

## **Unit 12 Knowledge Management**

### **Objectives**

The objectives of this unit are to:

- introduce you to the concept of Knowledge Management (KM)
- acquaint you with the sources and types of knowledge
- provide a framework for developing KM systems
- explain the benefits and challenges of implementing KM

### **Structure**

- 12.1 Introduction
- 12.2 Knowledge and Knowledge Management
- 12.3 A Few Facts of Knowledge Management
- 12.4 Sources and Types of Knowledge
- 12.5 Knowledge Creation
- 12.6 Knowledge Management Framework
- 12.7 Benefits of Knowledge Management
- 12.8 Pioneers in Knowledge Management
- 12.9 KM Initiatives in Indian Organizations
- 12.10 Software For Knowledge Management
- 12.11 Trends and Challenges in Knowledge Management
- 12.12 Summary
- 12.13 Keywords
- 12.14 Self-Assessment Question
- 12.15 Further Readings

#### **12.1 Introduction**

Present day's organizations, large or small, gather vast amount of knowledge during the course of regular their normal operations. This knowledge remains in the 'minds' of organizational members conducting the operations- be it research, design, development, manufacturing, or services. This wealth of organizational knowledge (generally referred to as knowledge assets, knowledge capital, intellectual capital etc.) disappears, when these persons leave the organization. The effects of losing organizational knowledge is especially noticeable and can have far reaching implications when people occupying important positions such as Chief of Designs or Chief of Marketing leave since all the knowledge they gathered over long years of experience is lost permanently to the organization, along with them. A significant amount of time must be invested in relearning and reinventing the work processes. Most organizations do have some manual system of compiling knowledge to create a corporate memory but they have not been effective mainly due to difficulties in careful organization and accessing of the compiled knowledge. Computers have not played a significant role in this area, till recently, having mainly concentrated in the data processing field: obviously due to the faster pay back period for the money invested. However, things are changing and this field is receiving due attention from developers and organizations.

#### **12.2 Knowledge and Knowledge Management**

According to Peter F. Drucker in The New Realities, "Knowledge is information that changes something or somebody—either by becoming grounds for actions, or by making

an individual (or an institution) capable of different or more effective action”. Knowledge is viewed as a collection of facts, ideas, learning’s and policies, practices and a lot more. Knowledge can also be defined more narrowly as agreed- upon explicit or formal facts, rules, policies and procedures, whereas skills are seen as information processing competencies that can generate explicit knowledge. Skills are learned by doing; knowledge is learned by studying or investigating. Knowledge can be classified as “tacit” knowledge that is personal (i.e. knowledge that cannot be expressed and communicated) and “explicit” knowledge that can be codified and expressed in a human or formal language.

Although the terms “information” and “knowledge” are often used interchangeably, there is a clear distinction between information and knowledge. Information is a flow of messages, while knowledge is created by that very flow of information and is anchored in the beliefs and commitment of its holder. Traditional management models focus on how to control the information flow and information processing within the organization. This view, however, fails to capture the essence of organization as knowledge-creating entity. What “knowledge management” should achieve is not a static management of information or existing knowledge, but a dynamic management of the process of creating knowledge out of knowledge. Hence one can argue that organizational knowledge creation is a continuous self-transcending process, which requires a new kind of management that goes beyond the traditional models of “management”.

Knowledge management is such a preposterous, pretentious and profoundly confusing phrase that many of those who really understand KM—including some of the field’s pioneers—refuse to use the term. If there is anything that those experts do agree on, it is that knowledge management is not about managing people in any traditional sense. Nor is knowledge management really about managing knowledge. They prefer terms such as knowledge sharing, information systems, organizational learning, intellectual asset management, performance enhancement, etc.

Knowledge management refers to strategies and structures for maximizing the return on intellectual and information resources. Because intellectual capital resides both in tacit form (human education, experience and expertise) and explicit form (documents and data), KM depends on both cultural and technological processes of creation, collection, sharing, recombination and reuse. The goal is to create new value by improving the efficiency and effectiveness of individual and collaborative knowledge work while increasing innovation and sharpening decision-making.

KM is the collection of processes that govern the creation, dissemination and utilization of knowledge. In one form or another, knowledge management has been around for a very long time. Practitioners have included philosophers, priests, teachers, politicians, scribes, librarians, etc. The importance of knowledge as a key source of competitive advantage is now well established in management studies. Knowledge is undoubtedly an indispensable resource to create value for the next generation of society, Industries, and companies. Yet, despite all the discussions and attentions in both the academic and business worlds, very few have articulated how organizations actually create and manage knowledge. Many companies still seem to remain locked in the phase of building efficient and effective information technology (IT) systems when they try to “manage knowledge”.

Ultimately, knowledge management is really just a way of looking at the world of business. It's a realization that who and what are assets of the organization. And just like building, operating and managing physical assets, knowledge assets need to be managed for the greatest possible return on investment.

**Knowledge Management (KM)** is a management technique to effectively manage knowledge in organization. It comprises of-

- Construction (compilation/collection /collation) of knowledge generated within the organization (and from external sources) into a Knowledge Repository (KR)
- Organize the knowledge so constructed in the organization in such a way that it is easily accessible to all those in the organization, who need it, on time
- A management system that maintains the KR up-to-date and relevant
- A set of tools, including computer systems that facilitates ease of accessing the KR as well as building and maintaining it.

### **12.3 A Few Facts of Knowledge Management**

#### **KM is not useless**

The entire idea sits on the fact that it's a long-term strategy to maintain the existing knowledge of the person/organization and also to harvest the "new" knowledge, which a person acquires during his process of learning. Debating what knowledge management "is not" is pointless. People intuitively know whether they are managing their own knowledge well and whether their organization helps them to work without stress and inefficiency.

#### **People and technology**

People should not have to choose between knowing a little about lot or a about a little. They should be able to concentrate most on what they need to know most and, when needed, find out a lot about related things. This requires a browseable knowledge environment designed the way people think. People want to solve problems, think, and collaborate. They do not want to "use technology". Technology is a means, not an end. Technology must serve people, not the other way around. Technology creates knowledge management problems faster than it creates knowledge management solutions. If knowledge management were intuitive, organization would have perfected it by now.

#### **Financial factor**

The cost of not managing knowledge greatly exceeds the cost of managing important knowledge. Organizations have the habit of externalizing the cost of not managing the knowledge to their customers.

#### **Future trends**

Those who want to think and act in integrated, creative ways and solve complex problems need rich, integrated, up-to-date knowledge management environments to support them. The gulf between traditional and knowledge-driven organizations is growing as knowledge-driven organizations concentrate not only on present success but

their own evolution so they can better take advantage of the new knowledge-intensive environment.

