Introduction

1.1 Background

Till recently, knowledge management was a concern only of those Companies whose major business was to sell knowledge-based products. Now, it is fast becoming an important corporate function for many Organizations as awareness that effective management of intellectual resources enhances competitiveness is spreading quite rapidly. Stealthily, the theory has infiltrated into many different operations and processes of business which is possibly the best prospect for knowledge management. The management of knowledge is no longer kept separate from business processes, but is best maneuvered by embedding in all aspects of business. It may so happen in future that the knowledge management would become so all-encompassing and widespread that it would seem unnoticeable.

The changing level of Organizational impact of the advancement of computing technologies in industry is significantly evident. Initially only work level automation took place such as communication, instructions, deposits, reservations etc. In the sixties there were centralized mainframe computers which provided little degree of freedom and allowed only numerical calculations and primary level electronic data processing. Consequently huge data got accumulated at the lower echelons of organizations. Data management systems were employed for the analysis of accumulated data from the seventies. Such systems usefully combined these data into valuable intelligent reports, to help the higher management of the organization to optimally deploy resources like finances, personnel and stores. The requirement of data was a mystery to the information system (IS) groups within businesses as they made efforts to perceive the requirements of information managers and huge data and
information were generated by the accountants. The introduction of Personal Computers (PCs) in the eighties added wholly new dimension to a generally mechanical data atmosphere. It enabled the higher management officials to utilize distributed computing power to satisfy their own amorphous statistics and information requirements. Thus the PCs became the decision support systems, which had the ease of operation and enabled independent decentralised command of information for the managers. The mid to late eighties brought designed data base management systems which facilitated even more efficient business information and computing. Business outcomes, value creation in business relationship and inter-Organizational coordination and aggressive gain for the Organization were the main focus. Superior and faster information was the crux of all these developments. The materialization of the Internet and connected technologies became the key mechanism which provided access to a rich range of information. With the help of the new technologies huge data and information was created. But it was difficult proposition for the corporate personnel to extract useful portion from these repositories of information as they were more concerned with generating complete understanding of the prospects and threats in the market. It was from these dilemmas and related debates that the insight of knowledge management emerged as an important factor for business and other organizations to succeed in competitive world.

Today any mention of knowledge leads to a debate as to how knowledge is characterized. Realistically it can be described as the most worthy substance in a collection initializing with data, encircling information, and concluding at knowledge. A data expressed in a concise form is classified, conveyed and amended to enhance its value, which will become information under a given framework. This adaptation of data into information is perfunctory and has been made easy with the help of technologies for storage and processing which facilitate to sum up the content of
information and its value, further leading to its classification, based on its usefulness in a particular situation and context. Classification of information is done with a perspective of effectiveness in specific circumstance.

Knowledge is the most human contribution. It has the highest value and greatest relevance to decisions and actions. It has also greatest dependence on a specific situation or context. Knowledge happens to be the most challenging type of content since it originates from and is applied to in the minds of the people (Grover and Davenport, 2001). People having knowledge not only have access to information, but also are able to internalize the information within the framework of their experiences, expertise, and judgment (Grover 2003). In the process of doing so, they assimilate new information that expands the range of possibilities, and in turn allows for further interaction with experience, expertise, and judgment. Hence, in the Organizational context, all new knowledge emanates from people (Grover and Davenport, 2001). Part of this knowledge gets incorporated in Organizational artifacts like processes, structures, and technology (Grover, 2003). However, institutionalized knowledge often inhibits competition in a dynamic context, unless adaptability of people and processes (higher order learning) is built into the institutional mechanisms themselves. In sum, the mechanical generation of databases, Web sites, and systems that process data is good and has the potential to take us to a higher plane in the Organization. It helps us in understanding our own processes more and thus contributes in dealing with our Organizational problems. This knowledge or information may exist in various forms within the Organization. It could give rise to a competitive advantage or new information offerings. Regardless of definition, however, knowledge managers often take a highly inclusive approach to the content with which they deal. In reality, Organizations club under Knowledge management,
1.2 Useful Concepts in Knowledge Management

The practice of knowledge management has benefited from several key concepts, some of which were not created within the knowledge management movement, but have been imported into it.

**Tacit vs. Explicit Knowledge:** Philosopher Michael Polanyi first propounded this concept but the credit for its application in business and knowledge management goes to the Japanese management scholar Ikujiro Nonaka. It propounds that there are basically two types of knowledge: tacit, which is entrenched in the human brain and is not possible to be expressed easily, and explicit knowledge, which can be easily structured and codified (Davenport and Volpe, 2001). Although both kinds of knowledge are valuable, western thought has mainly concentrated on managing explicit knowledge (Grover and Davenport, 2001).

**Knowledge Processes:** The knowledge processes lie somewhere between information and the firm’s source of revenue, its products and services. This process can be generically represented as three sub processes: knowledge generation, knowledge codification, and knowledge transfer/realization. Knowledge generation incorporates all processes active in the acquisition and development of knowledge. Knowledge codification entails converting the knowledge into appropriate and accessible formats. Knowledge transfer involves the process of moving the knowledge from the source of generation to the point of application. The knowledge is a difficult concept because the process is repetitive, escalating and often irregular (Grover and Davenport, 2001).
**Codification vs. Personalization:** This distinction is similar to the tacit vs. explicit concept. It involves an Organization's primary approach to knowledge transfer. Companies using codification strategies primarily focus on storage of explicit knowledge (Davenport and Volpel, 2001). Personalization means that the primary method of knowledge transfer remains the direct interaction amongst people.

**Knowledge Market:** This concept recognizes the interests of individuals in holding onto the knowledge they possess. To motivate them to part with it, something needs to be offered in exchange. Each Organization acts as a market for knowledge wherein knowledge is traded for various other things such as money, respect, promotions, or some other knowledge (Davenport and Volpel, 2001).

**Communities of Practice:** This idea, which developed in the "Organizational learning" movement, posits that knowledge flows best through networks of people who may not be in the same part of the Organization, but have the same work interests. Some firms have attempted to formalize these communities, even though theorists argue that they should emerge in a self-organizing fashion without any relationship to formal Organizational structures.

**Intangible Assets:** Many observers have recently pointed out that formal accounting systems do not measure the valuable knowledge, intellectual capital, and other "intangible" assets of a corporation. This is undeniably true. The market value of knowledge-intensive Organizations is often several times their "book" or accounting value. It has been suggested by various analysts that accounting systems should start recognizing and incorporating intangible assets and that knowledge capital needs to be shown in the balance sheet. Even then, one needs to appreciate that knowledge is subjective and cryptic making it difficult to give a fixed and permanent value to it.
1.2.1 Knowledge Management and Knowledge Management Systems

