CHAPTER 4

MECHANISM AND CHALLENGES OF APPLICATION OF EKM IN IT BUSINESS CONTEXT

4.1 Introduction

In the past decade, a number of experiments have been carried out in relatively prosperous organizations with an objective to yield strategic advantages of Knowledge Management (KM). Researchers have worked on possibilities of effective implementation of KM in organizations (Davenport and Prusak 1998, Davenport et al. 1998). And KM Initiatives are considered as a costly affair with unpredictable result as well. There has to be fair Mechanism defined for successful application of EKM in the IT companies. There are certain influencing factors those need to be identified and managed, immaterial of whether the company is a small scale or a medium scale or a large scale organization.

There are several important core and non-core business processes that make the business run and EKM need to cater all the information requirement essentials for the same. Today the world is experiencing a major technological revolution, centered on Information and Communication technologies (ICT). Under the impulse of ICT, new technologies and flexible forms of Human Resource Development (HRD) and management, the formation of a new economy, characterized by rising growth, innovative learning methods, more educational advancement, more technical advancement; new web based training methods, overall employee development, global opportunity, global competition and more information sharing.

It is believed that; KM processes involve major investments in a wide spectrum of areas related to knowledge capture, storage, value addition, distribution and finally educating employees about the benefits of knowledge creation and sharing (Davenport 2000). KM process is an interesting synergic mix of human, communication and IT tools (Petresh 1996). IT plays an important role in efficiently storing, distributing and adding value to knowledge (Ruggles 1997). It is experienced that IT and Communication Technology have developed a rich state of sophistication and are capable of performing knowledge exercises efficiently (Van der Spek and Spijkervet 1997).
Along-with these sophistications and benefits, there are certain challenges as well associated with them which need to be taken care. Also many of the researchers observed that it is majorly the human component that failed to create satisfactory effort and support in developing efficient knowledge system in an organization (Davenport 1997, Hickins 1999, Cross and Baird 2000, Asllani and Luthans 2003).

4.2 Key Business Process and EKM

A business process basically can be understood as a set of logically related business activities that combine to deliver something of value which could be a product or a service or even information to the desired client. Business processes can be seen individually, as discrete steps in a business cycle. There are several business processes in an enterprise that are associated with the functional view of that enterprise.

Most large organizations are structured into divisions and departments (e.g. sales or finance departments) that are dedicated to performing specific functions and staffed with personnel who are expert at those functions. Business processes cut across these organizational divisions. Where different activities in a process require different skills, the process is likely to involve a number of people and departments.

E.g.; one illustrative business process could be “Hiring an employee”. Now in this example: One of the projects in an organization raised a “Request of additional resource”, the resource management group raised an “internal request for the resource”; when not found within the organization, request was forwarded to the HR Department; The HR Department arranged for the “Hiring of a New employee”. Now in this case, the work flows through several internal departments. However, from the customer’s point of view, a single process has taken place.

A business process is made up of a hierarchy of activity levels. These levels are typically given labels such as “sub-process,” “activity” and “task”. Different process design projects will target different areas of business activity, according to organizational focus and requirements. However, most process design projects are driven by a combination of these common requirements;

a) The need to increase efficiency

b) The need to evaluate business practice as part of an organizational Development project.
c) The need to evaluate potential new business ventures (e.g. joint ventures or alliances) or business offerings.

d) The need to manage the company’s knowledge resources.

Organizational structure throughout many diverse industries may be not similar, but all these organizations perform similar Business Processes. Whether it is a corporation, a government agency, or a non-profit association, to a large extent, it shares common Business Processes with other industries. The Business Process of Human Resources for one industry can be very similar to another. In fact, the Human Resource Business Processes may even be a Critical Success Factor for another industry with which a comparison can be considered very important exercise to Benchmark the business process. A Common business process framework indeed forms a quality base or a foundation of the famous Software Engineering Model proposed by SEI (Software Engineering Institute). Such a framework would strengthen the EKM Model effectively. In-fact this point has been considered and reflected in the proposed EKM Implementation Model given in Chapter 7 further.

KM is practiced with varied intensity in many organizations today, and here the difference is at the speed with which they need to gear up to manage this ever-evolving knowledge. EKM thus encompasses the management of all the key business processes and functions that can have an impact on the innovation process and on the leverage of different sources of knowledge to respond to customer needs.

The literature on organizational development presents numerous approaches to “Knowledge Management”:

- Individual and organizational learning (organizational culture);
- Relationships between employees, different areas of the company, different companies and the environment;
- Development of individual and organizational competencies;
- Mapping, codification and sharing of organizational information;
- Connectivity among employees;
- Leveraging of recent advances in IT and telecommunications;
- Measurement of the intellectual capital of the company.

