also the source team) does a similar task as the source team but in a new context.

Category 2- Near Transfer: In this type of transfer, the explicit knowledge a team has gained from doing a frequent and repeated task is reused by other teams doing very similar work. The receiving team does a task similar to that of the source team and in a similar context.

Category 3-Far Transfer: Tacit knowledge a team has gained from doing a non routine task is made available to other teams doing similar work in another part of the organization. The receiving team does a task similar to that of source team but in a different context.

Category 4- Strategic Transfer: The collective knowledge of the organization is needed to accomplish a strategic task that occurs infrequently but is critical to the whole organization. The receiving team does a task that impacts the whole organization in a context different from that of the source team.

Category 5-Expert Transfer: a team facing a technical question beyond the scope of its own knowledge seeks the expertise of others in the organization. The receiving team does a different task from that of the source team but in a similar context.

Argote and Ingram (2000) argue that knowledge transfer serves as a competitive advantage for firms. Borrowing from cognitive psychology, the authors define knowledge transfer as “the process through which the experience of one unit affects another.” Compared to individuals across
firms, individuals within a single firm usually share a greater number of similarities. Consequentially, the authors argue, interactions involving people allow greater knowledge transfer within firms than between firms. Argote and Ingram conclude that knowledge embedded in the interactions of people and tasks affords a competitive advantage in firms.

Lahti et al (2000) conducted a study on management consulting firm to know various aspects about knowledge transfer. A sample of 6 consultants from different offices of firm was taken. Data was collected through interviews during which 17 open ended questions were asked from each respondent. Some of interesting facts which were obtained from this study are:

1. Technology is best way for knowledge transfer.
2. Transferors – whether consultants or clients _ should have to capacity to convey their knowledge i.e., they must not only posses the knowledge but should be able to and motivate and share it. Recipients of knowledge must be willing and able to listen and learn to ensure effective Knowledge transfer.
3. Two crucial organizational factors that can hinder knowledge transfer are systems and structures. More specifically the critical systems are performance management and compensation/benefit which helps formalize knowledge transfer by reinforcing that the employer considers is important. Only way to ensure that knowledge transfer has taken place successfully is to test for an understanding of knowledge or to observe employees’ application of it on their jobs. The study also revealed that compensation is also an area of concern. Not only employees need to be held accountable for knowledge
transfer in their work performance, they must also be rewarded for it, thereby increasing its quality and reliability in the future. People should be given objectives and should be then evaluated and rewarded based on how well the knowledge is transferred amongst them.

4. Finally other organizational structures should be invoked such as company form, job design, project work structure office layout, company vision, strategy and culture. Jobs can be designed to incorporate more knowledge sharing. Formal and informal types of collaborative work structures (team, communities of practice, social networks) should be encouraged. Office layout like open work space environment can enhance knowledge transfer.

5. Developing a knowledge vision for the firm and strategies for reaching this vision would help to incorporate and formalize knowledge transfer.

The study concluded that the whole organization culture should be conductive to knowledge sharing.

Levin and Cross (2004) consider the mediating role of trust in knowledge transfer. Their research reveals two important findings. One: competence and benevolence based trust among individuals in an organization influences the link between the tie strength of two individuals and receipt of useful knowledge. Two, the researchers find a benefit of weak ties (i.e. between dissimilar individuals who do not routinely interact) antecedent to knowledge transfer.

Cummings (2004) observes the influence of structural diversity on work group performance in a global organization context. Like Levin and
Cross (2004), Cummings also finds that when members of structurally diverse work groups share knowledge external to the group, their performance improves. The author theorizes that this improvement stems from active exchange of knowledge through unique sources.