A knowledge based view of an Organization has emerged in the literature over time (Cole 1998; Spender 1996a, 1996b; Nonaka and Takeuchi 1995). This emerging view further builds and expands on the resource based theory that was initially propounded by Penrose (1959) and extended further by other management scholars (Barney 1991; Conner 1991; Wernerfelt 1984). This emerging knowledge based view maintains that it is the way in which the tangible resources are combined and applied that result into services, and this in turn depends on the firm’s know-how. This knowledge is rooted in and is disseminated through multiple entities like Organizational Culture, routines, policies, systems, and documents, as well as employees (Grant 1996; Nelson and Winter 1982; Spender 1996a, 1996b). As knowledge-based resources are perceived to be difficult to copy and are socially complex, this view propounds that the knowledge-based assets may give rise to a long term sustainable competitive advantage. What becomes more important is not the knowledge present in the organization at any given point of time, but the organization’s ability to efficiently apply the existing knowledge to generate new knowledge and lay down the strategies that leads to the creation of competitive advantage. In this process a key role is played by information technology that helps in delivering a knowledge-based view of the organization. The advanced information technologies like Internet, intranet, extranet, etc. can be effectively applied to create proper systems, increase and deploy intra and inter firm knowledge management. The idea of creating, coding, storing and disseminating knowledge is not new in organizations as over the years, training, employee development program, policies, related reports and manuals have served the same purpose (Alavi and Leidner, 1999). But now Organizational practices have become more knowledge focused. The benchmarking, best practices transfer and knowledge audits etc. convey the
recognition of the organizational knowledge and intangible assets in general (Grant 1996a, 1996b; Spender 1996a, 1996b). Recognizing the criticality of the organizational knowledge, the purpose is to amalgamate the relevant knowledge related work of multiple disciplines which contributes to and gives shape to our understanding of knowledge management and knowledge management systems in organizations as evidenced in Table 1.1.

<table>
<thead>
<tr>
<th>Perspectives</th>
<th>Implications for Knowledge management</th>
<th>Implications for Knowledge Management Systems</th>
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<tbody>
<tr>
<td>Knowledge vis-a-vis data and information</td>
<td>Data is facts, raw numbers. Information is processed/interpreted data. Knowledge is personalized information</td>
<td>KM focuses on exposing individuals to potentially useful information and facilitating assimilation of information</td>
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<td>State of mind</td>
<td>Knowledge is the state of knowing and understanding</td>
<td>KM involves enhancing individual's learning and understanding through provision of information</td>
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<td>Object</td>
<td>Knowledge is an object to be stored and manipulated</td>
<td>Key KM issue is building and managing knowledge stocks</td>
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<td>Process</td>
<td>Knowledge is a process of applying expertise</td>
<td>KM focus is on knowledge flows and the process of creation, sharing and distributing knowledge</td>
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<td>Access to information</td>
<td>Knowledge is a condition of access to information</td>
<td>KM focus is organized access to and retrieval of information</td>
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<td>Capability</td>
<td>Knowledge is the potential to influence action</td>
<td>KM is about building core competencies and understanding strategic know-how</td>
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Table 1.1 Knowledge Management and their Implications
1.2.2 Knowledge Management Strategies

Knowledge management is as difficult to define as knowledge itself. In 1990s, the new concepts and practices started evolving which made the Organizations realize that the knowledge was a more critical resource than tangibles like land, machines and capital. It also dawned upon the organizations that this critical resource was being poorly managed. It was being understood that if more focus was provided to the process of creating, providing, sharing, using, and protecting knowledge, the Organizational performance would significantly improve. Thus, knowledge management was seen as crucial investment for organization in the competitive world of business where organizations had to build up capabilities that would be difficult for others to imitate. Implementation wise, knowledge management was seen as crucial to product and process innovation and improvement, to executive decision-making, and to organizational adaptation and renewal. Theoretical constructs on how knowledge might be handled and managed were already rooted in several disciplines including economics, philosophy, epistemology, computer science, and sociology. This is also true that once firms accepted that knowledge is the key component in enhancing performance and that by some methods it should be managed better, they often floundered and did not know how and where to start. This led to the need for new models, constructs, methodologies that could aid corporate executives to not only to understand the various knowledge management initiatives or investments that are possible but also identify appropriate contexts for such initiatives. Classification or typology of "schools" of knowledge management was presented by Michael Earl (2001) as presented in Table 1.2.
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<tr>
<th>Attribute</th>
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<td>Technocratic</td>
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<td>Domain Enterprise Activity</td>
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<td>Shorko Films AT &amp; T Frito-Lay</td>
<td>Content Culture/ Incentives Knowledge learning</td>
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<td>Systems Cartographic Engineering</td>
<td>Income.</td>
<td>Knowledge Assets</td>
<td>Know-how</td>
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<td>Intellectual Asset register &amp; processing system</td>
<td>Commercialization</td>
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Table 1.2 School of Knowledge Management
1.2.3 Process-oriented knowledge management

Knowledge management entails creating and providing an environment that will allow organization members to create, capture, share, and leverage knowledge to enhance performance at all levels. The process is to externalize the experiential knowledge gained by organization members involved in the organization's activities, capture and store this knowledge in knowledge repositories and make these repositories accessible to everyone in the organization. It is the information technology that makes knowledge sharing possible across space and time and this knowledge becomes an organizational asset that remains in the organization even when the creators of the particular knowledge have left.

The success of knowledge management initiatives is measured by assessing whether it is adding to the strategic value of the Organization. Thus linking the knowledge management initiatives to strategic focus of an Organization helps to clearly define its scope and justify its implementation.

1.2.4 Knowledge management and risk management

Knowledge management is appearing to be a universal panacea for risk reduction. In risk management arena, the usefulness of knowledge management is being seen in the representation, dissemination and creation of knowledge of hazards and their associated risks.

The concepts and definitions in the field of knowledge management are still being debated by scholars and practitioners (King, 2000; Martin, 2000). Knowledge is a fluid mix of framed experiences, values, contextual information, and expert insights that provides a framework for evaluating and incorporating new experiences and information (Davenport and Prusak, 2000). Information gives rise to knowledge as data delivers information. It is posited that if information is to become knowledge,
humans must do virtually all the work (Davenport and Prusak, 2000). Cultural factors need to be taken into account. If the Organization culture doesn’t support the knowledge management initiatives, these initiatives would not take hold in an Organization (Holowetzki, 2002). It is the information and its derivatives that are stored in the minds of organizational members, are the greatest organizational asset. It becomes equally important that organization not only needs to manage knowledge assets, but it has also to effectively manage the interpersonal and organizational processes that act upon these assets. Effective knowledge management thus aids an organization to fulfill its objectives in a manner which brings about convergence of the data and information processing capacity of information technologies and the creative and innovative capacity of human beings (Malhotra, 1997). Knowledge management is a methodical, systematic and integrative process of synchronizing organization-wide activities of acquiring, creating, storing, sharing, diffusing, developing, and deploying knowledge by individuals and groups in pursuit of major organizational goals. It is the process by which organizations generate and deploy their institutional and collective knowledge by integrating Organizational learning, knowledge-production, and knowledge-distribution (Rastogi, 2000). Even though there are variations in various definitions, scholars agree that knowledge management is critical to businesses globally, whether this involves knowledge of markets, competitors, or processes (Martin, 2000; Nonaka and Takeuchi, 1995). The ever increasing pace of globalization and the constant interaction of technology and organizational change have further increased the importance of knowledge management. Knowledge management is no longer being seen as an input to business but it is being perceived as an important objective of the Organization. The fast receding industrial economy based on goods and services is being constantly upstaged
by a global knowledge economy, based on the production, distribution, and use of knowledge (Martin, 2000).