It is also important to highlight some of the taxonomy (Nonaka & Takeuchi, 1995) for knowledge in organizations. Accordingly, knowledge can be:
• Individual or collective
• Implicit (tacit) or explicit;
• Internal or external;
• Stock or flow.

These approaches and taxonomies complement each other. KM actually connects the capacity of companies to locate, use and combine various sources and types of organizational knowledge; in order to develop specific competencies and innovative capacities. These may further translate into newer and better enriched products, processes, management systems, customer responsiveness and market leadership. The main source of knowledge and competitive advantage of companies is their human capital, the tacit knowledge of their employees. Tacit knowledge is difficult to imitate, copy or “reengineer”. It is both individual and collective, takes time to build and is, in a sense, invisible, since it resides inside the head of the human resource.

4.3 Application of EKM: Strategy And Practicing recommendation

The 21st century exhibits challenges to the organization to continually change and adapt to numerous external forces, including globalization, new technologies, and unpredictable and ever-changing political conditions.

Dimattia and Oder (1997) paid attention to the knowledge management involved in blending a company’s internal and external information and turning it into actionable knowledge via technology platform. The internal orientation of knowledge management is primarily source for HR information within the organization. It uses knowledge expert directories, video-conferencing tools along with knowledge Management techniques for HRM (Aroop and Ganesan, 2010) To successfully implement these strategies, organization must build strategic capabilities, which organization uses to transform its resources and create a value.

There are three common application strategies applied with respect to organizational knowledge management initiatives that are found in any well-established IT company:

a. The coding and sharing of best practices: The most popularly and widely seen strategy is the coding and sharing of best practices. It is very effective as it give a detail illustrative experience as well as the benefits reaped therein.
Many companies have their common pool of knowledge that is well shared on a central knowledge repository which is active guideline.

b. The creation of corporate knowledge directories: A common application of knowledge management is the creation of corporate directories, also referred to as the mapping of internal expertise. Because much knowledge in an organization remains un-codified, mapping the internal expertise is a potentially useful application of knowledge management (Ruggles, 1998).

c. The creation of knowledge networks: A third common application of knowledge management systems is the creation of knowledge networks (Ruggles, 1998). That is establishing setting inter-linkages and bridging people together virtually and face-to-face to exchange and build their collective knowledge in each of the specialty areas.

As a matter of fact; one survey found that 74% of respondents believed that their organization’s best knowledge was inaccessible and 68% thought that mistakes were reproduced several times (Gazeau, 1998). It indicates that only applying EKM is not enough but developing a strategy to utilize it appropriately is as well a vital area to look into; in the day-to-day business routine. As a result, not only the routine but the Decision-making performance may as well get adversely affected since the best knowledge is sometimes not available to those who need it. Therefore organizations should develop EKM strategy, provide organizational structure for its implementation, allocate an adequate budget for the planned activities, provide incentives to the staff to implement and improve the process and, at the end of each activity, evaluate the performance compared with the expected results to enable feedback for continuous improvement of the process

- **Fostering a knowledge sharing culture**

In the knowledge based economy, knowledge sharing is not merely an alternative strategic option; it is required for organizational survival. Measures for the aggregation and sharing of knowledge should be initiated and a more open, knowledge sharing culture should be fostered within the organization.

Capturing what is already known by someone else in the group and adding one’s own knowledge is faster and more efficient than an individual reinventing a solution. Starting and implementing knowledge sharing in an organization must be done from inside the organization, not grafted from outside. Experience indicates that most
successful knowledge sharing programmes are driven by insiders. The insiders must own the process, be involved in all aspects of it, make the changes happen and encourage others to make the changes. At the same time, the insiders must use the outside world to validate and push the agenda forward within the organization; for example, using external recognition and knowledge fairs and expos as ways of showing that what is happening internally is valid and adds value.

- **Establishing Best Practice Groups/forum**

  The communities of practice are called as thematic groups, learning communities, learning networks, and best practice teams/groups in different companies. It is essentially the formation of professional groups facilitating staff to come together voluntarily to share similar interests and learn from other’s skills. Knowledge sharing on a significant scale is observed to take place only in organizations that have organized themselves into communities of practice. These forum need to be integrated into the company’s strategy and its organizational structure. However, they are a non-hierarchical phenomenon and management hierarchies have generally had considerable difficulty in learning how to nurture them.

  Modern organizations have been built on a rational and mechanistic approach to problem solving. However, experience shows that communities of practice only flourish when their members are passionately committed to a common purpose. This is a hard lesson to learn for companies and executives who have spent their lives trying to keep emotion out of the workplace.

- **Upgrading information management**

  Successful knowledge organizations have learned that building web sites and offering knowledge management IT tools neither create nor transfer knowledge by themselves. Employees stop visiting these web sites or using these IT tools if a community of practice is not bringing credibility and contributing content to these instruments. IT tools are made to facilitate knowledge sharing among users rather to constrain the emergence of a sharing culture by imposing complex technical requirements. An important insight is that building a ‘learning organization’ requires building communities within which that learning can take place. Without communities linked to structure, organizations do not learn very fast.