Awad and Ghaziri (2004) give a comprehensive account of knowledge management beginning from knowledge. Knowledge capture, knowledge transfer, knowledge sharing and finally knowledge management. An in depth study has been done on knowledge concept, people, to procedures, to tools. According to them Knowledge Management is process oriented. It strikes a balance between the behavioural aspects of knowledge and knowledge management. They opine that actual carrier of knowledge involve people with an attitude of sharing common knowledge in the interest of the project or the organization. Technology is only a tool employed to expedite processes. Further they write that change often moves organizations and advances people's intellect. For change to be effective, organizations and people need to change. And for companies to make use of human experience and intelligence there is need to provide people a knowledge sharing environment, empower them with requisite tools and create a climate for learning and testing new ways of doing business.

Adler (1997) opines on the basis of the study conducted by him that a better process of sharing knowledge, helps the firms immensely. Mayo (1998) has also felt that recruiters should look for capabilities to share knowledge with new employees, as well as assessing what new knowledge they have brought to organization. If the staff is encouraged to discuss their mistakes openly, a culture of openness and seeking help could lead to the
creation of a learning environment far from fear of punishments etc. This could in turn facilitate the knowledge management activities in the firm.

Dyer and Nobeoka (2000) conducted a case study regarding knowledge sharing within Toyota’s network and provided evidence that suppliers do learn more quickly after participating in Toyota’s knowledge sharing network. Toyota’s network has solved three fundamental dilemmas with regard to knowledge sharing by devising methods like:

1. Motivate members to participate and openly share valuable knowledge (while preventing undesirable spillover to competitors).
2. Prevent free rider.
3. Reduce the costs associated with findings and accessing different types of knowledge.

Toyota has done this by creating a strong network identity with rules for participation and entry into the network. Most importantly, production knowledge is viewed as the property of the network. Toyota’s highly interconnected strong tie network has established a variety of institutionalized routines that facilitate multidirectional knowledge flows among suppliers. The study suggests that the notion of a dynamic learning capability that creates competitive advantage needs to be extended beyond firm boundaries. Further, if the network can create a strong identity and coordinating rules, then it will be superior to a firm as an organizational form at creating and recombining knowledge due to the diversity of knowledge that resides within a network.

Hansen (2002) in his study of 120 new product development projects in 41 business unit of a large multiunit electronics company introduces the concept of knowledge networks and explains why same business units are
able to benefit from knowledge residing in other parts of the company while others are not. The core premise of this concept is that a proper understanding of effective inter unit knowledge sharing in a multiunit firm requires a joint consideration of relatedness in knowledge content among business units and the network of lateral inter-unit relations that enables task unit to access related knowledge.

Results of study have also shown that project teams obtained more existing knowledge from other units and completed their projects faster to the extent that they had short interunit network paths to units that processed related knowledge. In contrast neither network connections nor extent of related knowledge alone explained amount of knowledge obtained and project completion time. The result also showed a contingent effect of having direct inter unit relations in knowledge networks. While established direct relations mitigated problems of transferring non codified knowledge, these were harmful when the knowledge to be transferred was codified, because they were less needed but still involved maintenance costs. The implication of the study is that research on knowledge synergies in multiunit firms also needs to consider the cost and drawbacks of having integrated inter unit mechanism.

### 2.3 KNOWLEDGE MANAGEMENT STRATEGY AND SYSTEMS

The firm must organize and manage the existing knowledge internally as well externally to make effective use of it. The effectiveness of building knowledge within the firm depends on the firm’s ability to monitor and absorb newly acquired knowledge from many sources and integrate this knowledge into its existing knowledge base (Cohen and Levinthal, 1990; Hamel, 1991; Hansen, Nohria, and Tierney, 1999; Leonard, 1995).
In the absence of internal knowledge management systems the organizational learning will not take place resulting into lack of storage of new knowledge in organizational memory which will in turn hamper the process of knowledge sharing within as well outside (value chain) the firm. Stein (1995) divides this process into four separate parts; acquisition, retention, maintenance, and retrieval.

External knowledge management systems are generally Internet based systems that link members of the value chain. External knowledge systems bring the value chain members closer together and add value to the product throughout the value chain.