Knowledge management is increasingly being focused on as an important and a key determinant for survival and growth of a firm, industry or country in the knowledge era. Various management disciplines have contributed to knowledge and knowledge management (Gao, et al 2002). Operating in the global economy today without a planned and efficient knowledge management system is considered challenging and lacking a strategic perspective. It seems that the key to success is not the skilful management of endless knowledge, but the ability to direct activity to those knowledge resources which are crucial for the Organization's economic operations (Karaszewski, 2008). Even though lots of Organizations are seriously working on knowledge management, still the concept is localized to a few information system wizards within these organizations (Khilji, 2001).

It has also been noticed that excessive focus on technical issues rather than social aspects often gives rise to poor knowledge management practices or even failure to implement and get compliances in the organizations. Specifically, there is lack of empirical evidence about what are the specific cultural variables that support knowledge management processes and help in development of knowledge culture (Oliver and Kandadi, 2006). Although Knowledge Management is the correct approach to attain a strategic advantage, there has been considerably less focus on the ways by which an Organization implements a Knowledge Management initiative. In order for a Knowledge Management initiative to succeed, it is necessary that knowledge exchange takes place. For knowledge exchange to happen, significant cultural elements must exist, particularly those that reward the sharing, adaptation and application of the collected corporate knowledge (Hayduk, 1998).
There are two fundamental approaches to knowledge management: the process approach and the practice approach. The process approach attempts to codify Organizational knowledge through formalized controls, processes, and technologies (Hansen et al., 1999). Firms following the process approach may implement unambiguous policies governing how knowledge is to be collected, stored, and disseminated throughout the organization. The process approach often requires the use of information technologies, such as intranets, data warehousing, knowledge repositories, decision support tools, and groupware to improve the quality and speed of knowledge creation and distribution within the Organizations (Ruggles, 1998).

Process approach has faced criticism that it fails to capture most of the tacit knowledge embedded in Organizations and that it constrains individuals into fixed patterns of thinking (Brown and Duguid, 2000; DeLong and Fahey, 2000; von Krogh et al., 2000). The practice approach instead assumes that most of the Organizational knowledge is tacit in nature and that formal control, processes and technologies are not appropriate for transmitting this type of information. Instead of building formal systems to manage knowledge, the focus of this approach is to build social environments or communities of practice essential to aid the sharing of tacit understanding (Brown and Duguid, 2000; DeLong and Fahey, 2000; Gupta and Govindamjan, 2000; Hansen et al., 1999; Wenger and Snyder, 2000). These communities are informal social groups that meet regularly to share ideas, insights, and best practices. From this discussion the questions arise like how does culture affect Organizations' approaches (e.g., process or practice) to knowledge management? Also as firms pursue these initiatives, how do cultural influences affect the knowledge management activities of knowledge generation, codification, and transfer? To address such queries, it becomes necessary to explore the concept of Organizational Culture.
Firestone et al. (2005) presented a three-tier framework of business processes and outcomes distinguishing operational business processes, knowledge processes, and processes for managing knowledge processes. Operational processes are those that use knowledge but, apart from routinely produced knowledge about specific events and conditions, don’t produce or integrate it. Examples of outcomes are Sales Revenue, Market Share, Customer Retention and Environmental Compliance (McElroy, 2003, Firestone, 2003, Firestone and McElroy 2003, 2003a).

Knowledge processes are of two kinds, one is the knowledge production, which is a process that an organization executes, which in turn produces new general knowledge and other knowledge whose creation is non-routine; and the other is the knowledge integration, a process that makes available this new knowledge to individuals and groups in the organization. Knowledge management thus can be seen as a set of processes that aims to change the Organization’s present pattern of knowledge processing to enhance both it and its outcomes. The discipline of knowledge management is the study of such processes and their impact on knowledge and operational processing and outcomes. This in turn implies that the knowledge management does not directly manage, create or integrate most knowledge outcomes in Organizations; it only influences knowledge processes that in turn, impact knowledge outcomes (Firestone et al. 2005).

It was Nonaka (1991, 1994) who described clearly the distinction between tacit and explicit knowledge and propounded the Organizational knowledge creation process that draws on the dynamic process of conversions between these knowledge types.

Thus, knowledge management is based on developing individual participation in communities of practice. Organizational success is not so dependent on the static ‘stock’ of knowledge, but rather on the dynamic social processes through which
knowledge is enhanced and renewed. Organizations need to develop cultures where their members are encouraged to share knowledge in order to gain a strategic advantage for the Organization (Elkjær, 2004).

Wherever the literature focuses on knowledge management, it mostly concerns itself with the attributes of knowledge, the difference between information and knowledge, and classification of knowledge. Some authors view knowledge as justified true belief (Irma and Rajiv, 2001) and a frequent expression for knowledge is "information in action" (Kucza, 2001). Nonaka (1994) and Huber (1991) defined knowledge as a justified personal belief that increases an individual's capacity to take effective action. Taking cognizance of process-oriented perspective, knowledge is viewed as a dynamic factor generated by social interaction between individuals and Organizations. Knowledge is active because it is action oriented and subjective because knowledge is information in a certain context.

All Organizations may not be inclined knowledge management initiatives. Therefore to understand the success or failure of knowledge management within a firm, one needs to identify and assess the preconditions which are essential for this effort to flourish. These preconditions are what are known as capabilities or resources in the literature on Organizational behavior (Nonaka, 1991; Gold et al., 2001). Most of these attempts explaining knowledge management focused on high level processes and thus address knowledge management either too broadly or in too specialized a fashion. Knowledge being so intangible, it becomes necessary for knowledge management to cover other aspects such as sociology, physiology and information technology and so on (Kucza, 2001).

With many approaches possible on research of knowledge management, the approach selected for this research was to focus on the processes taking place within knowledge
management for developing a model that is both simple and comprehensive enough. Knowledge management has been defined as a continuous process that manages all knowledge to predict current and future needs. It not only identifies and exploits existing and acquired knowledge but also provides new opportunities. The main conditions that define knowledge management capabilities include the process of acquisition, conversion, application and protection of knowledge.

It has been posited that Organizational knowledge management process can be based on a framework wherein Organizations can be viewed as social collectives and knowledge systems. Based on this framework, it has been proposed that knowledge systems consist of four sets of socially enacted "knowledge processes": (1) creation (also referred to as construction), (2) storage and retrieval, (3) transfer, and (4) application. Taking into account different characteristics of knowledge management, an appropriate definition of it might be that knowledge management is the overall task of managing the process of knowledge creation (acquisition), conversion, utilization, and protection, as well as other related activities (Alavi and Leidner, 2001).

1.3 Organizational Culture

Nowadays the ability of a firm to compete in the global arena is defined by its ability to manage knowledge and knowledge workers. It becomes all the more apparent in knowledge-intensive industries such as software, biotechnology, consultancy and pharmaceuticals. It has caught on in all the other industries too and has become an important issue. It has been proposed that only those Organizations that are able to create a culture for knowledge management will survive and grow.