  HR practitioners need to play a proactive role in IT industry. As business partners, they need to be aware of business strategies, and the opportunities and threats facing the organization. As strategists, HR professionals require to achieve integration and
fit to an organization's business strategy. As interventionists, they need to adopt an all-embracing approach to understanding organizational issues, and their effect on people. As innovators, they should introduce new processes and procedures, which they believe will increase organizational effectiveness. (MadanmohanRao, Nicoles200)

- **Knowledge Mapping and Competency Mapping**

One of the most effective and recommendable way to implement KM initiative is creatively start knowledge mapping or what in some organization it is called as competency mapping.

It's an ongoing quest within an organization to help discover the location, ownership, value and use of knowledge artifacts, to learn the roles and expertise of people, to identify constraints to the flow of knowledge, and to highlight opportunities to leverage existing knowledge.

Knowledge mapping is an important practice consisting of survey, audit, and synthesis. It aims to track the acquisition and loss of information and knowledge. It explores personal and group competencies and proficiencies. It illustrates or "maps" how knowledge flows throughout an organization. Knowledge mapping helps an organization to appreciate how the loss of staff influences intellectual capital, to assist with the selection of teams, and to match technology to knowledge needs and processes.

- **Knowledge Maps**

Creating directories or visual representations, i.e., charts or maps, of knowledge repositories can be an early, tremendously useful exercise in knowledge management. The knowledge maps serve as a blueprint to pinpoint knowledge sources and will facilitate finding relevant information and knowledge pockets in the organization. Developing the knowledge maps requires extensive observation and communication with various communities about business issues they deal with, key processes, how things actually get done in their part of the organization, interrelationships between work groups, information resources used, knowledge bases created, and transfer of learning and experience, among other things. Mapping efforts at IBM which resulted in a successful publication, IBM’s Guide to Market Information, are described in Information Ecology: Mastering the Information and
Creating a knowledge map for all organizational knowledge is a daunting task and is best done with a building block approach. For construction of a comprehensive map, one of the fundamental building blocks is a map of the expertise in your organization. Quickly connecting people to other people with specific expertise for guidance, instruction, or discussions about a business issue can decrease learning curves, increase employee satisfaction, prevent reinvention-of-the-wheel activities, and produce better business decisions. Employee expertise maps can be used to identify employees to participate in short- or long-term projects, to provide training in their area of expertise, and to consult on specific business questions.

Maps of organizational expertise can be portrayed in several ways. One mapping option is simply an overlay of the organization chart, although this may not allow the user to easily discern clusters of expertise. Maps of expertise by geographic location can be valuable in large, dispersed organizations. Maps organized by people working in a particular business function or by business teams/communities of practice may be the most intuitive for the user—especially if the labels used to describe functions or teams are commonly used and understood throughout an organization. The map of expertise should be backed by a database detailing skills, experience, expertise, and location/contact information such as email and phone numbers, at a minimum. Some data elements required for a database of employee expertise may be contained in employee databases maintained by Human Resources that can be ported to this application.

IT professionals typically have a strong network of people contacts developed from their efforts to locate information. They also have an understanding of types of expertise most frequently sought and are thus, invaluable participants in expertise mapping efforts. Mapping tasks are never complete; in order for maps to be useful, they must be updated and maintained.

Companies like TechMahindra Ltd, have recognized the significance of personnel competencies as an asset in contemporary business. As competencies of personnel are differentiated also knowledge sharing and competency development have becoming important issues. As a part of the Appraisal process governed by the HR entity along with the support of the Training Division runs the competency mapping drive. Under this initiative a repository of all available and projected skill
sets is maintained and mapped with the desired role and profile of candidate. Based on this mapping, the role based training is automatically assigned by the reporting manager with given deadlines.

A challenge for managers in the current turbulent environment will be to foster employee involvement to create the vision of the organization and it becomes more difficult to specify goals and long-term objectives. Such employee involvement could facilitate development of strategies in real time, in agreement with the organization's vision and its implementation in real time. Employees as users and creators of knowledge must be autonomous roles of self - leadership and self - regulating, because they place so as to seize the dynamic changes in their immediate environment. Managers will need to encourage employees to work with incomplete information, based on their judgments and taking decisive action and to capture niche increasingly narrow opportunities. In the new economy, control of the employees will be ultimately self-imposed.(Hincu And Luban,2009). In spite of the important advantages of the access to knowledge they need, often employees from the organization do not want to share knowledge with their colleagues because of the fear to loss the inherent advantage in organization. Although, for knowledge sharing sophisticated technology exists, the human behavior may lead to a partial and ambiguous knowledge sharing. A favorable culture could contribute to motivate individuals to share their knowledge and to absorb any knowledge received, to minimize ambiguity of context and transferred knowledge and to facilitate the flow of knowledge between source and recipient.