Kwan (1999) proposes a knowledge management system named Knowledge Scope, consisting of a process meta model that describes the elements and relationships in an organizational process to integrate workflow support with a knowledge repository, enabling knowledge capture and retrieval as an organizational process proceeds in the Knowledge Scope system environment. Knowledge Ware (a system development methodology) enables an organization to integrate knowledge practices into their business processes with the support of information technology.

KPMG Consulting (1998) identifies the need for a knowledge system, explains what a knowledge system is and lists various stages in knowledge journey and predicts the future of knowledge systems.

The Arthur D Little (ADL) knowledge management system includes the key elements of their knowledge capital (Chug. L, 1999). It consists of information about the staff, which improves their ability to identify people with needed knowledge and skills. They have information about their methodologies and tools which allows them to deliver consistent services in efficient and effective manner. They also have the information about their practices and groups which keeps everyone up to date.
During the phase of knowledge implementation there are several key blunders that may hamper its success. These blunders include overflowing knowledge repositories (Warren, 1999; Duffy, 2000) and not maintaining already entered content (Malhotra, 1997; Hildebrand, 1999). Companies need to understand the knowledge actually required to carry out business activities rather than overloading their systems with all possible information. Also companies need to regularly add new and remove outdated knowledge. Without maintenance, knowledge becomes outdated which could contribute to poor decision making.

Teltech research indicates that no knowledge management application is successful if knowledge is not regularly updated (Hildebrand, 1999).

Priya and Singh (2001) write about the perceptions about knowledge among cross section of managers at middle management level at BHEL. Study attempts to examine and evaluate the effectiveness of knowledge management system in practice and suggest the ways to translate individual talent into corporate knowledge. A mix of questionnaire and interview method was used for primary data collection from respondent. The study finds that.

- All respondents believe that knowledge is critical for success of the organization.
- Almost all respondents believe that workshop and training can stimulate behavioral changes immediately, also it can help the employees to know the value of sharing and learning from each other.
- Majority of respondents agree on personalized strategy whereas few consider codified strategy a better option.
- Behavioral change is a major change faced by the organization while initiating knowledge management.

- Most common barriers of knowledge sharing are (in descending order): attitude of employees, insecurity among employee, improper organizational structure, inadequate motivation of employees to share knowledge, inappropriate organizational culture, departmental and geographical barriers, inadequate top management support and financial constraints.

- Most important benefit that can be reaped from knowledge management are (in descending order) improved productivity, improved decisions, increased profit, reduced cost, timely provisions of information to employee, increased responsiveness and innovation, creative learning environment, higher return on investment, and greater staff retention.

Authors suggest that organization should focus on some critical success factors for the successful implementation of knowledge management, organization should emphasize more on flow of knowledge rather than stacking of knowledge and successful implementations of knowledge management require change in behavior of employee. Also organizations have to be innovative to attract and retain knowledge workers by developing a system of multiple responsibilities, participative performance management and exploring talents at the grassroots. Further:

- People should be rewarded for contribution of knowledge

- Knowledge sharing criterion should be used in performance evaluation.
More emphasis should be laid on innovation and changing the organizational structure.

Tata Steel is one of the foremost companies of India to take knowledge management seriously and to ensure its implementation despite facing obstacles initially (Dutta and Kumar, 2005). Tata Steel is the only company in manufacturing sector in India and only steel company in the world to receive Asia’s Most Admired Knowledge Enterprises (MAKE) award in 2003. Knowledge Management initiative at Tata Steel began in 1999 and reaped excellent results. The company implemented a knowledge system which was modified later as per obstacles faced:

1. As company felt that knowledge management was cultural transformation rather than a project, a group of people with the help of top management was hired from within the company to implement knowledge initiative.

2. Knowledge repository was established on company intranet where all employees were encouraged to share their experiences of success and failure. For more effective knowledge management these repositories were created at departmental level and integrated with main knowledge repository.