In recent times, the research has started focusing on interaction between knowledge management and Organizational Culture and is also exploring the relationships between knowledge management, research & development and the Organizational
Culture. In the current knowledge intensive era Organizations have started considering human resource as the most crucial asset in contemporary business. They have started to learn to manage their intellectual capital and knowledge as important assets of the Organization. Similarly, as Organizations have embraced the group approach to work processes, the value of sharing knowledge in an effective manner has become extremely important. Extending this model and introducing the concept of knowledge management to the mix, we end up with communities of practice, organic self-organized groups of individuals who are dispersed geographically or organizationally but communicate regularly to discuss issues of mutual interest (Lave and Wenger, 1991). In order to survive, Organizations are searching for the competitive advantage by generating precise knowledge which is distinctive and difficult to imitate by others. One certain way to create Organization-specific resources is human resource development. This development and utilization is concerned with practices deployed for improving employee skills using training and other forms of knowledge enhancement (Lepak and Snell, 1999). It becomes a challenge to integrate the knowledge and skills gained from earlier assignments into the repository of an Organization's knowledge and capabilities. This challenge can be addressed by utilizing effective human resource and knowledge management practices. In addition, successful repatriation human resource strategies require job satisfaction, attachment to the Organization, and a willingness to share international experiences (Stevens et al., 2006). The task of human resource development becomes easier if a well-managed knowledge management system is present in the Organization. It acts as a central method which supports human resource development and provides a cutting edge to the human resources by providing a sound understanding of the environment, Organizational, team and individual contexts supporting an Organization.
It is difficult to find the most appropriate perspective in the literature to evaluate culture where the focus is on relating culture to Organizational effectiveness and knowledge management. Mostly, researchers agree that culture can be thought of as a set of cognitions shared by members of a social unit. In literature there is no single definition or concept of Organizational Culture (Ott, 1989). A multitude of definitions have been proposed by various authors (Keesing, 1974; Schein, 1981; Ott, 1989, Denison, 1990) by creating a typology of Organizational Culture and many of these faced challenges.

It has been pointed out that a multitude of cultures are possible in an Organization and that the culture can be defined as a pattern of basic assumptions; invented, discovered, or developed by a group; as the group learns to balance between the issues of external adaptation and internal integration; and which has worked well enough to be considered as valid and therefore to be taught to new additions to the group as the correct way to perceive, think and feel in relation to challenges (Schein, 1988; Schein, 1990). It was also posited that the learned responses to the group's challenges of survival and integration are subconscious, taken for granted and shared by the members of the group (Reichers and Schneider, 1990). The Organizational Culture has also been defined as a social force which controls models of Organizational behavior by giving shape to members' cognitions and perceptions of meaning and realities, thus giving rise to affective energy for deciding who belongs and who does not. Then there is a functional definition of Organizational Culture that gives a glimpse to the functions performed by the Organizational Culture and why these continue to exist. Theorists have posited that there is a significant relationship between Organizational Culture and effectiveness. Four traits of Organizational Culture have been identified in the literature: involvement, consistency, adaptability and mission. The involvement describes the level of involvement or sharing of the
personnel of the Organization in decision making process. Consistency refers to being highly consistent, coordinated and integrated for a shared system of beliefs, values and symbols which are understood by the members of the Organization. Adaptability denotes the degree to which an Organization can alter its behavior, structures and systems so that it can survive environmental changes. The mission is the existence of a shared vision of the function and purpose of the Organization and members (Denison, 1990; Denison and Mishra, 1995; Fey and Denison, 2003; Denison, et al., 2004). Mission has two-fold aspects for Organizational functioning: first, it defines purpose and meaning, second it envisions the direction and goals. The human resource management includes practices which make sure that Organization's human capital contributes to the business outcomes and helps increase productivity by enhancing employees' skills and motivation (Huselid, 1995). Most Organizations are largely dependent on their human capital to develop a competitive advantage. Their market valuation depends more on their intangible assets, like knowledge and core competencies (Lawler, 2005). The resource-based view posits that human resource systems can aid in sustained competitive advantage by assisting in the development of competencies that are firm-specific, produce complex social relationships, are embedded in a firm's history and culture, and generate tacit Organizational knowledge (Lado and Wilson, 1994). Human resource development denotes the methods deployed for improving employee skills through training and various types of knowledge and skills enhancement techniques. This signifies that human resource development enhances the human capital that is there in the Organization (Lepak and Snell, 1999).

It has been posited that there are four dimensions to human resource development and utilization: training and development of employees, decision-making involvement, support for personal initiatives, and goal communication (Rauch et al., 2005).
Training and development has been found to be critical because Organizations are going to find it difficult to find specific and unique skills in the labor market (Lepak and Snell, 1999). Hence it becomes necessary and prudent to develop these skills internally. The additional benefit of the training for employee development is that it will help influence employee’s behavior and attitudes such that it is in line with Organizational goals. The performance of the employee is enhanced by involvement of employee in decision making helps foster employees commitment (Arthur, 1994, Huselid et al., 1997; Lepak and Snell, 1999). Empowering employees can also be accomplished by supporting their personal initiatives. These initiatives encompass role behaviors like having more responsibility, working independently with responsibility, and having control of one’s own work. This leads to an improvement in business outcomes (Arthur, 1994; Huselid et al., 1997). The communication aims to provide information to an employee or a group of employees which can be integrated with their own existing knowledge and utilize it in decision making. All these human capital improvement programs like training and development, promotions structure, job enrichment, work design and other human resource development activities need to be linked to effective business outcomes which should have direct relation with Organization’s core competencies (Blackman and Lee-Kelley, 2006).

1.3.1 Organizational Effectiveness

The Organizational effectiveness can be evaluated by choosing the appropriate criteria. Literature mentions four major approaches to evaluate Organizational effectiveness namely, goal, system resource, internal process and operation, and strategic constituencies (Cameron, 1980; Cameron and Whetton, 1983). It has been posited in the literature that the most appropriate approach for defining Organizational effectiveness would be the one that defines it in terms of how efficiently an
Organization achieves its goals (Cameron, 1980; Lusthaus et al., 2002). In this approach, goals become the central component. Thus, it is proposed that the goals that are clearly identifiable, consensual, assessable and time-bounded become the critical aspects to focus on while evaluating Organizational effectiveness (Price, 1972). It has been found problematic to describe and measure Organizational effectiveness for various reasons. First of all, it is not clear whether one has to go with a single goal or one can generate consensually a multiple set of goals for an Organization. Next aspect that needs careful consideration is who all to involve in the Organization to identify the Organizational goals and build consensus (Brown, 1994). Even though these aspects need careful addressing, Organizations still initiate multitude of processes to identify Organizational goals, objectives and various systems, and communicate their effectiveness by defining the extent to which these goals are achieved (Lusthaus et al., 2002).

These aspects become even more complex and also less studied in literature in case of Research & Development Organizations. In the case of an industrial operation, one can consider the quantity and quality of output as appropriate goals, but in the case of Research & Development Organizations, most outputs are not only intangible but even subjective in nature. Then, there is the issue of productivity which needs to be related to the objectives and goals of the Organization. Organizational effectiveness relates to the productivity concept, but it also includes aspects like quality and utility which may not be part of productivity. Apart from being productive, Organization needs to be viable over a long period of time and this necessitates that Organizational members be satisfied with the Organization (Jian and Triandis, 1997).