- The training perspective :

One of the most applied purposes of undertaking Training from HR point of view is transferring information and knowledge to people and equipping them to translate that information and knowledge into practice with a view to enhancing organization effectiveness and productivity, and the quality of the management of their resource people.

Moreover, it is also essential that in an organization there should be staff having the training skills with proper developed training methodology and techniques too. Else it would be a scenario that they will be able to transfer knowledge on the basis of their experience but not the skills to apply the knowledge to particular situations which arise in enterprises. And it is observed that it indirectly affect productivity of
an organization in the long term; and productivity is increasingly the application of knowledge.

Few examples in this context such as negotiation, workplace mechanisms to improve workplace relations and human resource management policies and practices such as:

- Recruitment, selection, induction
- Performance appraisal
- Leadership and motivation
- Employee retention
- Wage and salary determination

All the above practices need information dissemination and extraction predominantly; from time to time. Knowledge Management Cycle although not coined to be the term shows its existence and impact in all these practices. This knowledge transfer maybe through direct interaction formally or informally but an effective measure is carrying our training and development programs. As a matter of fact it is essential to raise awareness call for the need for increased investment in the development of human capital as an essential condition for achieving competiveness and remain updated with the dynamics of business situations as well as technological advancements. Training and Development programs empower the human resource of an organization.

- **Defining a KM Methodology:**

Typically for Knowledge Mapping mentioned earlier in this chapter; the knowledge management strategy could be based on identifying the critical knowledge to be preserved. The methodology could be to prepare a knowledge map that structures the knowledge of an area or domain and enables a comprehensive visualization of the domains of available knowledge in the company.

To evaluate the critical importance of the items of knowledge the following characteristics were observed in various organizations: rarity and inability to replace; strategic usefulness to the company; level of difficulty in identifying the source of knowledge; and level of complexity in using the knowledge. The knowledge map also facilitates the design and development of a knowledge portal and an inventory of the knowledge accumulated in the organization and for collecting the tacit knowledge residing with many retired/exiting specialists.
There could be ten strategies identified for successful KM implementation based on the given literature reviewed so far as well as the qualitative research study undertaken;

1) Establishing a KM Methodology: KM Methodology follows seven steps
   i. Problem identification – to be focused and projected among group of interest in context to the enterprise.
   ii. Prepare to face the change- A paradigm shift required to get equipped from skill-set as well as mindset point of view.
   iii. Formation of knowledge management team- with key people identified with detailed roles, responsibilities and reporting schema.
   iv. Mapping out the knowledge (of the person who possess and one who desires) - requires innovative ways to recognize knowledge “silos” and use the resources optimally.
   v. Continuous feedback Mechanism- would be the backbone of this methodology which needs strong technological support to store as well as keep a follow-up and update.
   vi. Define building blocks for KM system - consisting of structure or frame work for knowledge repository, knowledge retrieval system etc.
   vii. Appropriate integration of existing information system- crucial to absorb the existing schema and merging with the proposed without any spilling-off of knowledge.

2) Designate a point person (CKO: Chief Knowledge Officers or similar key person)

3) Empower Knowledge Worker (KW)

4) Management of Customer Centric Knowledge

5) Manage core competence- manage as well as map it with relevant business process and workplace mechanisms

6) Foster collaboration and innovation

7) Learning from the best practices in the industry as well as those defined within the enterprise.

8) Extend knowledge Sourcing

9) Interconnect communities of expertise (Internal/External resource experts to the business enterprise)

10) Report the major value of knowledge asset
Executing these ten strategic steps could certainly enhance the effectiveness of KM initiative.

- **EKM Implementation And Practicing recommendation**

According to Grant (1996), the essence of organizational capability is the integration of individuals’ specialized knowledge to create value through conversion of inputs to outputs in the form of organizational products and services. He further identifies three primary mechanisms for the integration of knowledge to create organizational capability: directives, organizational routines, and self-contained task teams. Directives refer to the specific set of rules, standards, procedures, and instructions developed through the conversion of specialists’ tacit knowledge to explicit and integrated knowledge for efficient communication to non-specialists (Demsetz, 1991).

The need to sell the EKM concept to employees shouldn't be underestimated; after all, in many cases employees are being asked to surrender their knowledge and experience — the very traits that make them valuable as individuals. Global IT companies are successfully leveraging KM to capture best practice, improve project management, nurture innovation, enhance customer service, re-use software code, implement newer methodologies for software development like Agile and expand across boundaries of technology generations and varying the maturity levels of market. In IT sector, software is often called the ‘quintessential knowledge industry’, with software being an artifact which is purely knowledge creation and which challenges the industrial age economics in today’s Internet age.