### **The paradoxical image**

Call it the knowledge management paradox: those who are so busy “putting out fires” that they have no time to tackle knowledge management are those who most need to manage their knowledge better. While many CEO put KM as the top priority, few companies are still at a stage of implementation: It’s the mind shift of the organizational heads to add knowledge to the balance sheet. What we know now is that, those companies that crack strategic knowledge management will be those most likely to succeed in the new economy. The new economy is always termed as the knowledge economy. Hence a company with higher knowledge quotient makes it big!

### **12.4 Sources of Knowledge**

The **two** sources of Knowledge are:

**Internal sources** emerging from the operations of the organization- internal sources include the organizational operations such as design, development, engineering, sales, marketing, manufacturing, customer contact, etc. This is the basic source of organizational information, which is controllable and can be easily canalized to KR. In the absence of any formal mechanism, this knowledge remains in the minds of organization members and usually, disappears with them.

**External sources** such as Industry/Professional Associations, Commercial web sites etc.- there are many professional bodies such as IEEE, academic bodies such as universities, research institutions, industry associations such as NEMA, and commercial organizations. These sources usually make the knowledge available through web sites and some times through publications. Some of them could be free services and some could be for a fee. A well-designed KM should be able to take advantage of both the sources to create and maintain a KR and allow members to easily access the knowledge stored inside it.

### **Types of Knowledge**

There are two kinds of knowledge- **explicit** knowledge and **tacit** knowledge.

**Explicit knowledge** can be expressed in words and numbers and shared in the form of data, scientific formulae, specifications, manuals and the like. This kind of knowledge can be readily transmitted across individuals formally and systematically. **Tacit knowledge**, on the other hand, is highly personal and hard to formalize, making it difficult to communicate or share with others. Subjective insights, intuitions, and hunches fall into this category of knowledge. Difficult to verbalize, such tacit knowledge is deeply rooted in an individual’s actions and experience, as well as in the ideals, values, or emotions he or she embraces.

These two types of knowledge are complementary to each other, and both are crucial to knowledge creation. They interact with and change into each other in the creative activities of human beings. Understanding this reciprocal relationship between explicit knowledge and tacit knowledge is the key to understanding the knowledge-creating process. The interaction between the two types of knowledge can also be called as the knowledge conversion. Knowledge is created through such interactions among individuals with different types and contents of knowledge.

Knowledge creation in organizations takes place primarily through the dynamic process of four different modes of conversion between the two dimensions of knowledge.

**Socialization:** Tacit knowledge to conversion takes place when tacit knowledge within one individual is shared by another through training.

**Combination:** Explicit knowledge to explicit knowledge conversion takes place when an individual combines discrete pieces of explicit knowledge into a whole new concept.

**Externalization:** Tacit knowledge to explicit knowledge conversion can be said to take place when an individual is able to articulate the foundations of his and her tacit knowledge.

**Internalization:** Explicit knowledge to tacit knowledge conversion takes place when new explicit knowledge is shared throughout the firm and other members begin to use it to broaden, extend and reframe their own tacit knowledge.

The Factors that Constitute the Knowledge-conversion Process :

<b>Socialization: From Tacit to Tacit</b>	
Tacit knowledge accumulation	Managers gather information from sales and production sites, share experiences with suppliers and customers and engage in dialogue with competitors.
Extra-firm social information collection (wandering outside)	Managers engage in bodily experience through management by wandering about and get ideas for corporate strategy from daily social life, interaction with external experts, and informal meetings with competitors.
Intra-firm social information collection (wandering inside)	Managers find new strategies and market opportunities by wandering inside the firm.
Transfer of tacit knowledge.	Managers create a work environment that allows peers to understand craftsmanship and expertise through practice and demonstrations by the master.
<b>Externalization: From Tacit to Explicit (Creating Concepts)</b>	
	Managers perform facilitation of creative and essential dialogue, the use of “adductive thinking”, the use of metaphors in dialogue for concept creation.

<b>Combination: From Explicit to Explicit</b>	
Acquisition and integration	Managers engage in planning strategies and operations, assembling internal and external existing data by using published literature, computer simulation and forecasting.
Synthesis and processing	Managers build and create manuals, documents, and databases on products and services and build up material by gathering management figures and /or technical information from all over the company.
Dissemination	Managers engage in planning and in implementation of presentations to transmit newly created concepts.

<b>Internalization: From Explicit to Tacit</b>	
Personal experience: real-world knowledge acquisition	Managers engage in “enactive liaisoning’ activities with functional dept. by using cross functional development teams. Search and share new values and thoughts: share and try to understand management visions and values through communications with fellow members in the organization.
Stimulation and experimentation; virtual-world knowledge acquisition	Managers engage in facilitating prototyping and benchmarking and facilitate the challenging spirit within the organization; managers form teams as a model and conduct experiments and share results with the entire dept.

**Source:** Adapted from Nonaka, Byosiere, Borucki, and Konno (1994).

Give examples of any three organizations is the Indian contest which, in recent times have become success stories as a result of knowledge conversion

- a.
- b.
- c.

## 12.5 Knowledge Creation

Most, if not all, firms in developing countries are engrossed in activities to catch up with advanced countries. Even the majority of firms in advanced countries are engaged in catching up, as not all firms can be pioneers of novel breakthroughs even in these countries. Nonetheless, research on organizational knowledge creation and innovation is concentrated mainly in advanced countries and is focused mostly on the pioneering process. Research on those subjects in the catching up process, particularly in developing countries, is, however, scanty. Table 12.1 shows the average amount spent on the knowledge management by the companies in specific industries.

**Table 12.1. Average amount, the companies in specific industries have spent on knowledge Management**

INDUSTRY	2000	2001	2002
Business Services	\$344,184	\$415,658	\$492,493
Communication	\$244,657	\$455,727	\$413,681
Government	\$108,444	\$472,765	\$523,529
Education	\$87,111	\$224,632	\$386,444
Financial services	\$1,072,351	\$717,168	\$1,439,336
Discrete manufacturing other process	\$239,688	\$436,313	\$803,571

Manufacturing	\$797,500	\$729,583	\$941,818
Healthcare/Pharmaceuticals	\$294,000	\$253,333	\$273,889
Insurance	\$158,335	\$236,113	\$127,781
Retail/wholesale	\$4,159	\$19,136	\$10,455
Transportation	\$75,000	\$150,250	\$140,200
Utilities/Energy/Chemical	\$800,040	\$918,417	\$2,200,100
Technology	\$315,075	\$390,871	\$483,407
Others	\$275,974	\$373,533	\$476,784

*Source:* IDC, 2001.