It becomes advisable to involve Organizational members in brainstorming sessions on effectiveness and to consider different criteria, measurement methodologies, and due
weightages to be allotted to them. In the case of Research & Development Organizations the output measures can be subjective, discrete or scalar and even non quantitative. The next step would be to establish clear-cut relationship of these output measures with the Organizational goals (Jian and Triandis, 1997).

Practitioners have attempted to operationalize this hazy concept of Organizational effectiveness. The activities defined and included in Organizational effectiveness are an enhanced ability to innovate, better coordination of efforts and fast commercialization of new products. It was also posited that the internal factors like cost structure, revenues, Organization size, efficiency as well as external factors like economic activity, industry growth and profitability, level and intensity of competition, customer preferences can contribute in Organizational effectiveness. It has been suggested that Organizational effectiveness consists of three important processes viz. efficiency, adaptability and innovativeness (Gold et al., 2001).

The efficiency has been defined by economists as absence of waste. An efficient economy or Organization is known as one if it utilizes all its available resources and produces the maximum amount of output that its technology permits. Adaptability refer to the altering of a significant Organizational attribute and it could be business strategy or structure that would change in reaction to environmental changes and innovations and this also becomes a measure of knowledge management effectiveness. It refers to a degree of uniqueness that gives rise to a new or modified product, system, program or process (Baumol and Blinder, 1994). Finally, the purpose of this review is not to provide a new conceptualization of effectiveness or to argue for superior methods of measurement. Instead, it aims to argue for an appropriate conceptualization and measurement for a particular context of Organizational effectiveness in the selected objective area. Thus, this study utilizes the dimensions of
efficiency, adaptability and innovations which are very suitable for the R&D Organizational effectiveness.

1.3.2 Organizational Culture, Knowledge Management, & Organizational Effectiveness

The issue of Organizational Culture’s influence on knowledge management success has been raised in the literature. Some have investigated the way in which this influence manifests itself in the interaction between Organizational Culture and knowledge management. It has also been suggested that building and shaping culture is critical in an Organization’s ability to manage its knowledge more effectively. It is the interaction among individuals which becomes important in the innovation process. This interaction could be dialogues among individuals or groups which may lead to creation of new ideas and hence it can be viewed as having potential for creating knowledge (Gold et al., 2001). It also has been posited that the ability of a firm to learn, develop memory, and share knowledge is dependent on its culture (Turban and Aronson, 2001).

Most Organizations nowadays are quite dependent on their human capital. The Organization’s competitive advantage and their market value are increasingly dependent on their intangible assets, such as their knowledge, core competencies, and Organizational capabilities (Lawler, 2005). Also, it has been argued in the literature that the Organizational performance and growth are linked to and are dependent on successful human resource development management in terms of enhancing motivation, performance, involvement, loyalty and commitment (Sharabi and Harpaz, 2010).

In this age of Knowledge-based economy, knowledge power is the key to a nation’s economic growth and international competitiveness. Economic theory links the development of Research and Development (R&D) and human capital to the
economic growth of a country. It becomes the responsibility of the governments to
develop the technological infrastructure, including research Organizations and
education system and also develop institutions to protect intellectual property rights
which acts as the foundation for the development of innovation capabilities and the
pursuit of scientific research (Aghion and Howitt, 1992).

Thus, the knowledge management in an Organization has become one of the most
critical factors in an Organization’s success and competitiveness. Because of new
emerging technologies, scientific developments and changing economic relationships,
the knowledge of projects for Research & Development changes fast. In the 21st
century, management thinking is being profoundly influenced by two new thoughts:
First, managing Organizational knowledge is critical to attaining competitive success;
second, managing knowledge has become an important attribute and needs to be
considered as a basic skill requirement for every modern manager (Sanchez, 2001).

Knowledge is being viewed as the most crucial property of an Organization.
Managing this knowledge that is complex plays an important role in attaining success
for an Organization (Petit and Huault, 2008).

Knowledge is purported to be related to experience, beliefs, concepts, and ways of
working of the workers in an Organization and has the potential to be shared, utilized,
and communicated (Garrick et al., 2004). It has been proposed that knowledge is at its
root prosthetic and practical, still whatever we view as knowledge is de-contextualized
not only due to its abstract nature but also due to difficulty in understanding its
distinctiveness. Knowledge management is known as a discipline for identifying,
gathering, organizing, storing, sharing, and applying knowledge.

Many Organizations have felt the need for a new strategic approach due to the current
trends of the knowledge society where knowledge and the application of knowledge
are considered as the most crucial asset (Stehr, 1994; Barnett, 2003; Jansink et al.,
This approach envisages treating and managing the knowledge as an important source of innovation and a potential ingredient for creating sustainable competitive advantage (Numprasertchai and Igel, 2005). It has also been posited in the literature that losing the Organizational knowledge may influence the Organizational output and productivity negatively, diminish Organizational memory, and reduce Organizational learning (Massingham, 2008).

Knowledge management also encompasses management of researchers, experts, and innovation processes and organizing and enabling process of management and application. The effective knowledge management necessitates a culture in which knowledge and information are considered of high value by all the Organization members and all the knowledge processes become an integral part of the Organization's business processes.

As knowledge management concepts and applications are picking up in many Organizations, it is presenting unique opportunities and challenges for academic world (Garrick et al., 2004; Gustavs and Clegg, 2005). This has led the academic world to start considering knowledge, management as a managerial practice and have started to include the related topics in their academic programs. Knowledge management plays an important role in Research & Development institutions by enhancing research efficiency and effectiveness and providing value and benefits to research centers (Numprasertchai and Igel, 2005).

Furthermore, winning repatriation HR strategies encourages job satisfaction, connection with the Organization, and a readiness to share international experiences (Stevens et al., 2006). The mission of human resource development is made easy by a well-controlled knowledge management system. It works as a vital system that leverages human resource development. It offers an upper hand to the human resource
by providing a good awareness of the environment, Organizational, team and individual contexts supporting any Organization.

Various studies discuss the issue of Organizational Culture’s impact on knowledge management success. Organizational Culture is a cause of sustained competitive advantage (Barney, 1991) and practical research demonstrates that it is a vital issue for Organizational effectiveness (Denison, 1990; Denison and Mishra, 1995; Fey and Denison, 2003; Denison, et al., 2003, Brian et al., 2009; and Zheng et al., 2009). Gold (2001) review of the cultural environment conductive to knowledge management, recommended that molding culture is central to an Organization’s capability to control its knowledge more efficiently. To attain a competitive advantage, Organizations have to produce specific knowledge because specific resources are exceptional and tricky to reproduce.

One way to produce Organization-specific resources is human resource development. Human resource development and operation refers to the practices used for improving employee skills by means of training and new forms of knowledge and skill enrichment (Lepak and Snell, 1999). Further, when the human resource development is effectual it leads to the level of the human capital of employees to be elevated. So, we can say that human resource is a vital factor in the growth of the Organization. It is a major intention of this study to investigate the connection among Organizational Culture, knowledge management, HRD and Organizational efficiency and to examine whether the Organizational Culture and HRD affect Organizational usefulness through knowledge management in R&D Organizations. There are various researches on Organizational efficiency in knowledge management, Organizational Culture, and HRD, but only some studies focused on R&D Organizations and there is hardly any study on R&D Organizational success. In order to attain sustainable economic
growth, there is a vital necessity for the R&D profession to evolve an effective R&D management system.

