CHAPTER II

KNOWLEDGE MANAGEMENT

2.1.1 Introduction to Knowledge Management:

Today’s era is of knowledge economy and ability to manage knowledge has become crucial for the companies to sustain in the competitive environment. In the present post industrial society, knowledge has become a key resource of the economy. Companies’ greatest assets lies in – the wealth of experience, ideas, and insights that are spread across or rooted within their organizations. The companies can benefit from these intellectual resources by using existing knowledge to improve performance and combining knowledge to create something new and innovative. This scenario of managing knowledge brings focus on knowledge management. According to Hibbard, Knowledge management is the process of gathering a firm’s collective expertise wherever it resides – in databases, on paper or in people's heads – and distributing it to where is can help produce the biggest payoff.

2.1.2 Historical Overview of Knowledge Management:

Knowledge Management is a newly emerged concept and came into limelight merely a decade before. Knowledge Management is still being studied and researched by many academicians and management pioneers and so has a short history. Knowledge Management evolved since 1960s when Peter Drucker coined the term “Knowledge Worker” and then with the passage of time the concept of KM slowly gained attention by the management practitioners and pioneers. Every decade academicians published their work on KM and in late 1990s KM entered the lexicon in earnest. Organizations started considering KM in their strategic planning, post of CKO (Chief Knowledge Officer) was introduced, KM became an established practice by most of the companies. KM had its rise and downfall, many critics termed it as fad but amongst all criticism KM is alive and still growing and became the need of every organization for its survival and sustenance in the dynamic market.

Following is the timeline of KM evolution:

1970s:

This decade saw the early development of KM. Theorists and practitioners like Peter Drucker and Paul Strassman published their work and observed the importance of information and explicit knowledge for the success of the company. Leonardo barton’s
case study of Chaperrel Steel Company where knowledge management strategy was practiced since mid-1970s brought into light the importance of knowledge and strategies of managing knowledge. The case study was published in her book entitled Wellsprings of Knowledge – Building and Sustaining Sources of Innovation, published by the Harvard Business School. Organizational Learning was focused by Peter Senge’s work which stressed on the culture dimension of managing knowledge. Other authors who contributed in the study of knowledge management are Chris Argyris, Christoper Barlett and Dorothy Leonard Barton of Harvard Business School. Thomas Allen’s research at M.I.T in Information Technology transfer helped to understand how knowledge can be produced, used and diffused. This was the point where role of computer technology became apparent in knowledge management practices.

Two examples of technology solutions that were available for use in early knowledge management systems can be cited. One such solution was Augment (short for augmenting human intelligence), introduced in 1978 by Doug Engelbert, and other early hypertext/groupware application systems that were capable of interfacing with other applications and systems. Another notable example was the Knowledge Management Systems developed by Rob Acksyn and Don McCraken, which was an open distributed hypermedia tool that predated the World Wide Web by a decade.

1980s

In this decade companies started to consider knowledge as an asset of the organization which was earlier not recognized by classical economic theory. Knowledge was being considered crucial for the competitive advantage of the company. Many journals like Sloan Management Review, Harvard Business Review, and others started publishing articles, research and theories on Knowledge Management. Peter Drucker along with authors like Matsuda and Sveiby, wrote in-depth about the role of knowledge in organization. In late 1980s, the work done on artificial Intelligence and Expert systems introduced the concept of Knowledge Acquisition, Knowledge Engineering and Knowledge based system. These computer based concept further fuelled the growth of knowledge management. 1980s saw publishing of first book on Organizational Learning and knowledge management and Senge’s

1990s:

In this decade Knowledge Management became apparent and established business practice by many US, European and Japanese organizations. KM gained widespread attention by management gurus. Knowledge Management became the agenda of conferences organized in this decade. In 1991 Thomas Stewart published cover story ‘BrainPower’ which was
followed by many management experts publishing articles and books on knowledge management. In 1995, Nonaka Ikujiro’s and Hirotaka Takeuchi’s book ‘The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation’\(^6\) perhaps became the most widely read work. In the same year, A Andersen and the American Productivity and Quality Center (APQC) co-sponsored the Knowledge Imperative Symposium in Houston. Thomas Stewart’s ‘Intellectual Capital’\(^7\), Karl Erik Syeiby’s “The New Organization Wealth”\(^8\) and Verna Alle’s “The Knowledge Revolution”\(^9\) became popular titles in the field of KM.