Knowledge creation, whether for imitation or innovation, takes place at two levels—individual and organization. The prime actors in the process of knowledge creation are individuals within the organization. Knowledge creation in organizations is not, however, the simple sum of knowledge creation by individuals. Rather it is the process that creates knowledge, which is distributed across the organization, is communicated among its members, has consensual validity, and is integrated into the strategy and management of the organization. Individual knowledge creation is, therefore, an indispensable condition for knowledge creation in the organization but cannot be the sufficient one. Organizations create knowledge only when individual insights and skills become embodied in organization routines, practices, and beliefs. Only effective organizations can translate individual knowledge creation into organizational knowledge creation.

Knowledge creation is a function of an organization's absorptive capacity. Absorptive capacity requires a learning capability and develops problem-solving skills. Learning capability involves the development of capacity to assimilate existing knowledge (for imitation). While problem-solving skills represent a capacity to create new knowledge (for innovation).

Absorptive capacity has two important elements: prior knowledge base and intensity of effort. First, the prior knowledge base refers to existing individual units of knowledge available within the organization. Accumulated prior knowledge increases the ability both to make sense of and to assimilate and use new knowledge. Relevant prior knowledge base includes basic skills and general knowledge in the case of developing countries, but it includes the most recent scientific and technological knowledge in the case of industrially advanced countries. Thus prior knowledge base should be assessed in its relation to the task difficulty involved. Second the intensity of effort refers to the amount of energy expended by organizational members to solve problems. Learning how to solve problems is usually built up over many practice trials involving related problems. Such effort intensifies interaction among organizational members that facilitates knowledge conversion and creation at the organizational level. The following case gives an insight to the concept of knowledge creation.

### **Case: Samsung's Knowledge Creation Is Catching Up**

Despite the skepticism, that it lacked the technological capability to enter and remain competitive in the semiconductor industry. Samsung Electronics Company has leapfrogged from a mere producer of discrete devices to the most vibrant producer of dynamic random access memory (DRAM) chips in only a decade. Samsung has emerged as the largest memory chipmaker and the seventh largest semiconductor maker in the world. Samsung's production increased from \$83 million in 1985 to \$5.2 billion in 1994. In memory chips, already dominant in 4 megabyte and 16-megabyte DRAM semiconductors, Samsung is ahead of Japan in 64-megabyte and 256-megabyte generations, while also attempting to crack more profitable applications-specific integrated circuits (ASICs).

It was in 1974 when the first local semiconductor firm was established by a Korean-American scientist with a Ph.D. from Ohio State University and semiconductor design experience at Motorola. Samsung bought out the company during a financial crisis that occurred in the company's first year. With a large stake in consumer electronics, Samsung made the acquisition turned-entrepreneur provided Samsung with an even higher tacit knowledge base. His tacit knowledge was effectively transferred to Samsung engineers. This enabled the firm to progressively produce various transistors and integrated circuits on a small scale, largely for house consumer electronics. Samsung also established its semiconductors R&D laboratory in 1982.

Samsung set up an R & D outpost in Silicon Valley in 1983 and hired five Korean-Americans with doctorates in electronics engineering from Stanford, Michigan, Minnesota, and Notre Dame Universities with semiconductor design experience at IBM, Honeywell, Intel and National semiconductors. These scientists, plus about three hundred American engineers, including several designers who left Mostek, brought to Samsung the crucially important tacit knowledge to crack VLSI technology. Silicon Valley was a strategic location for the development of the 64k DRAM. A high density of scientists and engineers in the vicinity offered the rich source of critical information and expertise that Samsung needed. The outpost also provided opportunities for engineers in Korea to participate in training and research in USA and enabled them to learn significantly about VLSI technology.

Samsung organized another R&D task force in Korea with Samsung engineers who were experienced in LSI and trained on VLSIs at technology suppliers and two Korean-American scientists. The scientists had 64k DRAM development experience at American companies and gave Samsung a significantly higher level of tacit knowledge. Active interaction between the outpost in Silicon Valley and the team in Korea, through training, joint research, and consulting, elevated significantly both the tacit and explicit knowledge within the Korean team in a very short period of time resulting in the effective transfer of knowledge from silicon valley to Korea. This made Samsung engineers better equipped to assimilate VLSI technologies from Micron Technology and Zytex. In short, Samsung had deliberate strategy to upgrade its prior tacit and explicit knowledge, expanding its prior knowledge base.

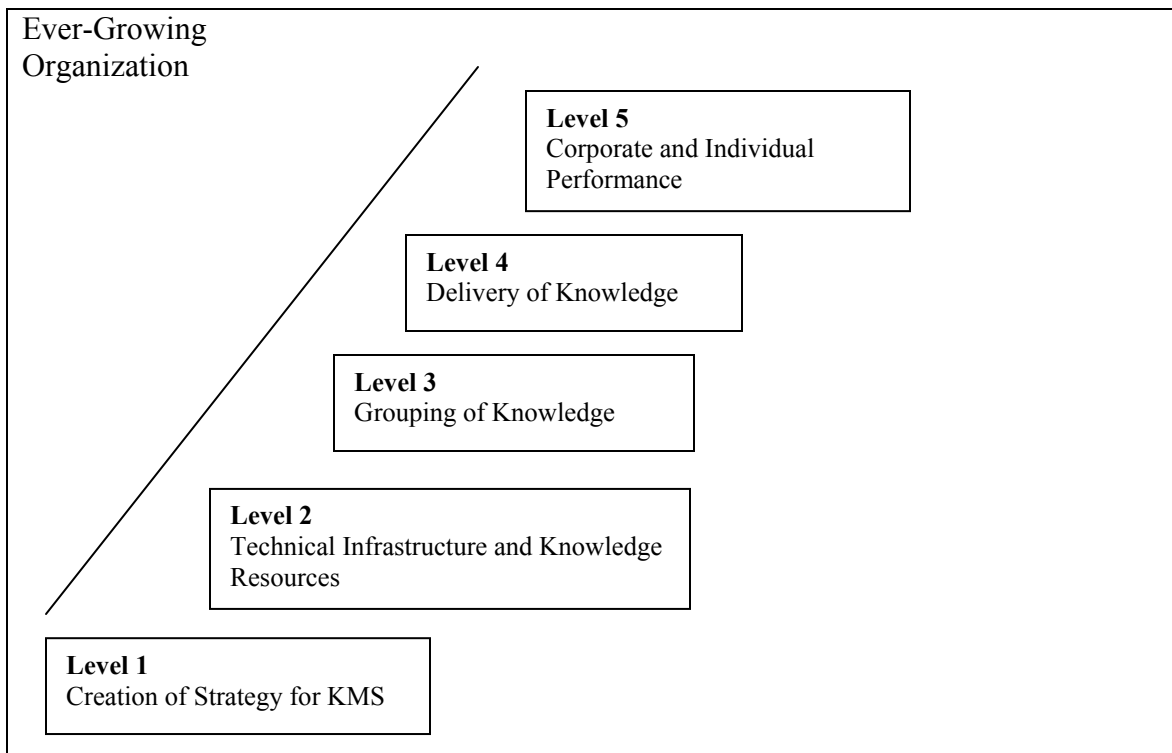


The goal was clear to all members. Personal dedication and long working hours expedited knowledge conversion at the individual level. The shared awareness of a crisis and determination to solve problems within the assigned time frame intensified close interaction among members. This, together with high prior knowledge, led to rapid knowledge conversion among the individual members and to a high rate of knowledge creation at the organizational level enabling Samsung to have a high absorptive capacity. Samsung managed the crisis to become creative.