1.4 Research & Development, Knowledge Management & Information Technology

A most important driver of knowledge management in current times is Information Technology (IT). India has a robust set of Science & Technology (S&T) guidelines and widespread network of about 2500 R&D Organizations. Most of them are Government supported. These Organizations comprise almost every branch and facet of research and technology varying from paleo-botany to spacecraft. Knowledge Management (KM) system is an expression used to illustrate the creation of knowledge repositories, enhancement of knowledge access and sharing as well as communication, enhancing the knowledge environment and controlling knowledge as an asset for an Organization. Knowledge Management System (KM System) is an IT based system for managing knowledge, supporting creation, capture, storage and distribution of information in Organizations. The KM system facilitates employees to have ready access to the Organization's documented facts and resources of solutions and information. The knowledge management (KM) structure is extremely vital for the Organizations that propose to put it into practice in the Organization. The KM systems can share important Organizational information that can help the organization to keep away from re-inventing the wheel each and every time, trimming down redundant work, cutting down training time for new employees and preservation of Intellectual Property created even after the employee leaves the Organization. Knowledge Management System is proposed to facilitate workers to have ready access to Organization’s documented foundation of solutions, facts and base of information. The crucial differentiation among knowledge management in contrasting
Organizations is how successfully each escalates knowledge creation and diffusion beyond a select few to everyone who needs it.

A model has been proposed in literature that illustrates six elements as a band of constraints that should be considered in managing R&D. The six vital elements of the structure which comprises open innovation, connecting with the world, knowledge management, public approach (Yellow river capitalism), balanced development (deliberative dictatorship) and communities of inquiry (comprehensive national power) are not given hierarchically but supposed to be considered as significant elements for working amicably in the contemporary world. The six elements structure is located in inclusive cross-industry and international networks or different oceans of “guanxi” and deep learning. It is feasible for the management of R&D to be in each cultural surrounding while still drawing on the exclusive common elements of R&D management and putting into operation these elements with out of the ordinary emphasis. An advantage of operating from one wide structure is the opportunity of developing better knowledge and assistance globally. Consecutively, global understanding in connection with the R&D management has the potential to benefit from the on the whole imagination and effort of the entire nations. The effortless integration of global innovation systems is an experiment that a common structure can assist to address since it will help to preserve courage of dialogue, support and an open attitude (OCED, 2007)

The connection among KM and R&D management is essentially close. Conversely, less concentration has been awarded to the development and execution of KM systems for R&D Organizations. Knowledge Management (KM) is a vital component of Research and Development (R&D) Organizations. Business Organizations continuously fight back to protect core competency to get hold of sustainable
competitive advantage. Such a great effort has unsurprisingly intensified fragmentation, abridged product life cycle and strengthening of competition in industries. The tendency is clearly obvious in sky-scraping technology industries such as computers, communications and electronics.

The competitive environment of the high technology industries are characteristically linked with speedy change and considerable vagueness and insistence on incessant enhancement in R&D capability (Parikh, 2001). As a result, high technology Organizations operating in the vigorously altering environment, recognize R&D innovation as an obvious challenge. To attain knowledge management-based modernization successfully in an R&D Organization, its basic characteristics should be taken into account basically in designing knowledge management activities. Two reviews demonstrate that lots of companies are even now looking to multiply their spending on R&D and innovation in order to drive growth, while the global economy continues to send mixed signals. A study organized by Battelle researchers and the editors of R&D Magazine on conducting Research and Development in the US exposed that total US funding for research and development (R&D) is likely to increase, but by just 3.3 percent in 2008. This spending of the federal government, along with that of academia, industry, and non-profit Organizations is expected to rise from $355 billion in 2007 to $367 billion in 2008. Industrial investments in R&D, which dominates, are likely to reach $258.7 billion in 2008, an increase of 3.4 percent over the 2007 level of $250.3 billion. The knowledge exhaustive nature of R&D shows the way for many scholars to highlight knowledge management as an essential means of R&D innovation (Kogut and Zander, 1992; Johannessen et al., 1999; Parikh, 2001; Forcadell and Guadamillas, 2002; Paraponaris, 2003). The fundamental principle of KM at R&D Organizations is to assist new product development in the course of knowledge creation.
There are characteristics of New Product Development (NPD) business processes that create particularly demanding challenges to Knowledge Management System (KMS). Donnellan (2006) states the KM questions faced by engineering teams employed in NPD and summarize the balanced method take on board by Analog Devices Inc. (ADI) that integrates together technical and socio-technical systems to encourage the product development process. Investigations on KMS have paid petty attention to NPD processes regardless of the fact that KMS technology seems to have the possibility to have an effect in that area. Ramesh and Tiwana (1999) analyzed the NPD process for a Personal Digital Assistant operating system and moved on to develop a sample system to encourage collaborative NPD. New Product Development typically commands incorporation of diverse knowledge to recognize synergetic effects (Nonaka and Taekuchi, 1995; Devenport et al., 1998, Parikh, 2001; Rodan, 2002; Paraponaris, 2003). Court, Culley et al. (1997) explored the purpose of information in NPD teams and reported on the purpose of information technology to encourage the product development process. The methods by which the NPD team members rescue, utilize and consequently convey the information, were analyzed. An important finding was that even though team members have access to Information Systems (IS) tools and services, in spite of everything they preferred to make use of manual and verbal methods of communication and information recovery. This favored preference may propose that computer information access and storage is even now at the immaturity stage and as a result is used with lack of enthusiasm by design teams. A vital challenge that became visible to the researchers was the wide-ranging use of personal information stores and the nonexistence of easy-to-use indexing systems. As such, it is important in KM in R&D Organizations to attend to successful knowledge flow among individual researches and research units as well as knowledge collaboration across Organizational boundaries with customers and/or partners (Kogut
and Zander, 1992; Parikh, 2001; Paraponaris, 2003). Parikh presented additionally an information technology demanding knowledge management cycle model, a purpose of which would be a KM based new product development model.

Scott (1996) presented a structure that divided the NPD process into three phases and then categorized the types of knowledge and IS appropriate for each phase. The initial phase is the pre-product phase and the knowledge necessities at this phase are linked to what has been learned about the products in the past and how that understanding can be employed to the planned project. Groupware and Intranets are seen as IS support systems that can assist the initial phase. The next proceeding phase is interest with the actual product design activity and concentrates on the design decisions that are taken and the IS that can present decision support. The final phase concentrates on production matters that occur after design. Product data management and IS are seen as appropriate at this stage, as well as Video Conferencing to assist coordinate production planning.