There are six key attributes of knowledge which must be factored into KM Practices, according to Khuge et al (2001):

1) Subjectivity (context and Individual background shape the interpretation of knowledge)
2) Transferability (Knowledge can be extracted and transferred to other context)
3) Embedded-ness (knowledge is often in a static and buried form that makes it difficult to extract or reformulate.
4) Self- reinforcement( the value of knowledge increases and not decreases when shared)
5) Perish ability (Knowledge can become outdated)
6) Spontaneity (Knowledge can develop unpredictably in a process)
One way companies motivate employees to participate in KM is by creating an incentive program. However, there's the danger that employees will participate solely to earn incentives, without regard to the quality or relevance of the information they contribute. The best KM efforts are as transparent to employees' workflow as possible. Ideally, participation in KM should be its own reward. Again the good old tool of Training in the form of orientation clubbed with incentive and appreciations may work, along-with with the fire in the belly attitude (self-motivation). If KM doesn't make life easier for employees, it will eventually fail.

It would be worth pin-pointing those several factors that may have an impact on the application of EKM especially in context to the companies in IT sector.

4.4 Factors affecting application of EKM

There are various factors responsible for the success and failure of application of KM in an IT organization. For any growing company this is of prime importance as it could come out to be a winner strategy for its success in the short term as well as long term scenario.

Accordingly, there are 21 significant factors observed during the pilot study which were later considered; after normalizing the main list of factors observed in the IT companies in and around Pune (refer list given in table no.2.6). Few research citations to support the listed factors considered as important aspect of this research study have been given below;

Davenport et al. (1998) conducted a study on 31 projects in 24 companies in 1998 to evaluate success factors in KM projects (Davenport et al. 1998). Eighteen projects were determined to be successful; five were considered failures, and eight were too new to be rated. The common factors identified among successful KM projects in this study were - senior management support, clearly communicated KMS purpose/goals, linkages to economic performance, multiple channels for knowledge transfer, motivational incentives for KM users, a knowledge friendly culture, a solid technical and organizational infrastructure and a standard, flexible knowledge structure.

Davenport & Probst (2002) later developed a list of success factors for implementing KM initiatives. Their success factors defined were leadership, performance
measurement, organizational policy, knowledge sharing and acquisition, information-systems structure, and benchmarking and training.

The results of a KM implementation project of company Natura (Waldir Arevolo, Esteban Kolsky and Kathy Harris, 2003) indicate that cultural and technological barriers had to be overcome successfully, as the key factors for ensuring successful KM implementation. Kavindra Mathi,2004) Ruggles (1998) points out that the success factors people, process and technology needs to be balanced in a 50/25/25 relation. People need to be the major focus with 50% of the time and budget of a KM implementation project while process and technology only need 25% each.

An assumption is often made in the literature that the “full and active commitment and sponsorship of senior management” is critical to the success of KM processes (O'Dell and Grayson, 1998). KPMG (1998a) reports that 26% of organizations surveyed rated lack of senior management commitment to KM as a major barrier to success. O'Dell and Grayson (1998) suggest that the role of senior management is to support a learning organization and to promote knowledge sharing.(Alaviand et al, 1999)

Furthermore, some abstract factor like ability to identify, capture and transfer critical tacit knowledge was considered to be the key to success of KM as mentioned in some later researches (Koskinen 2001).

Technical issues such as knowledge representation, storage, search, retrieval, visualisation, and quality control were identified by Ginsburg and Kambil (1999) as major success factors. Similar findings were arrived at in a number of successive researches.

Leadership and top management commitment/support were found to be crucial for success of few KM projects (Holsapple and Joshi 2000). Resource influences such as having sufficient financial support, skill level of employees, and identified knowledge sources were also found to be important in some other studies (Holsapple and Joshi 2001).

Malhotra and Galletta (2003) observed that using incentives always did not guarantee a successful KMS. And this has been a critical observation in the qualitative study of this current research study as well hence innovative ways of recognitions of the employee was yet another dimension that came forward through this study.
Most significant factor found by few more researchers, was organizational and cultural issues associated with user motivation to share and use knowledge (Alavi and Leidner 1999). It was experienced that promoting a culture of knowledge sharing within the organisation, rewarding employees for knowledge sharing, and creating a “best practices” repository influence KM processes (Barna 2003). A structured framework was proposed for assessing success of knowledge management system (Jennex and Olfman 2004). The framework used three criteria - how well the model fitted actual KMS success factors, the degree to which the model had a theoretical foundation and whether the model could be used for two types of approaches (process/task approach and infrastructure/generic approach) in building a KMS.