Samsung hit the market with a 64K DRAM in early 1984, some forty months after the American pioneer and about eighteen months after the first Japanese version became commercially available. Korea became the third country in the world to introduce DRAM chips and significantly narrowed the technological gap with Japan and USA.

## 12.6 Knowledge Management Framework

All mid-sized and bigger organizations need to look at KM seriously- It is not just a fad anymore nor a far of concept- it is real and here and is now available- it is of strategic importance and we cannot afford to postpone it any longer except at the cost of survival. Each industry has its own KM system evolved to suit its needs. Though the entire process starts with a bang, but somewhere down the line the entire process stands still. Following on the CMM Working model, we can devise a similar model for effective working of a KMS in the organization as depicted below in figure 12.1.



**Figure 12.1: Working of a KMS in an organization.**  
**Level 1: Creation of a Strategy for KMS**

Termed as the creation of a strategy for KMS. This level involves a process where the Best Practices of the organization are listed and accumulated. A strategy is evolved for accumulation of entire gamut of the organizational and personal knowledge. Identify organizational needs/objectives in line with the systems needs/ objectives. Establish policies, which are to be adhered to.

Instead of putting the entire process to be unpredictable, we create a process, which makes the organization run on a particular schedule. Performance of the system is gauged by the capability of the individuals and the organization collectively with their innate skills, knowledge and motivations. Policies for managing the system, implementation procedures are established. An effective process can be characterized as practiced, documented, enforced, trained, measured, and able to improve.

**Level 2: Technical Infrastructure and Knowledge Resources**

This level would involve the design of repository, collaboration, dissemination, and hardware specifications. Technology requirements as in Capture, Store, Search, Retrieve, Message, Structure, Navigate, Share, Collaborate, Synthesize, Solve, Recommend, Integrate, Maintain in Detail the process and functionality scope of the system, Process would/may overflow as the input as the input of another process. Hence knowledge could not necessarily be sequential. After knowledge is acquired, synthesized, or created, it needs to be codified, accessed and transferred again. The knowledge cycle is supported by collaboration.

Functional scope would include the technology, comprising of KM. Functionality as in semantics collaboration, visualization and scale. Semantic functionality utilizes technologies such as clustering, categorization, linguistics analysis, data extraction, and knowledge maps. It would also include functionality filters identification of experts, and alignment of users into communities (net groups threaded conversations, network directories). Visualization addresses navigation and retrieval. Scale addresses the range of data types and physical locations available to KM users.

Technology requirement scope lists technologies that collectively comprise full function KM. Not every enterprise needs all functions, and no KM vendor/tools fulfill all of these requirements. The selection of technologies is preceded by the clear definition of KM strategy and scope. KM deals with enterprise-wide structured/unstructured data source, representing multiple data types and formats. KM must bridge knowledge resources to be accumulated as in the process of existing knowledge, knowledge sharing, knowledge discovery, identification of intellectual assets of the personnel of the organization and implementation of KM framework.

The level 2 of the system should allow us to summarize the planning and tracking of the entire process. The process is under the control of a knowledge office and each knowledge worker has the right to make the necessary contribution to the system.

### **Level 3 Grouping of knowledge**

This level would involve the proper grouping of all the knowledge accumulated during level 2. Knowledge can be classified in the following groups: Individual Group/Project/Corporate.

**Individual Knowledge:** Acquisition of knowledge would involve the following, search, filter, integrate, capture, store, validate and personalize the entire process. It would also let the user learn, analyze, interpret, comment, evaluate, explore and classify the intellectual asset of the person.

**Groups/Project Knowledge:** Individualistic knowledge to be integrated with the group. What counts here are the integration, management and recording capability of the group knowledge. Each individual should be competent enough to know what's happening in his/her group.

**Corporate knowledge:** This would cover the knowledge of the organization, policies, practices, market trends, industry trends and the like, integration of external sources in the knowledge base. Monitor, comment and synchronize the entire process of the organizational knowledge. At the end of this level, all these three groups are to be in sync with each other. Attention should also to be given to peer groups, inter-group coordination, intra-group coordination, training program, organization process, and organization process focus. This level should also ensure that the process is based on a common, organization-wide understanding of the activities, roles, and responsibilities in a defined process.

### **Level 4: Delivery of Knowledge**

The level would start with the strategy of identifying audience for all the resources accumulated. Personalization of the knowledge acquired would be done here. Audience identified would have to be summarized and the entire visual to be presented to them for proper usage. Establish a common bond and provide seamless access.

### **Level 5: Corporate and Individual Performances**

This level would require the knowledge office to measure the performances of the corporate and the individual performances after effective dissemination of knowledge through the KMS. The information, which has been gathered, has to be used effectively for better performance of the organization and the individual.

An effective KM should have the following feature: acquisition, creation, packaging, or application of internal and external knowledge as a primary objective of the work. The

inputs and the outputs will have high levels of variability and to a certain extent some degree of uncertainty equivocally, and incompleteness. The process of knowledge work tends to be variable, and difficult to analyze as a set of procedures or steps. Characterized by exception rather than routine, it is performed by professional or technical workers with a high level of skill and expertise. Knowledge and work processes include such activities.

Any KM project should essentially have the following four components-

- Create KR (Knowledge Repository) – involves finding and collecting internal knowledge and best practices. Some of the knowledge may be found in organizational documents such as memos, reports, and presentations and can be easily stored in a repository. Other knowledge is discovered through discussion. Discussion databases are another form of knowledge repository. Tools like Lotus Notes and Microsoft Exchange Server facilitate these discussion databases.
- Improve knowledge Access- involves determining ways to facilitate finding the person with the required knowledge and then transferring the knowledge to another person. Sometimes, simply storing the knowledge in a repository is not sufficient. Face to face transfer of knowledge can be more effective. Technology, such as desktop video conferencing, can enable face-to-face knowledge access.
- Enhance knowledge Environment- involves changing the way people work. Employees are encouraged to share knowledge as well as reuse existing knowledge. Coaching and training in learning and sharing practices will probably be necessary. This may be a very difficult task if the organization's culture does not currently share information.
- Manage Knowledge as an Asset- involves demonstrating that effectively using the knowledge management repositories or face-to-face transfer of knowledge has allowed the organization to save or make money. This is currently difficult, but will probably become more accepted as knowledge management becomes more widely used.