Mid-1990s saw worldwide companies including Indian companies implementing knowledge management program. Knowledge Management Forum and International Knowledge Management Network (IKMN) went online. Many knowledge management online journals forums began appearing. Thus, it led to widespread attention of knowledge management. KM entered into top management strategy agenda in corporate entities. Technology advancement added pace to the growth of KM. Many IT firms started developing Knowledge Management Software, and many other software facilitating the KM process. Theorists explored the KM practices to interdisciplinary with risk management, change management and was considered as a replacement to the failure of TQM (Total Quality Management). Companies started introducing Chief Knowledge Officer post. Thus, in this decade the real essence of KM was recognized and implemented.

**Today:**

Now, KM is well established and endorsed by the pioneers of the management field. Companies all over the globe realised the power of KM practices. At present KM is well established, avidly taken up by developing countries like India, China and Malaysia and widely practiced by organizations of all shapes and sizes. KM got introduced in university courses. Technology uptake such as Social networking, groupware, cloud, mobile technology all helped to extract the best out of KM program. On the other side KM also received its share of criticism and started raising questions on distinctness of KM. Theorists considered it as a fad, as too much hype being created about KM.

**2.1.3 Data, Information, Knowledge Hierarchy:**

Before defining knowledge management, the relationship between data, information and knowledge must be understood. It is important to understand the distinction between data, information and knowledge.
Data:

Data is comprised of the basic, unrefined, and generally unfiltered information. Thierauf defined data as: "unstructured facts and figures that have the least impact on the typical manager." Data represents unorganized and unprocessed facts. Raw numbers, images, words, sounds etc., are data and acts as raw material to information. For e.g. Elements such as 8989.
**Information:** Information is processed data it involves manipulation of raw data. “Information is defined as organized or processed data that are timely and accurate. For data to become information, it must be contextualized, categorized, calculated and condensed.” Information is further processed to create meaning of the data.

**Knowledge:** Knowledge resides in the user and happens only when human experience and insight is applied to data and information. “Knowledge is meaningful links people make between information and its application in action in a specific setting.” The knowledge possessed by each individual is a product of his experience, and encompasses the norms by which he evaluates new inputs from his surroundings. Example ‘A sales analyst might say that the company’s shares may lower down because sales report depicts drop in sales’

**Wisdom:** Wisdom is the highest level of abstraction, with vision, foresight, and the ability to see beyond the horizon. “It is the summation of one’s career experience in a specialized area of work”. Example: ‘Change the marketing strategy and packaging of the product to increase sales.’

**2.1.4 Types of Knowledge:**

Knowledge can be broadly categorized into two forms Tacit and Explicit knowledge. Organizations consist of both these forms of knowledge.

**2.1.4.1 Explicit Knowledge:**

The explicit knowledge is the codified knowledge in the form of documents, books, reports, white papers, spreadsheets, memos training courses etc. Explicit knowledge is a physical entity it can be easily created, managed or distributed. Explicit knowledge can be easily stored and reused for decision making process.

**2.1.4.2 Tacit Knowledge:**

Tacit knowledge is the knowledge present in the mind of the people in the form of experiences and jobs. Michael Polanyi in 1958 first introduced the term ‘tacit knowing’ or ‘tacit knowledge’. Tacit knowledge includes values, beliefs and intuitions stem from years of experience. It is the knowledge used to create explicit knowledge and is best communicated personally through dialogues and scenarios, with use of metaphors. People are often unaware of their possession of tacit knowledge. It is challenging for the companies to capture and disseminate this tacit knowledge. It is researched that about 95% of organizational knowledge is in the tacit form and remaining 5% is stored as explicit knowledge.
Tacit knowledge is very crucial for the company. Tacit knowledge is very difficult to transfer from one person to another person in written or verbalize form. To effectively transfer tacit knowledge requires personal interactions among employees and trust on each other’s knowledge. Thus, there are many factors which makes it difficult to identify, capture, and share this tacit knowledge than explicit knowledge. Tacit knowledge is the main focus point of knowledge management process.

On the surface, explicit or documented knowledge is easier to identify, because it is a physical entity that can be measured and distributed. It can be stored as a written procedure or as a process in a computer. With that in mind, it is reusable for decision-making purposes. By contrast, tacit knowledge is personal and hard to formalize and communicate. “It is primarily heuristic, mind sets, and unconscious values. The downside is that it is occasionally wrong and hard to change”.