3. After about an year of establishing knowledge repository, knowledge communities were formed which provided a platform for like minded people to meet and share their experiences. People sometime would solve problems at communities through brain storming.
4. But after initial success some problems started to occur later, e.g. resistance of people to share their experiences/knowledge, poor connectivity and technology problems.

5. To make employees understand importance of knowledge repository, many seminars were organized in the company and on advice of McKinsey consultants; many communities of practice were established. Employees were free to join any community irrespective of the area they belonged to.

6. When desired results were still not obtained, an index called ‘KM index’ was introduced to measure knowledge initiative taken successfully by any employee. It was made mandatory for every employee to score minimum 130 points on KM index (e.g. 70 points for providing valuable contribution to knowledge repository, 30 points for one time feedback, 30 points for application of KP from the site etc).

7. Due to this stringent monitoring system, employees started browsing knowledge repository pages more frequently and slowly on the cultural front, the attitude of people started to change from “I am an expert and do not need new knowledge” to “I need help and I can also help.”

8. To increase effectiveness of knowledge use, further two changes were brought. Firstly performance evaluation was linked to Knowledge Management for which senior executives would use balanced scorecard to monitor and modify the performance of employees. Secondly, CEO would reward the best performing employee, team and knowledge community.
Major benefits that were reaped from this system in Tata Steel were (in addition to lower cost and increased revenues):

- Conversation/interaction among employees increased.
- Experts/ skills were available throughout the organization.
- Job satisfaction increased among people which further reduced the loss of intellectual capital.
- Expenditure on R & D was reduced, as main ideas were now generated from within the organization.
- Duplication of ideas was reduced.
- Productivity increased because of easy availability of knowledge.
- More innovative culture was established.

Overall effect of successful implementation of this system was that Tata Steel gained a competitive advantage in the market.

Mukherji (2005) writes about striking a balance between knowledge codification and personalization in software firms where long term success of the organization is critically dependent upon making continuous innovations, rather than providing cookie – cutter solutions for standardized problems. In the case study conducted at XYZ Corp. the author explains the knowledge management initiatives being undertaken which comprised of three subsystems.

1. Databank: A document repository which comprises of codified knowledge in the form of white papers, approach notes, case studies, best practices documents etc.). It can be either tech bank (documents relating to technology) or sales bank (repository of document required by sales and support personal).
2. Yellow pages: The expert locator which help at making people to people connections to facilitate haring of knowledge that has not been codified in databank. Employees are encouraged to declare themselves ‘expert’ and their profile is maintained at yellow pages. When any employee faces problem whose solution is not available, an inquiry is posted to a declared expert. It is most frequently used system with about 3000 questions posted in a year and 75 percent of these successfully resolved.

3. Forum: A virtual platform for much communication among a group of people with similar interests. Anybody in the organization can join the discussion forum. Forum facilitates exchange of information and documents and maintains logs of various discussions that act as a dynamic reference point for the community.

In addition to this XYZ corp. has set up Off Shore Development Centers (ODCs) for very important clients. It is ensured that knowledge generated out of such projects is completely protected even from the rest of the organization. ODC has three components.

1. It has a learning portal for employees who join ODC.

2. It contains detailed knowledge about client and also provides training that is built around client requirement.

3. Project databank: It contains databank that has details of the projects done for the client so far, FAQs, best practices and reusable components etc. This component comprises of a directory of past proposals and techno commercial and marketing information which helps in making proposals for bidding a project.

ODC, has its advantages like it acts as key enabler for retaining knowledge, provides training to new recruits and improves productivity
through reuse but as ODC is isolated from the enterprise knowledge management, it fails to generate value for XYZ corp. Also such a stand alone knowledge system goes against the philosophy of enterprise knowledge management because it fragments the organizational knowledge.