4.5 Challenges Associated with application of EKM

Multiple challenges are faced at the start of any initiative say as simple but critical as behavioral pattern like ‘resistance to change’ to more of technical like ‘incompatibility of the KMS with the business software’ or even managerial and economic challenges. There are numerous challenges that are faced while EKM is applied; of which most prominent of them are discussed here-with.

- **Process And Architecture**
  Integration of core business processes or the work place applications is limited or rather cumbersome. KM applications are typically implemented as stand-alone applications. Business applications rarely include a robust KM. So framing a holistic KM-integrated Business Process / Model is a critical challenge posed in front the enterprise. Apart from this Documentation / No-Trash Management, Integrating into Planning Systems, actual systematic execution and defining and using Measurements for KM effort and ROI are few other challenges that are faced in general.

- **Technology Infrastructure**
  Although technology is not the major ingredient in the KM Methodology it is certainly the important vehicle to actually apply EKM. Use of Integrated Databases, Interoperability, and latest effective Navigational Tools would enhance the EKM initiative. Yet it is still a task to identify the best option applicable to the EKM as per the case and more difficult to identify, and nurture the capabilities in utilizing the same in the most optimal way.
Culture

EKM initiative is required to be strongly supported by a cultural transformation in which all the stakeholders must learn new relationships between practices and attitudes. Creating new mindsets comes up as a major trial in front of the implementers. This cultural transformation requires strong patronage from the Management. The Management is expected to demonstrate business values in practical sense and attempt to inculcate the same in the team. Managing the change should be a way of the work and not a reactive process in the organization keeping Up with latest technologies as well as methodologies maintaining the safety and Security of the most crucial treasure of the organization which is both ; the human knowledge and the enterprise information.

Apart from these bundle of challenges, one of the non-technical but very crucial is taking Motivation seriously. Sustained collaborative practices require an incentive to create social capital by rewarding the stakeholders for contributing and receiving knowledge as a member of a community. In-fact going ahead it would be well said that companies should make the message very clear to the employees that if they do not share the knowledge, they are putting themselves out-of career building opportunities.

Allerton(2003) states that KM is actually just 5 % of technology while a huge 95 % of Management. Therefore the real challenge to this context, in front of organizations would be how to recognize, create, retain, transfer, share and manage the enterprise knowledge. A foremost challenge in knowledge application in organizations is also the absence of a collective mind and a central memory which would remain a challenge as a natural case.

While at the same time there, has been little criticism in this said concept, wherein one of the reasons projected for eventual threat of fading away of the EKM concept is pointed out to be the excessive emphasis on software and methodologies. Technology did not get the desired importance and was under-rated. So relating technology to the complexity of knowledge processes, would be worth-while without over (or under)-estimate technology or to miss the opportunity of bringing knowledge to where it belongs, the center of organizational attention. This is yet another facet of the challenges faced while considering EKM as a case in the recent days.
4.6 Use of Information Technology and Quality perspective of EKM

EKM is a Methodology applied in the enterprise while its execution requires appropriate technological platforms and tools. So, technology is a vehicle to drive the EKM method, in the journey of organizational learning process. Technology can support knowledge application by embedding knowledge into organizational routines.

EKM is functional in the enterprise in a systematic and planned scheme so that the outcome is qualitative and assured. To strengthen this process certain measures that can help dramatically accelerate the process and enrich the content-wise quality of the flow of information. We can define competitive intelligence as the set of inter-related measures that aim at systematically feeding the organizational decision process with information about the organizational environment in order to make possible to learn about it, to anticipate its evolution and to take better decisions in consequence. So, we consider competitive intelligence as an important component of knowledge management (KM). Davenport and Prusak (1998) describe KM as a set of managerial activities related to the generation, codification and sharing of knowledge. And knowledge about the technological, commercial, competitive environment is part of organizational knowledge.

For Davenport and Prusak (1998), the main role of information technology (IT) in KM is to accelerate the speed of knowledge transfer. KM software support knowledge flows through networks and communities.

While knowledge flows in real sense it means is data, in digital or analogical format is transported by informatics systems or natural communication. Information and knowledge concepts only make sense in relation to cognition. As marked by Senge (1998), a person can receive more information due to technological facilities, but it will not make any difference if the person does not have the appropriate skills to apply this specific information in a useful manner. Furthermore, Choo (1998) reminds us, the energy for innovation – the creative spark – can only be lit by individuals. But organizations may supply the fuel and the environment for the spark to catch and nourish the flame into something the organization can use. So based on these studies one can understand that IT has a supportive role played in this application of EKM and the main role is played by the content which is knowledge.
and the skill-set and willingness of the knowledge worker who wish to apply and use EKM based systems.

There is a basic enterprise information system proposed by Ahmed, 2010 (depicted in Figure 4.1) which can be upgraded as one case or else can be utilized as a base system on which a better KMS can be built on.