2.2. What is Knowledge Management?

“Knowledge Management is the process of gathering a firm’s collective expertise wherever it resides – in databases, on paper, or in people’s heads – and distributing it to where it can help produce biggest payoff.” Knowledge management practices involve creating, storing and sharing or disseminating tacit and explicit knowledge of the organization. It is studied that, up to 95% of information is stored in tacit form of knowledge. This tacit knowledge is the raw material or fuel for innovation and creativity.
which is the only competitive advantage a firm has to sustain in this unpredictable business environment. It is a challenging task for the companies to identify this tacit knowledge and utilise it towards company’s benefit. Knowledge management systems help the companies to manage this tacit knowledge, which is otherwise difficult to capture, by facilitating an environment of creating, storing and sharing knowledge. As defined by Malhotra “KM is a framework within which the organizations views all its process as knowledge processing, where all business processes involves creation, dissemination, renewal, and application of knowledge toward organizational sustenance and survival”\textsuperscript{17}. Awad and Ghaziri described that,“Knowledge Management contains following integral parts:

- Using accessible knowledge from outside sources.

- Embedding and storing knowledge in business processes, products and services.

- Representing knowledge in databases and documents.

- Promoting knowledge growth through the organization’s culture and incentives.

- Transferring and sharing knowledge throughout the organization.

- Assessing the value of knowledge assets and impacts on regular basis”\textsuperscript{18}

Thus in short, Knowledge Management is a strategy implemented by the organization to make optimum utilisation of its knowledge and gain maximum organizational benefits.

Knowledge Management concept is based on three pillars; People, Process and Technology. KM involves participation and interaction of these three factors to enhance the organizational efficiency. An organization can be termed as knowledge organization when it creates an environment for its people to freely exchange their ideas, views, expertise about various processes across different functional areas using technology as a tool, and thereby produce knowledge assets which results in increasing the efficiency of an individual, process and as a whole of the organization. The goal of KM is to produce positive returns on investment in people, process and technology.
2.3 Organization Knowledge:

The knowledge organizations maintains knowledge from various sources such as knowledge about the products developed, different clients/customers and competitors, Financial status and the knowledge about the personnel of the company. Combining all these will create a Organizational Knowledge. Organizational knowledge is defined as all the knowledge resources within an organization that can be realistically tapped by that organization. It can therefore reside in individuals and groups, or exist at the organizational level. Hatch defines it as: "When group knowledge from several subunits or groups is combined and used to create new knowledge, the resulting tacit and explicit knowledge can be called organizational knowledge." On the other side learning is the way we create new knowledge and improve ourselves. Organizational learning is based on applying knowledge for a purpose and learning from the process and from the outcome. Brown and Duguid describe organisational learning as "the bridge between working and innovating."

2.4.1 The Knowledge Management Life Cycle:

The knowledge management life cycle also termed as KM process defines the sequence of activities performed in implementing the knowledge management practices. The given diagram shows three layers of overall Knowledge Management Life Cycle with, Knowledge Organization at the centre. The middle layer shows the various activities performed during the KM process. The activities are knowledge creation, collection, organize, refine, disseminate and maintain. The final layer describes the enablers/drivers of KM process as Leadership, Technology, Culture and intelligence.
Knowledge Management process involves various activities performed sequentially. The KM-Lifecycle is an ongoing process which begins with capturing the knowledge available in the organization, then the knowledge is organized in a form which can be disseminated, later the organized knowledge is refined on the basis of where it needs to disseminated and the knowledge is disseminated.

Figure 2.5 Organizational Knowledge

Figure 2.6: The Knowledge Organization
(Source: Awad and Ghaziri, 2007)
2.4.2 Knowledge Capture:

Knowledge Capture is a process where knowledge from different areas of the organization is captured and stored. It involves gathering both explicit and tacit knowledge from various sources. The explicit knowledge gathering involves data entries, emails, other documents stored as archive, customer/client views and feedbacks, previous project reports etc. On the other hand tacit knowledge is captured with the help different strategies such as interviews, questionnaire, Onsite observation, insights, brainstorming etc. As tacit knowledge is more important as well as difficult to capture, a well planned strategy should be planned to extract the tacit knowledge of the employees. To encourage employees to share their tacit knowledge the companies adopt a policy of rewards, incentives, appreciation etc. This capturing of tacit knowledge reduces the major risk of knowledge walk out when a key employee leaves the organization. Once the knowledge of both the forms explicit and tacit are captured the process shifts to another phase of its life cycle. The final outcome of this phase is collection of explicit and tacit knowledge from all the sources within the organization.

Figure 2.7: Knowledge Management life cycle Steps

2.4.3 Knowledge Organizing/Codifying:

This is the phase where the captured tacit and explicit is organized in a way which can be further reused and disseminated within the organization and increase the knowledge asset value of the organization. Knowledge organizing involves codification process this is the process where the tacit knowledge captured is converted into explicit form. The tacit knowledge captured via interviews brainstorm discussions etc are now coded in the form of physical documents, so that, it can be further reused and disseminated. The codified
knowledge is further systematically organized on the basis of its further use by using cataloguing and indexing technique. The result of this phase is gathered and the explicit and tacit knowledge together is converted into explicit organized knowledge.