Further the authors have discussed the need to choose between two competing strategies, codification or personalization. Codification is strategy for those organizations that follow an assemble to order product or service strategy (since such situations are dealt repeatedly, efficient use of codified knowledge provides them with scale economics), whereas personalization is the dominant strategy for organizations pursuing a product innovation or highly customized service offering. Such organizations solve unique problems by leveraging specialists’ knowledge. As expert knowledge is complex and tacit, it is not easily amenable to codification. Therefore organizations establish extensive networks among their employees to facilitate people to people exchange.

Authors opine that organizations should not straddle between both of these knowledge strategies as having both implementers and innovators rubbing elbows can be detrimental to growth.

The study concludes that long term success of software service organizations is critically dependent upon making continuous innovations, rather than providing cookie cutter solutions for standardized problems. This can only be achieved through balanced mix of knowledge exploration and exploitation which needs to be supported by the dual processes of codifications and personalization.
Skyrme (1998) proposes as how knowledge can be used as a lever of business strategy. Knowledge enhanced business strategies are built on two broad thrusts—managing what you already know and innovation—the creation and commercialization of new knowledge. A firm’s focus should be on knowledge leadership rather than knowledge management. By exploiting knowledge, organizations can achieve a range of benefits like avoidance of costly mistakes, sharing of best practices, faster problem solving, faster development times, better customer solutions, gaining new business and improved customer service. He further reports that there are seven levers of organizations used to exploit knowledge. These include customer knowledge, knowledge in people, knowledge in products and services, knowledge in processes, organizational memory, knowledge in relationships and knowledge assets.

Hensen et al (1999) studied knowledge management practices in several industries with focus on management consulting firms. The study indicates that since knowledge is core asset of consultancies, these firms were among the first to pay attention to and make heavy investments in management of knowledge. The consulting business employs two different strategies of knowledge: codification and personalization. The study concludes that it is imperative for a company’s knowledge management strategies to reflect its competitive strategy. Further only strong leadership can provide the direction a company needs to choose, implement and overcome resistance to a new knowledge management strategy.

In knowledge intensive industries, firms that pursue an aggressive knowledge strategy tend to outperform those competitors who pursue less aggressive knowledge strategies over time (Zack, 1999). Citing the example of
Buckman Labs, Zack further states that it prioritized its knowledge management efforts by focusing on several markets where its treatment applications knowledge lagged its current or potential competitors although to maintain existing advantages. It continually created and renewed its knowledge of all markets. It took more aggressive knowledge strategy in those markets than in markets where its knowledge led the industry.

2.4 KNOWLEDGE MANAGEMENT AND PERFORMANCE

Does effective knowledge management lead to better business performance?

Empirical research has shown that knowledge management can lead to improved performance through employment strategies designed to create an organizational learning environment, employee development, effective communication, knowledge sharing, better product or service quality and the involvement of top management in the design, implementation and support of creating a business culture that embraces knowledge management as a core value of the organization (Anantatmula, 2007).

Smith (2004) presents a generic model (Fig 2.1) with three systemic fields termed as Focus, Will and Capability. The three fields form a dynamic system. The actual current performance level achieved by the system depends on the interactions and interdependencies of the three fields.
Fig 2.1 Model of Performance

Focus represents a clear definition and understanding of the performance proposed; Focus is associated with questions (such as What ?; How ?; Who ?; Where ?; When ?; Why ?). The field of Will represents strength of intent to action the performance defined in Focus; Will is associated with attitudes, emotions, beliefs and mindsets. Capability represents the wherewithal to transform into reality the performance defined in Focus; Capability is associated with such diverse areas as skills, infrastructure, budgets, tools, physical assets etc. A change in any one of these fields may effect a change in the state of one or both of the other fields.