Recent studies further put forward the significance of internet networking in facilitation and innovation in knowledge flow. In multinational companies, the use of dispersed constellations in R&D activities is seen to increase. The underlying principles behind this may differ and in a lot of cases, the perfect condition is not a discrete development team. This scattering of teams leads to intensifying the challenges due to communication and incorporation issues and a co-location of development attempt is often observed as added benefit when possible. Multinational conglomerates have conventionally functioned in a centralized R&D structure. It has lately been recognised that to attain competitive advantage, Organizations must constantly create, transfer, and make use of knowledge that is more and more dispersed all through their global working. It has been declared that the conventional
centralized R&D framework that was seen in the post-war years is slowly being displaced by the emergence of global R&D networks. The reasons given for this change are that the number of knowledge sources is escalating and it is essential to utilize the best to stay competitive and that the necessity to adapt to local needs calls for local presence. Further, these multiple sites promote the development of additional ideas due to the mixed international upbringing in global networks. The function of virtual teams presents considerable challenges for Organizations wanting to deploy them. In recent studies on scattered teams it is understood that the global teams have revealed inferior performance than co-located teams. Even though lots of these challenges are there in conventional teams, they may turn out to be further more evident in virtual settings. Knowledge management turns out to be extraordinarily significant for the Government led-R&D projects as we know that implicit knowledge is a crucial factor for the success of government-led R&D project selection, where quick and precise decision making is required to be made under lack of information situation. Government Organizations largely concentrate on so-called “selection and focus” strategy which needs implicit and action-based knowledge. In view of the fact that R&D is exclusive and ambiguous in nature, decision-makers have no adequate explicit knowledge upon which to rely. As R&D is a “Solution-Chasing Problem” in which problems can be recognized only after the projects have been finished (Cole, 1989), it is almost not possible to forecast its costs and advantages in advance (Meredith and Mantel, 2000). Further, quick changes in technology and the market do not permit decision makers to have enough time to gather actual data. In this respect, Isenberg (1984) claimed that implicit knowledge is a crucial element for strategic decision making, especially in R&D.

R&D has been considered for a long time in various contexts, economies, and environmental difficulties throughout the years. The changeover from early days of
flourishing markets and economic growth in the 1950s to today’s exceedingly competitive and global marketplace is getting reflected in the way the R&D it is managed. The early success stories of the industrial research laboratories like Bell Labs, Xerox Parc and Lockheed Martin Skunkworks have been replaced by those of the companies like the additional market-focused 3M, the quick launching of new product ranges from Japanese manufacturers like Toyota and Sony, and R&D collaborations like Ericsson network of companies covering the “Bluetooth” technology and standard.

Managing R&D is aimed at attaining the most favorable conditions for systematizing and controlling functional activities. The objectives have been influenced by deregulation, distorting boundaries and meeting of industries and technological discontinuities where a lot of Organizations have been forced into concurrently re-inventing themselves as information and communication technology industries. This means that research Organizations have been required to obtain dynamic meta-capabilities such as collaboration, networking and virtual work as strategic foundations for the escalating complications of modern R&D management.

The outlook on R&D development has been conflicting all through the years since the framework and fundamentals of the economy have altered and so has the opinion on most excellent practices. One effort for illustrating the last 50 years of development inside the R&D field is shown in Table I.3. The five models of R&D generation are offered on a period scale, their constituent components or design which is still applicable and required by many companies, and for this reason do not signify a map of where companies are to be positioned today. The numerous industries or companies have performed as role models or drivers of best practices, an experience that can also be predictable from research results all through these periods.
<table>
<thead>
<tr>
<th>R&amp;D Generations</th>
<th>Context</th>
<th>Process Characteristics</th>
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<tbody>
<tr>
<td>First Generation</td>
<td>Black Hole demand (1950 to mid-1960s)</td>
<td>R&amp;D as ivory tower, technology-push oriented, seen as an overhead cost, having little or no interaction with the rest of the company or overall strategy. Focus on scientific breakthroughs.</td>
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<tr>
<td>Second Generation</td>
<td>Market shares battle (mid-1960s to early 1970s)</td>
<td>R&amp;D as business, market-pull oriented, and strategy-driven from the business side, all under the umbrella of project management and the internal customer concept.</td>
</tr>
<tr>
<td>Third Generation</td>
<td>Rationalization efforts (mid-1970s to mid-1980s)</td>
<td>R&amp;D ad portfolio, moving away from individual projects view, and with linkages to both business and corporate strategies. Risk-reward and similar methods guide the overall investments</td>
</tr>
<tr>
<td>Fourth Generation</td>
<td>Time-based struggle (early 1980s to mid-1990s)</td>
<td>R&amp;D as integrative activity, learning from and with customers, moving away from a product focus to a total concept focus, where activities are conducted in parallel by cross-functional teams.</td>
</tr>
<tr>
<td>Fifth Generation</td>
<td>Systems Integration (mid-1990s onward)</td>
<td>R&amp;D as network, focusing on collaboration within a wider system — involving competitors, suppliers, distributors, etc. the ability to control product development speed is imperative, separating from R and D.</td>
</tr>
</tbody>
</table>

*Source: Description of five generations of R&D processes (developed and adapted from Roussel, 1991, p. 39; Rothwell, 1994; Miller and Morris, 1998, p.19; and Chiessa, 2001, p.12)*

Table 1.3
During the first generation of R&D (1950 to mid-1960s), the majority of the fresh products that were created were also sold, new industries came into view and technology was by and large seen as the medication for all the complaints. The first generation of R&D performed under the hypothesis that the more the R&D, the more products were created. In a nutshell, R&D was seen as an operating cost. When considering R&D as a process, it was regarded as linear and as alerted on approaching technology downstream towards the marketplace – a marketplace described by a command matching or at times beyond the supply.

In the course of the second generation of R&D (mid-1960s to early 1970s), the supply and demand were in an extra durable association, rivalry was built up, and additional importance was located on marketing effort to amplify the sales volume. Inside the atmosphere, more focus was placed on the short-term demand side, ignoring long-term study in favor of ideas from the market. Process-wise, the market-pull effect was reinforced and the process was seen to some extent contradictory as contrast to the first generation of R&D, i.e. ideas started off from the market, to be improved and developed by R&D. Project management was also established to instruct and supervise the R&D effort, and the business side as the internal customer of R&D was highlighted.

Further, the third generation of R&D can be distinguished during the period of mid-1970s to mid-1980s, when the economy was buzzing with high rates of inflation and command saturation. Cost control and cost cutting turned out to be the name of the game, leading R&D to eradicate wasteful ways by evaluating and improving the way new technology was developed and supervised inside the company. The strong process-focus resulted in a further connected and interaction-focused view of R&D, bringing together the technological competence more intimately together with the
market requirements. The portfolio outlook of R&D resulted in many traditions of matching the risk-reward range of possibility of technical and market success.

In the fourth period ranging from early 1980s to mid-1990s, the economy improved and business people again thought of diversification strategies in support of turning to their core business, all under a time-based rivalry model driven by Japanese companies like Toyota, Sony and Honda. On the whole, the automotive industry was immensely targeted and functioned as a role model for countless others. The center of attention transferred from developing products to putting the product in a total business concept, together with services, distribution, and multi-product platforms also. With regard to R&D process, the new product development process was emphasized and the incorporation and concurrently-happening activities were brought frontward as success factors when motivated for speed.