![Figure 4.1: The Enterprise Information System](image)

The enterprise information system comprises all the functions that create and manage collections: acquiring information from diverse sources such as Web crawlers or authoring tools, indexing materials, organizing those materials into a structure that is pertinent and understandable to the organization, maintaining versions and archives, and, most importantly, making the information readily accessible through advanced, easy-to-use search and browsing tools (see Figure 4.2) Users of enterprise information systems run the gamut from IT and information professionals, to knowledge workers in R&D or market and competitive analysis, to support staff; all the stakeholders.

Therefore, IT is only one of the dimensions of KM and technology alone does not transform information into knowledge. The KM ultimate challenge is to increase the chances of innovation through knowledge creation. The role of IT in this context is to extend human capacity of knowledge creation through the speed, memory extension and communication facilities of technology.
A glance at some KM based Software

There is plethora of software supporting the EKM Initiatives partially as well fully in the market. As per the research study carried by Rodrigo Baroni de Carvalho and Marta Araújo Tavares Ferreira, 2001, a ten KM software categories typology is proposed, as follows:

- Intranet-based systems;
- Electronic document management (EDM);
- Groupware;
- Workflow;
- Artificial intelligence-based systems;
- Business intelligence (BI);
- Knowledge map systems;
- Innovation support tools;
- Competitive intelligence tools;
- Knowledge portals.

The software is discussed in terms of their contribution to the four knowledge conversion modes proposed by Nonaka and Takeuchi (1995) and study carried by Rodrigo Baroni de Carvalho and Marta Araújo Tavares Ferreira, 2001.

These modes of growing knowledge have been discussed in brief in Chapter One earlier. Now it would be worth plotting them on the schemes proposed by Nonaka and Takeuchi (1995) to represent the four knowledge conversion modes, accordingly to the characteristics observed in this research by Carvalho and Narta as depicted in table no 4.1.

<table>
<thead>
<tr>
<th>Prevalent mode</th>
<th>ICT application</th>
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<tbody>
<tr>
<td>Socialization</td>
<td>Virtual design tools (e.g. 2D/3D-Cad, structural-design-software, design software for electricity component, internet-based messengers)</td>
</tr>
<tr>
<td>Externalization</td>
<td>Word editor</td>
</tr>
<tr>
<td>Combination</td>
<td>Email, Internet, Virtual communities, Project database, emails, corporate databases, text editor</td>
</tr>
<tr>
<td>Internalization</td>
<td>Corporate databases, Virtual design tools, structural design software, design software for electricity, Workflow systems</td>
</tr>
</tbody>
</table>

Table No.4.1: Knowledge and ICT related tools; Source: Vaccaro et al. (2009) adapted from schema proposed by Nonaka and Takeuchi (1995)
Carvalho and Ferreira (2001) further classified different aspects of knowledge management technologies regarding to their role in the knowledge conversion process as follows in Table No.4.2.

<table>
<thead>
<tr>
<th>To Tacit</th>
<th>To Explicit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socialization</strong></td>
<td><strong>Externalization</strong></td>
</tr>
<tr>
<td>From Tacit</td>
<td></td>
</tr>
<tr>
<td>Knowledge Maps</td>
<td>Groupware</td>
</tr>
<tr>
<td>Knowledge Portals</td>
<td>Workflow</td>
</tr>
<tr>
<td></td>
<td>Knowledge-Based Systems</td>
</tr>
<tr>
<td></td>
<td>Knowledge Portals</td>
</tr>
<tr>
<td>Internalization</td>
<td>Combination</td>
</tr>
<tr>
<td>From Explicit</td>
<td></td>
</tr>
<tr>
<td>Innovation Support Tools</td>
<td>Intranet</td>
</tr>
<tr>
<td></td>
<td>Electronic Document Management</td>
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<td></td>
<td>Business Intelligence</td>
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<tr>
<td></td>
<td>Competitive Intelligence</td>
</tr>
<tr>
<td></td>
<td>Knowledge Portals</td>
</tr>
</tbody>
</table>

Table No.4.2: Knowledge transfer processes and ICT related tools; Source: Carvalho and Ferreira (2001)

In addition to IT development, portals can also include other IT tools such as Email, Electronic Data Management Systems (EDMS), Decision Support Systems, Expert Systems, Groupware, Wikis, Weblogs, and other shared networked and net-based technologies which are used to leverage KM processes through the organizations.

In an effort to make departmental portals more strong and stable, they are enhanced with more capabilities such as departmental intranet and extranet internet sources. Nowadays, portals are known as the most effective ways for sharing information and knowledge in organizations. It has been observed in the research survey study as well that they literally act as nervous system for companies and support business processes and information flow as also Kim (2003). Blackmore (1997) describes portals as an instrument to benefit from internet technologies in an organizational computerized environment. Portals are web based and they provide access to the information and applications through web pages. In other words, portals are web pages which do not provide any kind of services by themselves and they only guide
the users simply to the sites and information they need. Firestone (2003) classifies portals in three sets, namely

- Business portals,
- Corporate portals—collaborative portals tying together peers, collaborative portals tying together skills and information needs,
- Enterprise information portals—decision processing portals, collaborative portals, and knowledge portals."