Optimal performance is favored when Focus, Will and Capability form a self-reinforcing system, with all fields in balance and harmony. As Figure 1 shows, current performance potential is represented by the degree of overlap of circles; optimal performance being represented by completes congruence of all three circles. Once ideal Focus, Will, and Capability are defined, the system forms a “strange attractor”, by
which individuals in the organization make meaning to produce order from chaos through these fields. That means that when Focus, Will and Capability are defined appropriately, *KM will be promoted naturally*. Based on the authors’ lengthy experience in “field” implementation, Capability is most likely to be overdeveloped; Focus underdeveloped; and Will essentially undeveloped. Yet to optimize, or even maintain good performance, it is critical that balance and harmony are maintained among all the fields, since too much emphasis on any one or two of the fields are probably worse than too little.

Shaping Will to promote Knowledge Management requires developing a new mindset. Because of the inter-related nature of the performance fields, creating such a culture means shaping Focus to pull people towards the organizational goals rather than pushing them. Traditionally organizations formulate the KM vision/mission/goals in isolation and cascade them downwards through the organization. This does not positively influence the Will segment. Rather people must be pulled toward a visionary core through their involvement. This is accomplished by aligning the organizational vision to people, rather than the people to the vision.

It therefore can be inferred from the model that providing good infrastructure to people is not sufficient even though it is an enabler for knowledge management. There needs to be cultural change involving clarity about vision/mission /goals of knowledge
management to be achieved with a clear communication so as to create involvement of the people. When individual involvement increases, performance also becomes better. The model also stresses the need of training to develop Will/right attitude amongst employees.

Hariharan (2002) proposes that knowledge performance has three aspects:

1. Knowledge contribution/sharing

2. Knowledge application / re-use or implementation based on knowledge contributions by others

3. How others have re-used or benefited from your contributions. He further states that measurement and recognition systems need to be put in place to motivate both individual employees and companies to improve their performance along all three dimensions. For best results, a combination of recognition, reward and buy-in by employees is necessary. Measures to motivate knowledge performance could include:

- Incorporating knowledge-performance in employee performance appraisals
- Introducing awards / recognition schemes both at the individual and company level to encourage knowledge-sharing as well as application / re-use
- Encouraging knowledge-performance at the company level by incorporating it in corporate performance measurement systems such as the Balanced Scorecard
• Incorporating knowledge-performance where possible on other measurement systems - e.g. Corporate Quality Awards

• Ensuring visibility and recognition by peers across the organization both for knowledge contributions and for successful knowledge re-use or implementation

Knowledge management improves performance through measuring knowledge asset return on investment (Aaron, 2009). Liu and Tsi (2007) reported that organizations that introduced knowledge management were able to improve 5 percent to 10 percent in performance in the customer, financial, and internal business process areas and 10 percent to 15 percent in the learning and growth areas which supports that knowledge management has a positive effect on operating performance. They conclude that Organizations use knowledge management to improve operating performance through shortening manufacturing processes, reducing costs, increasing flexibility and improving product quality and service.

The positive link between knowledge management and firm performance is also questioned by Kalling (2003). For his analysis qualitative data from three knowledge ventures within a European manufacturing multinational company were used. His study indicates that although knowledge development is a frequent phenomenon, the utilization of it is not so widespread. This may point to the high cost of proper maintenance and implementation of knowledge management practices. Even when knowledge is utilized, it may not always result in an improvement in profitability. Kalling emphasizes the importance of coupling specialists’ knowledge with
CHAPTER 3

RESEARCH DESIGN

During review of existing literature on knowledge management, a clearly perceived need for studying the knowledge management in textile industry of Punjab emerged. To undertake the study a research framework was made. This chapter contains a detailed account of the whole process involved in carrying out present research.

3.1: RELEVANCE OF STUDY:

The extensive literature survey in chapter two brings out the following issues:

1. Knowledge management is a new concept and it is still evolving. It is still at an infancy stage in our country.

2. Knowledge management can not be ignored and sooner or later a firm has to become aware of this concept and its implementation to sustain competitive advantage.

3. In India penetration of knowledge management is limited to few organizations that too in some sectors only. It is yet to make its mark in all industries of our country.