## **12.7 Benefits of Knowledge Management**

Some of the tangible benefits of knowledge management are directly related to their bottom line savings. In today's information-driven economy, companies continuously tap most of the opportunities and ultimately derive most value from intellectual rather than physical assets. According to many experts, to get the most value from a company's intellectual assets, knowledge must be shared and served as the foundation for collaboration. Consequently, an effective KM program should help a company leverage the assets and provide the following benefits:

- Fostering innovation by encouraging free flow of ideas
- Improving customer service by streamlining response time
- Boosting revenues by getting products and services to market faster

- Enhancing employee retention rates by recognizing the value of employees' knowledge and rewarding them for it.
- Streamlining operations and reducing costs by eliminating redundant or unnecessary processes.
- A creative approach to KM can result in improved efficiency, higher productivity and increased revenues in practically any business function.

Knowledge Management's (KM) role is to connect knowledge owners with knowledge seekers. The knowledge of one is transferred to the mind of the other, so that a new decision can be made or situation can be handled. KM provides a means to capture and store passing knowledge and broker it to the appropriate individuals.

### **Examples where Knowledge Management can offer greatest benefit**

KM is beneficial especially in both social and business segments. Here are a few examples where KM could provide great benefits:

#### **Social (Governmental)**

1. Coping with natural disasters
2. Safety in aviation/railways
3. Research and education

#### **Business**

1. Research and Development – faster solutions and reduction of redundant research
2. Design and Development- by allowing easier access to past design documents, best practices and better designs become available, faster, making faster deliveries gaining a competitive edge for the organization
3. Operations- problems reported from the field greatly aid in improving manufacturing practices and add to product quality
4. Cultural Change- from striving to create and own ideas and objects- to sharing improving and reusing, in addition to create new ideas and objects.

### **12.8 Pioneers in Knowledge Management**

1. Anderson Consulting- created a system called knowledge Exchange to facilitate the sharing of problem resolutions and project documents.
2. USAA Insurance Firm- created a customer feedback system which increased customer loyalty, cut marketing costs, in addition to raising profit .
3. GE- GE has since 1982 collected all customer complaints in a database that supports telephone operators in answering customer calls. GE has programmed 1.5 million potential problems and their solutions into its system.

4. Ritz Carlton–All staff members are required to fill in cards with information from every personal encounter with a guest. These data plus all guest requirements are stored and printed out to all staff when the guest arrives again, so that each guest receives a personal treatment.
5. Agro Corp USA–Sells fertilizers and seed. Data on farmers’ soils are combined with weather forecasts and information crops. Analyses are fed back to the farmer via sales representatives to help farmer select best combinations of crops.
6. Dow Chemical USA–Has put all its 25000 patents into a database, which is used by all divisions to explore how existing patents can gain more revenues. The experience from this application is now being transferred into other intellectual assets, like brands.
7. Boeing 777 USA–First “paperless” development of aircraft included customers in constructed sub parts, rather than usual organization design team, construction team. Suppliers worldwide used same digital databases as Boeing.
8. Beckman Labs USA–A biotech firm has reorganized itself to optimize knowledge sharing. Has created Knowledge Transfer Department to co-ordinate efforts. Employees best at knowledge sharing gain both financial rewards and management positions.
9. McKinsey and Bain and Co–These two management-consulting firms have development “knowledge databases” that contain experiences from every assignment including names of team members and client reactions. Each team must appoint a “historian” to document the work.

Activity 2: Give real world examples in the following areas where KM has been beneficial.

Company name	Product name
R&D .....	.....
Design & Development .....	.....
Cultural change.....	.....

There are many others in the field now in India, all the leading software development organizations have some kind of KR. Especially those organizations that have been assessed at level 5 of CMM model of SEI have initiated KM activity in their organizations. Some of those KM initiatives are discussed in the following section.

## **12.9 KM Initiatives in Indian Organizations**

### **Knowledge Management Initiatives at Infosys**

Infosys provides consultancy and software services worldwide to 500 companies. It employs approximately 10,200 employees and executes nearly 100 software projects at any given point of time in diverse areas such as telecom, manufacturing, insurance, finance, etc. “Powered by intellect and driven by values”, KM at infosys is founded on ‘Learn once and Use anywhere concept. Needless to say, managing knowledge at infosys is a huge challenge. Infosys manages organization-wide knowledge using three centrally operated Knowledge Shop (K-Shop); Process Assets Database (PAD) and People Knowledge Map (PKM).

## **Knowledge Shop**

Infosys built the k-shop architecture on Microsoft site serve technology, and all employees can access it through a web interface. The company encourages people to submit papers related to technology, domain, trends, culture, project experiences, internal or external literature, etc. They can submit the articles in any format that the web supports, and designed templates for various content types to ensure uniformity. In addition, the K-shop has an excellent search facility that offers search through multiple parameters. K-shop documents are available to all infosys employees and are segregated based on the users selected keywords and content type.

## **Process Assets Database**

Process assets database is a database which capture the “as is” projects deliverable. This database contains the employee’s experiences on projects, projects artifacts such as project plans, design documents, and test plans. Users can search the documents, based on domain, technology, project type, project code, customer name, and so on. This helps provide new project with information on similar, previously executed projects and helps set quantitative goals.

## **People Knowledge Map**

The People Knowledge Map is a directory of experts in various fields. It is an internet-based system where employees can search and locate experts. It serves as the bridge between knowledge workers: the user and the provider. Infosys intranet portal SPARSH serves as the window for all systems and acts as the central tool. The company’s quality system documentation is a repository of all process-related guidelines, checklist, and templates. These serve to standardize the projects’ outputs. Infosys also has electronic bulletin boards for discussing technical and domain-related topics. In addition, there are news groups and newsletters brought out by various departments that discuss technology and business trends.

The distinguishing feature, however, is KM with project level focus. Ready reaction to customer request, improved productivity through rework, and teamwork are some of the benefits of this approach. Dynamic KM, which takes the form of web sites to manage knowledge content, training plan with material to tackle project attrition, weekly knowledge sharing sessions, defining the KM activities in the project plan (2%-3%) etc, - are some project related KM activities.