In conclusion, the fifth generation of R&D widens the limitations for companies' R&D actions in the light of amplified global competition, quick technological change and the necessity for sharing heavy technology investments. Consequently, R&D was required to relate with the business environment, e.g. competitors, distributors, customers, suppliers, etc., placing more importance on the capability to match and incorporate systems from various parties. Examples of this type of prompt system incorporation are companies from the computer hardware and software industry, e.g. Microsoft Corporation, Netscape Corporation and Dell Corporation. Supplementary, there was the need for the capacity to be speedy in product development and to manage the speed and therefore, being timely is the strategy. In line with this reason, cutting down the ambiguity due to development by separating the more research-oriented tasks is one common approach and thus, strengthening the prerequisite for effective and efficient integration of a coherent whole.
But knowledge management was not supposed to be equated along with IT. Human beings are the ones who think, experiment and learn to create knowledge. To a great extent, the valuable knowledge that lies in the brains and minds of people can be most excellently shared through human communication. IT is just a facilitator, though in the words of famous journalist, Thomas A Stewart, 'it is one hell of an enabler'. With no IT, it would be fairly complicated to duplicate and spread out knowledge linked documents in a cost effective way across an Organization that is geographically dispersed. As Stewart mentions, "Knowledge Management is knowing what we know, capturing and organizing it and using it to produce returns. Definition says nothing about computers but modern knowledge management is unimaginable without using them and in some sense they created it."

1.5 The Problem

Data and/or information simply cannot be termed as Knowledge. Knowledge management is ingrained in human understanding (Oltra, 2005) and social context (Alavi, 2001), running it requires consideration of both the information technology and the people (Havens and Knapp, 1999) in the Organization.

Indian R&D Organizations today are in the midst of technological revolution. Knowledge Management is becoming a key strategic component due to the combination of globalisation and increasing competitive intensity. R&D Organizations are facing an immense challenge, as although the need for induction of latest KM systems has become a foregone conclusion, there are concerns about the effective implementation of the KM systems and the return on these huge investments.

The continuously evolving changes in business environment and technology are bringing forth upon issues that need to be tackled by R&D Organizations. The
mindset of stakeholders has to change radically towards various aspects of KM technology for the survival of their institutions. To gain competitive advantages, the R&D institutions in the 21st century would need to constantly leverage latest technology and continuously introduce innovative products/services and reuse their knowledge assets (Gulati et al., 2002).

KM's role as a vital component in the transformation of an Organization has to be understood and appreciated by managements. KM purports to provide impetus to the Organization's ability to change and to respond fast for immediate and direct economic benefit. It also streamlines the administrative processes and facilitates the decentralization of the scope and scale of the business (Farbey et al., 1994).

KM has provided the Organizations wherewithal to be more efficient, flexible and economically powerful. It will continue to be the centrepiece of the modern day network in Organizations and enable them to be more self adaptive, reorganizing and explorative. Even though KM seems to be playing such a crucial role in the Organizations what is important is to always keep in mind that it is not the only reason of progress or change. The aspect of human elements, basically personality issues and cultures play an important role in Organizational operations including the effective and efficient deployment of KM (Chan, 2000).

The major contribution of KM to an Organization is in enabling business processes and work practices and increasing productivity by reducing costs and increasing output quality (Brynjolfsson and Hitt, 2000). All these benefits can be watered down or even negated by user opposition to the beginning of new innovations and technologies in an Organization. This aspect has become one of the most studied at present.
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For Indian R&D organizations, to cater to this frequently altering external background, it is becoming vital to consider KM as the strategic module that can help an R&D organization to make over them. How such KM adoption process will interact with internal Organizational environment and adoption factors needs to be understood better for facilitating this process.

Knowledge Management processes of an Organization are implanted in group settings which greatly control these processes (Alavi, Kayworth and Leidner, 2006). Many researchers and professionals (e.g. Lopez et al., 2004; Kulkarni, Ravindran and Freeze, 2007) consider that an Organizational Culture that is supportive and adaptive can facilitate the successful achievement of Knowledge Management technologies as well as practices. The earliest references to Knowledge Management date back to the 1980s (Martensson, 2000). As a result of the relatively young body of theory and research in Knowledge Management, the related literature is characterized by a lack of consensus in the definition of knowledge development which is paralleled by the lack of widely accepted theoretical frameworks and the inconsistencies in research findings (Fahey and Prusak, 1998). Therefore in addition to Knowledge Management, this survey focuses on examining literature from related fields that constitutes theoretical foundations for knowledge management. These fields include Organizational learning, Information system, Organization theory and Organizational behavior.

There are various researches on Organizational efficiency in Organizational Culture, Knowledge Management and Human Resource Development, but only some of these studies focused on R&D Organizations and roughly any study on R&D Organizational success. In order to attain sustainable economic growth, there is a vital necessity for the R&D profession to evolve an effective R&D management system.
The present research purpose is to study the Organizational Culture and Knowledge Management in selected Indian R&D Organizations. This study aims to contribute to reducing the gap that exists in determining the role of Organizational Culture in Knowledge Management realization in Organizations. In particular, this research aims at investigating the relationship between Organizational Culture and the Knowledge Management implementation in the selected Indian R&D Organizations. Following an extensive literature review, a conceptual model that represents the interaction of Organizational Culture and Knowledge Management success has been developed.

1.5.1 Justification

As Knowledge Management concepts and applications are picking up in many Organizations, it is presenting unique opportunities and challenges for academic world (Garrick et al., 2004; Gustav and Clegg, 2005). This has led to academic world to start considering Knowledge Management as a managerial practice and have started to include related topics in their academic programs. Knowledge Management plays an important role in Research and Development Institutions by enhancing research efficiency and effectiveness and providing value and benefits to research centers (Numprasertchhai and Igel, 2005).

Research and Development Organizations today are embarking upon Knowledge Management programs for gaining competitive advantage. The study aims at investigating the relationship between an Organization's success at Knowledge Management functioning and how the Organizational Culture supports the development. As the Organization is accountable for its spending of funds, careful considerations have to be made to avoid failures and unnecessary wastage in Knowledge Management implementations. There is a lack of empirical evidence about what are the specific cultural variables that support Knowledge Management
processes and help in development of knowledge culture (Oliver and Kandadi, 2006). Therefore, the purpose of this study is to expand the base of knowledge in the area and empirically test the relationship between elements of Organizational Culture conducive to Research and Development and Knowledge Management in the Indian R&D Organizations.

1.6 Research Objectives

The main objective of this work is to study the relationship between elements of Organizational Culture conducive to Research & Development and Knowledge Management success in Indian R&D Organizations.

As Indian R&D Organizations are trying to leave behind their traditional approach to R&D and aim for growth of the Organizations through R&D Management activities, they are redefining a Future Vision and Strategic Goal for the Organization for development of new products/processes/services, R&D Human Resource Management, and Cultural Audit through R&D in Information Management Systems and development of new valuable Intellectual Property. This study examines the influence of Organizational Culture facets such as Intellectual Property Management, R&D Human Resource Management, R&D Management Activities, and R&D Information Management Systems on accomplishment of Knowledge Management.

The objectives of this study are:

1. To study the status of 'Knowledge Management' in selected Indian R&D Organizations;

2. to study the elements of Organizational Culture that influence the knowledge management process;
3. to study the relation of Organizational Culture and Knowledge Management in selected Indian R&D Organizations and develop a suitable model depicting this interaction process;

4. to study the elements of the Organizational Culture such as Future Vision and Strategic Approach of an Organization, the Workforce Training and Development, the Cultural Audit process and Intellectual Property Management.