These Knowledge portals are tools to extract classified analysis for both unstructured and structured information and these portals clarify the relation among content, human, subjects and users activations. They can also provide variety of services such as chat room, email, research motors, customized news, RSS feedback, and external links (Jain 2009). Mphidi and Snyman (2004) study the portals and report different benefits such as compatibility, interaction, easy updated and low cost, user friendly interaction, focus, etc.

**The Quality Perspective:** EKM software can be considered "interdisciplinary business" because their development requires not only technical skills, but also a deep understanding of social and managerial aspects. Quality has been the key issue in Software Industry although it is understood in various ways. Quality is a perceptual, conditional and somewhat subjective attribute and may be as well understood differently by different people in different context of business situations. Yet the basic idea remain the same that is it could be a product or some sort of service which is given to the customers with the desired accuracy and satisfaction. Quality as a terminology can be understood as “Fitness to Use” from customer’s perspective or “Degree of Excellence” as per the dictionary meaning.

Today it has been observed that strong steps are initiated to enhance the Quality through number of knowledge management activities in varied ways, sometimes although not coined under the knowledge management umbrella. They are all over the map to name a few: building intellectual databases with improved schema structure unlike the traditional ones, measurement of scholarly capital, establishing contemporary libraries, building intranets, sharing Best practices. In a more specific proposition Quality deals with certain vital aspects of business in general such as Strong Customer Focus/relationship/bonding, people involvement as a significant stakeholder, better process approach, system approach to management, innovations
and continues improvement proposals, factual approach to decision making and mutually beneficial supplier relationships.

Enterprise knowledge management is a dynamic and a comprehensive concept. The context now-a-days is on information technology, people, organization structure and certain measurement unlike just managing the data and its forms. KM helps in transforming individual knowledge to group or organization knowledge, sharing and applying knowledge, managing and developing personal competences, managing information, measuring the intellectual capital and organizational learning.

The knowledge equation can be expressed as:

\[
(Support \ Information + Guidance )* \ Interpretation = Knowledge
\]

Why/what/who/when/how; Individual thinking occurs; capability is enhanced

The Knowledge efficiency can be expressed as a function of:

\[
F(Organizational\ knowledge, \ Individual\ knowledge)\]

(Source: Anurag Aggarwal & Ashutosh Gupta: Patni Computer System Limited)

Tata Consultancy Services (TCS) have defined a simple KM maturity model and a KM implementation methodology (SIGMARG). Their maturity model for an Organization is as follows:

1. Initial - Organization has no formal processes for using organizational knowledge effectively for business delivery.
2. Intent - Organization realizes the potential in harnessing its organizational knowledge for business

IT can support all four forms of knowledge transfer, but has mostly been applied to informal impersonal means (through such venues as Lotus-Notes discussion databases) and formal impersonal (such as knowledge maps or corporate directories). The latter have been found to be particularly useful transfer mechanisms for many organizations.
Concluding Remarks:

Enterprise Knowledge Management (EKM) promotes an integrated approach to identifying, capturing, retrieving, sharing, and evaluating an enterprise’s information assets. These information assets may include databases, documents, policies, and procedures as well as un-captured, tacit expertise and experience resident in individual workers. Due to the demand of EKM, some organizations adopted it by themselves while the others have consultant helping them. It highly impacts to the organizational operation and performance. The former concept of human resource development (HRD) in creating more knowledge for employees is very important. The question is how to sustain individual knowledge and allow the organization learn at the same time. The knowledge management implementation thus becomes one energetic solution to this problem as it is well-related to learning organization (LO). Knowledge management helps organization to systematically manage internal knowledge and continuously supports employees in learning. Hence such initiatives proliferated in an effective manner, by giving thrust to have a complete system run by a HRD becomes essential.

Finally to quote here, there is a very interesting model read while reviewing the literature; about Dr. Pestonji's 3H Model. This Model needs to be practiced which explains that HRD is all about taking care of employees HANDS( Working skills ), HEAD ( Cognitive abilities ) and HEART ( Employee engagement, satisfaction and happiness ). This indeed would give additional momentum to all the KM Implementation mechanism and make it a success.

As a matter of fact, it would not be an exaggeration to say that a proper blend of technology with knowledge of all forms as well as experiences of an individual as well team is certainly a key to a successful application of EKM. HRD play a significant role in the managing business dynamics and overall managing the people side of the business, for competitive edge in a period of globalization. Important aspects with respect to this thought stated here at the closure of this section would be uncovered in the subsequent Chapter.