Incentive for knowledge sharing is another feature of KM at infosys. When an infosys submits a document to the K-shop, experts review the document in detail. If found acceptable, the K-shop publishes it. The reviewer and author are rewarded with Knowledge Currently Units (KCU) when an employee reads or uses a document for the K-shop, he or she is encouraged to give KCU, for that document based on the benefits gained from reading it. Authors can accumulate KCUs for their documents and redeem

them for cash or other gifts. Thus, KCU serve twin objectives: they act as a mechanism both for rewarding knowledge sharing and rating the quality of assets in the repository.

Infrastructure supporting KM includes LAN/WAN/RAS facilities, E-mail, internet, intranet, extranets. Voice/Fax Networking/Chat, Video Conferencing, Real Audio/Video/Web-cast, Business Solutions Hosting, Systems Management, Technology Enabled Help-desk, Customer Connectivity, etc. Recognizing and Rewarding Innovation and KM is done through funding for presentation at conferences, Publications on web sites, “Ideas beget wealth”- the syslabs awards for technical innovation, best practice sharing, KCU- the Knowledge Currency Unit, innovation is a criterion for the infosys Excellence Award, “Innovation management”- a key result area in the infosys KMM (knowledge management maturity) model.

The K-shop owns around 12,600 documents. Knowledge Management has helped infosys increase its productivity and reduce defect levels. A rough estimate shows that infosys reduced its defects level by much as 40%, thus significantly reducing the associated rework and the cost of detecting and preventing defects. Also, effective reuse has increased productivity by 3%. All of this has been possible due to faster access to accurate information and reuse of knowledge. A team of eight full time employees designated as ‘Brand Managers’ help build and maintain the KM infrastructure in infosys.

### **Knowledge Management Initiatives at Satyam**

“Knowledge people make the difference” goes the vision statement of Knowledge Management at Satyam. Satyam declares, “As we take our first steps into the new millennium, organizations everywhere are beginning to see that knowledge is indeed the foundation upon which all things grow. Business excellence does not come about without a strong base in knowledge. Therefore those that will stay ahead in the new economy are those who act upon this realization, and build their funds of knowledge.”

Satyam’s knowledge initiative, apart from managing the existing knowledge resources of the company, also fosters a culture of creating sharing knowledge across the organization. Associates have access to a query-based KMS- the Knowledge Repository- that allows them to gain the advantage of collective experience, thus optimizing their own time on activities that build upon rather than repeat this experience.

The culture is one of effective communication and knowledge sharing across the organization via exchange of information, ideas, thoughts, solutions, technologies and best practices- and leveraging this “combined intelligence” to offer winning solutions to global customers.

A by-product of the knowledge initiative is the automation of certain routine query-based tasks, leading to a considerable saving of talent and time, which is put to the search for more creative and efficient solutions. Satyam is committed to being a learning



organization. Associates continuously improve their skill-sets and knowledge levels in technical areas and work on all round personality development.

Satyam's learning centre is a world-class mini-varsity of sorts, where technologists, academics and behavioral researchers provide high-quality training to associates. State-of-the-art multimedia laboratories and a panel consisting of distinguished in-house as well as visiting faculty from reputed educational institutes across the world, make for a rich educational resource base. Short-term training programmes keep associates intellectually stimulated and updated on the latest in their fields. The Satyam Learning Centre has received the Government of India's National Golden Peacock Award for contribution to Human Resource Development.

Given the high-velocity knowledge spiral of the present times, it becomes imperative for knowledge-based organizations to continuously stay at the forefront of know-how and technology. Satyam provides direct training and helps Associates become independent learners.

### **Knowledge Enhancement (KE)**

Associates are encouraged to take the initiative to further their own learning. Knowledge Enhancement provides multiple avenues for this purpose. Associates can take up to a year of paid sabbatical leave to teach or conduct research. In addition to this Knowledge Enhancement provides for reimbursement of tuition fee and certification programme expenses-thereby facilitating knowledge acquisition through multiple means.

### **Partnering with Pioneers in Teaching**

Satyam has links with institutions such as Harvard Business School, Massachusetts Institute of Technology and Project Management Institute. Associates are exposed to the latest knowledge through the best and most effective teaching methodologies. Satyam has a strategic partnership with MIT that provides access to MIT's knowledge base.

### **Knowledge Management Initiatives at BaaN**

BaaN is a world leader in powerful, innovative, easy-to-use business software. They are at the cutting edge of business technology used by industry leaders all over the world-promoting collaboration between customers and suppliers, linking people and processes across the world, and using the internet to make business faster and more cost-effective.

They have turned towards knowledge management, in keeping with the demands of time. Two departments, namely, "Knowledge Transfer" and 'Knowledge Development' are projected for this purpose. Their main objective is to empower the members with skills necessary to meet the external world. They have a centralized database system and it is christened as "SCOPUS". Intranet facility is provided for the members with their identity and password to use the system.

One of the features of BaaN is the encouragement provided to the employees for Knowledge management. “ASK HR” is one such technique that provides a chance to the employees to make use of public folders and register their doubts and genuine problems. Longer duration training programmes are provided for new recruits. The others receive short or mini programmes to update their knowledge.

Baan’s attempts to multiply knowledge could be seen in the well-maintained library for the purpose. They contain technical as well as non-technical printed material and is used by those employees who crave for knowledge.

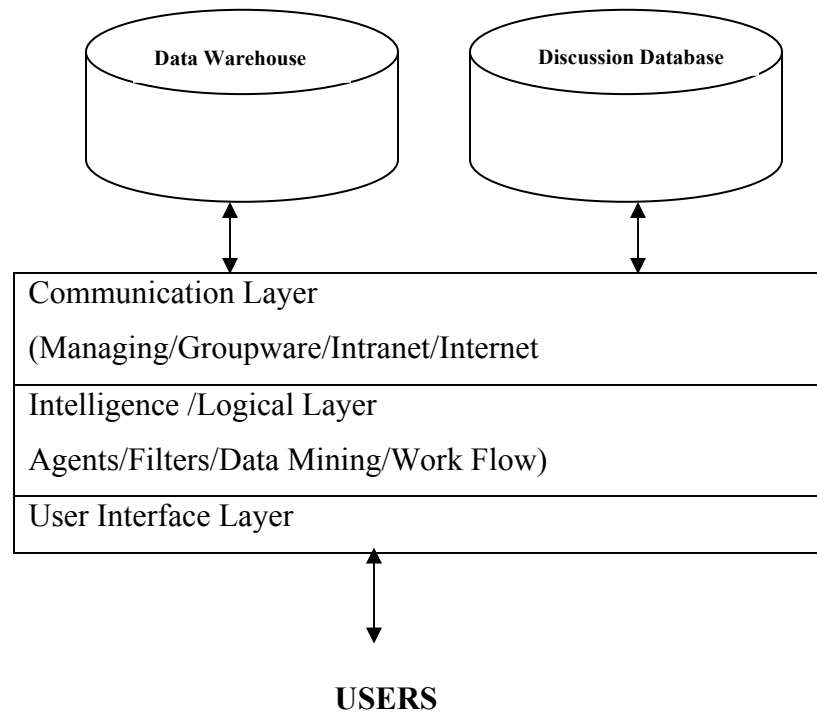
“SPANDANA” known as ‘reaction’ is keenly felt in their monthly meetings. The people talk and they talk openly and freely with the management. They are helpful in extending the sharing of the knowledge, which is considered as rich source of knowledge. The meetings also make the people to come out of their shell and express their genuine concern for aspects that the organization stands for. Sharing of knowledge, beyond doubt highlights the brighter side of the employees’ vast experiences in particular fields, their updated knowledge, their concern for the system and their sense of responsibility. Periodic Seminars and discussions help both in documentation and multiplying the knowledge thus leading to an effective knowledge management.

## **12.10 Software For Knowledge Management**

KM suites provide solutions for creating centralized repositories for storing and sharing data (knowledge) as well as providing solutions and tools for searching, retrieving and managing this data.

1. Retrieval ware by Convera- [www.convera.com](http://www.convera.com) - Retrieval ware creates a complete inventory of all enterprise assets, then enables users to search more than 200 document types on file servers, in groupware systems, relational databases, document management systems, web servers and more while respecting access rights- all from a common user interface.
2. Rightnow Technologies- [www.rightnow.com](http://www.rightnow.com) - Knowledge Management Software The self-learning-knowledge base completely integrates all communication channels resulting in customers and agents accessing information -whether they use self-service, submit an email or initiate a live chat session.
3. IBM-Lotus-Knowledge Discovery Products- a discipline providing the strategy process, and technology to share and leverage information and expertise to do just that knowledge discovery products and solutions can help rapidly achieve KM by capturing and organizing knowledge in the form of content, expertise and communication so it can be easily managed, located, evaluated and reused to drive responsiveness, innovation, efficiency and learning. this is shown in figure 12.2.

**Figure 12.2: Technology Architecture**



### **12.11 Trends And challenges In Knowledge Management**

Many software development organizations have been assessed for SEI's Capability Maturity Model (CMM) in India and many had been assessed at level 5. This mandates that the organization have a KR- and thus most of these organizations have instituted a KR in their respective organizations. These are not accessible for public but are accessible to their organizational members.

Presently the emphasis is being focused on Information Technology related KM-creating tools and techniques that facilitate creation of KR and effectively utilizing it.

Groupware (IBM-Lotus Notes, Microsoft Exchange Servers-Outlook) has become the more popular tool. Reasons are not hard to guess-

- It facilitates Discussion Groups very effectively
- It is very economical and cost effective
- Familiarity- they are the most popular e-mail tools
- Easy to use for creation of KR and using it

- Robust and reliable tools
- However, analytical tools are absent

Data warehouse aids creation of KR. Data Warehousing has grown from data repository to Knowledge Repository. Tools like, OLAP and data mining techniques facilitate effective utilization of KR. These facilitate not only extraction of information but also analysis. However, the costs are high in this segment.

ETL (Extraction Transformation and Loading) tools facilitate extraction of information from external sources including web pages, transforming them to desired format and loading them into the organizational KR. Business intelligence (BI) tools facilitate interpretation and form inferences, BI coupled with KM is fast emerging as a very powerful Decision Support System (DSS). This trend may, in near future, provide the success and impetus to DSS, which it has been lacking so far.

### **Issues and Challenges in KM**

“Organizations have dispersed for real and critical reasons,” says Chad Weinstein, Director of Knowledge Management consultant for Sopheon PLC, a Minneapolis-based professional services and software company. ‘It lets them get the best talent, the best resources and close proximity to potential clients or crucial suppliers.’ Along with the opportunities that come with dispersion, a globetrotting, telecommuting workforce presents challenges in managing and disseminating a corporation’s collective knowledge.

The first of those challenges is merely getting individuals within the company to communicate with each other wherever they are located, according to Daniel Rasmus, vice president and KM research leader for Giga Information Group Inc. in Aliso Viejo, Calif. “Ridiculous as it may sound, many organizations have trouble getting people to share information who aren’t on the same floor, so adding remote workers or those in other geographical locations can prove difficult,” he says.

Enterprises are realizing how important it is to “know what they know” and be able to make maximum use of the knowledge. This knowledge resides in many different places such as: databases, knowledge bases, filing cabinets and peoples’ heads and are distributed right across the enterprise. All too often one part of an enterprise repeats work of another part simply because it is enterprise impossible to keep track of, and make use of, knowledge in other parts. At Tata Steel, one incident more than any other drove home this point. In 1999, a foreign technical consultant was summoned to the Indian steel giant to solve a problem. He replied that he had already been engaged and solved it the year before. In other words, the company, despite having a sophisticated IT infrastructure, did not seem to systematically “know” what its problems were and how it had been solving them.

Enterprises need to know:

- What their knowledge assets are?
- How to manage and make use of these assets to get maximum return?

Knowledge assets are the knowledge regarding markets, products, technologies and organizations, that a business owns or needs to own and which enable its business processes to generate profits, add value, etc. Knowledge management is not only about managing these knowledge assets but also about preserving knowledge; using knowledge, and sharing knowledge. Therefore, knowledge management involves the identification and analysis of available and required knowledge assets and knowledge asset related processes, and the subsequent planning and control of actions to develop both the assets and the processes so as to fulfill organizational objectives. Success in an increasingly competitive marketplace depends critically on the quality of knowledge, which organizations apply to their key business processes. For example, the supply chain depends on knowledge of diverse areas including raw materials, planning, manufacturing and distribution. Likewise product development requires knowledge of consumer requirements, new science, new technology, marketing, etc.

The challenge of deploying the knowledge assets of an organization to create competitive advantage becomes more crucial as:

- The marketplace is increasingly competitive and the rate of innovation is rising. So that knowledge must evolve and be assimilated at an ever-faster rate.
- Corporations are organizing their businesses to be focused on creating customer value. Staff functions are being reduced, as are management structures. There is a need to replace the informal knowledge management of the staff function with formal methods in customers aligned business processes.
- Competitive pressures are reducing the size of the workforce, which holds this knowledge.
- Knowledge takes time to experience and acquire. Employees have less and less time for this.
- There are trends for employees to retire earlier and for increasing mobility, leading to loss of knowledge.
- There is a need to manage increasing complexity as small operating companies are transnational sourcing operations. A change in strategic direction may result in the loss of knowledge in a specific area. A subsequent reversal in policy may then lead to a renewed requirement for this knowledge, but the employees with that knowledge may no longer be there.

Another reason for the difference between tacit and explicit knowledge is more than academic is that, by and large, the distinction determines who owns the knowledge. Explicit knowledge is most likely the property of the firm. One way or another it is either data or work product. But since tacit knowledge cannot be codified, it effectively remains the property of the knowledge worker. Companies have certainly tried to own this knowledge. While the company employs them, knowledge workers are ethically—and sometimes contractually—prohibited from sharing their knowledge with competitors. But if the knowledge workers leave the firm they take that knowledge and its inherent value with them.

Making this distinction between knowledge and the knowledge worker makes it easier to account for knowledge assets. A knowledge worker is an asset that appreciates over time. Knowledge itself is more often a depreciating asset. Patents, for example, quickly lose their value if not licensed quickly. A sales lead becomes worthless if the contact chooses a competitor's product or leaves the customer's company for another job. Unlike other resources, however, knowledge is not subject to the law of diminishing returns; it is not depleted through use.

KM technology solutions themselves pose a challenge to implementation. Existing solutions often require customization that puts a "significant burden" on implementers. A survey with IT executives also said that they are waiting for some collaboration and communication tools to fully develop, such as voice recognition technology. The process approach allows an end-to-end view of how best to structure, sequence, and measure work activities to reach the targeted outcomes. Processes are described as "specific ordering of work activities across time and place, with a beginning, an end, and clearly identified inputs and outputs: a structure for action." The process approach promotes an examination of what and how things are done from a viewpoint of producing value for a customer. The capabilities of information technology (IT) also promote an explicit management of knowledge processes. IT can be used to capture, codify, distribute, and apply the firm's best knowledge.

Getting employees on board is a major issue in an environment where an individual's knowledge is valued and rewarded. Establishing a tradition that recognizes tacit knowledge and encourages employees to share their knowledge are ways companies motivate employees to participate in KM. Incentive programme is another way. 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.

KM is not a technology-based concept. It needs careful planning and analysis. While technology can support KM, it is not the be all and end all of KM. KM decisions should be based on who (people), what (knowledge) and why (business objectives). Also a KM programme should be in sync with the business goal. While sharing best practices is a good idea, there must be an underlying business reason to do so. Without a solid business case, KM is a futile exercise.

Knowledge is not static. As with many physical assets, the value of knowledge can erode over time. Since knowledge can get stale fast, the content in a KM programme should constantly updated be amended, and deleted. Further, the relevance of knowledge at any given time changes, as do the skills of employees. Therefore, there is no endpoint to a KM programme. Like product development marketing and R and D, KM is constantly evolving business practice. Another most important fact is that not all information is knowledge. Companies diligently need to be on the lookout for information explosion and overload. Here quality is the key and not quantity.

## **12.12 Summary**

The importance of knowledge as a key source of competitive advantage is now well established in management studies, as suggested by the growing literature focusing on knowledge creation and transfer. Knowledge is undoubtedly an indispensable resource to create value for the next generation of society, industries, and companies. Yet, despite all the discussions and attentions in both the academic and business worlds, very few have articulated how organizations actually create and manage knowledge. Many companies still seem to remain locked in the phase of building efficient and effective information technology (IT) systems when they try to “manage knowledge”.

It is imperative for today’s progressive organizations to integrate Knowledge Management (KM) in their routine operations. Incentive for this is the falling cost of hardware and availability of appropriate software tools to capture and manage corporate knowledge. Now the sources of knowledge are moving from paper to soft copy form and on to the web- thus- available to all, either freely or through payment of a nominal fee. This soft copy form of information/knowledge lends itself to automatic collection, transformation and manipulation besides being amenable to fast distribution to all concerned- all these can be accomplished automatically without human intervention. KM progresses through four stages namely, create Knowledge Repository, improve knowledge access, create knowledge environment and manage knowledge as an asset. Challenges in effective implementation of KM in organization stem from new forms of acquiring information, new tools to store and manipulate information, new tools for transformation of information, new ways of working over distance and time, and to shift from information access and sharing to knowledge networking. KM has been progressing from Groupware and Data warehousing to Business Intelligence thru usage of sophisticated software tools. KM can give significant benefits to organizations by assisting them to improve quality of service delivery, avert disasters and reduce costs through early recognition patterns, alerts and probable actions.

### **12.13 Keywords**

**Knowledge** is collection of facts, ideas, learning’s and policies, practices and a lot more. Knowledge can also be defined as agreed- upon explicit or formal facts, rules, policies and procedures.

**Skills** are information processing competencies that can generate explicit knowledge. Skills are learned by doing; knowledge is learned by studying or investigating.

**Knowledge Management** is the collection of processes that govern the creation, dissemination and utilization of knowledge.

**Tacit Knowledge** is highly personal and hard to formalize, making it difficult to communicate or share with others.

**Explicit Knowledge** can be codified and expressed in a human or formal language. It can be expressed in words and numbers and shared in the form of data, scientific formulae,

specifications, manuals and the like. This kind of knowledge can be readily transmitted across individuals formally and systematically.

**Socialization-** Tacit knowledge to conversion takes place when tacit knowledge within one individual is shared by another through training.

**Combination-** Explicit knowledge to explicit knowledge conversion takes place when an individual combines discrete pieces of explicit knowledge into a new whole.

**Externalization-** Tacit knowledge to explicit knowledge conversion can be said to take place when an individual is able to articulate the foundations of his and her tacit knowledge.

**Internalization-** Explicit knowledge to tacit knowledge conversion takes place when new explicit knowledge is shared throughout the firm and other members begin to use it to broaden, extend and reframe their own tacit knowledge.

#### **12.14 Self-Assessment Questions**

1. What is Knowledge Management and how does it enhance the competitiveness of a firm?
2. Describe the various steps involved in a KM framework. What are the essential components of a KM project?
3. Search for articles and information about Indian companies that have taken KM initiatives. Highlight some important issues discussed in those articles.
4. What are the problems and challenges in the implementation of a KM system?

#### **12.15 Further Readings**

Van Krough, George. (1998). *"Care in Knowledge Creation"*, California Management Review, Special Issue on the Knowledge and the Firm (pages 135-53).

Noneka, Ikujiro. *"The Knowledge Creating Company"*, Harvard Business Review, Vol 34 (6).

Duffy, (2000). *"Knowledge management –to be or not to be?"* Information Management Journal, Vol 34 (1), 2000.

Civi E. (2000). *"Knowledge Management as a competitive asset: A Review"*, Market Intelligence and planning Vol 18 (40).

Eisenhart. (1989). *"Knowledge Management- Building Theory from Case Study Research"*, Academy of Management Review, Vol 14.