**2.4.4 Knowledge Refining :**

Once the knowledge is properly organized in a way ready to be disseminated it goes through a refining process. Refinement involves properly dividing the knowledge on the basis of its context. The knowledge is mined using data mining software which results in revealing patterns and trends from the organized knowledge. The patterns revealed help the management and the decision makers to understand the various trend or knowledge available in the collection of explicit knowledge developed in the previous phase of the life cycle. The data mining process helps to discover new tacit knowledge from the explicit one. Thus the final outcome of this phase is the refined knowledge available with respect to context in the form of patterns, tutorials, insights, white paper, graphical representations, projections etc.

**2.4.5 Knowledge Sharing/Dissemination :**

This last phase of the KM process provides the intent of knowledge management i.e it is an attempt to make all the people of the organization knowledgeable. This step involves sharing or disseminating or transferring the refined knowledge across the organization to its authorized users. The key point here is not to let the knowledge sit idle as a repository in the database but make it available to every key person who need it or who can be benefited from it. Knowledge Dissemination helps employees to upgrade their knowledge, increase their adaptability, to learn new techniques and process and thus also helps in retention of employees.

**2.5 Knowledge Management Enablers/Drivers :**

Knowledge Management drivers are the key factors which help in successfully implement knowledge management practices as well as these factors optimise the benefits of implementing KM systems. Knowledge Management drivers decide success or failure of KM practices in the organizations. Following are the key drivers of KM ;

Knowledge Management drivers or enablers are those factors and issues which affect the complete knowledge management process. They are the key points in success or failure of knowledge management systems.
These factors and issues play a vital role in executing the key KM-process of capturing, organizing, refining and disseminating knowledge. These factors influence the overall execution of knowledge management activities. Following are the drivers of KM:

1. **Leadership**: Leadership is most crucial and integral driver of KM. The human aspect is most crucial in knowledge management. KM is based on sharing and acquiring knowledge. It is very difficult to make people share their knowledge. Leadership quality plays a vital role here; a good leader can set an example for sharing knowledge. A leader can generate that trust among its employee and once trust is developed among the management and employees the organization can reach its goal successfully. KM activities needs participative behaviour from everyone within the organization, a good leader can motivate his employees and trigger participation in the KM process and make it fruitful. Leaders who don’t understand the value of distributable and actionable knowledge not only limit opportunities, but they’re also building huge contingent operating liabilities. Only a good leader can understand that hoarding knowledge diminish its value and leveraging knowledge can create value.

2. **Finance**: The main objective of knowledge management is to produce positive returns on investments on people, process and technology. It must increase the efficiencies in production, sales and services on a daily basis.

**Figure 2.8: Knowledge Management Drivers**
3. Culture: Organizational culture initiates the knowledge management process and helps in the evolution of the same. A good organizational culture can make knowledge management practice evolve with fruitful results. Organizational culture is defined as set of implicit assumptions held by the members of a group that determines how the group behaves and responds its environment. Culture includes the organization values, visions, norms, working language systems, symbols, beliefs and habits. It is the pattern of such collective behaviours and assumptions that are taught to new organizational members as a way of perceiving, and even thinking and feeling. Organizational Culture affects the way people and groups interact with each other, with clients and with stakeholders.

4. Technology: Technology is the back - bone of the knowledge management process. Technological advancement in communication, networking, internet, intranet, cloud and many, all these facilitates made the KM as effective Process. In this scenario of employees working on remote sites, technology makes it easier to share information which is crucial for the success of KM implementations. Newly emerged concept of Big Data, where every organization is generating huge amount of data, is managed efficiently with data warehousing and data mining. Knowledge creation, storage, organizing and analysing has become more effective and optimized with the advent of data warehousing and data mining technologies. Many companies are implementing groupware software such as Lotus, SharePoint or Web 2.0, which helps to capture, store and share tacit knowledge which is considered most crucial for knowledge management. These groupware software helps to implement communities of practices. Organizational based social networking can be created which eliminates the barrier between the employees and allows them to interact informally, this enhances trust among them and this trust later on makes sharing of tacit knowledge easier. Thus, technology plays a vital role in successful implementation of knowledge management activities and acts as one of the pillar of KM.

5. Process: Successful implementation of KM activities results in enrichment of the processes of the organization. KM targets to make the process of the organization more efficient, responsive and optimized to cope with the changing business environment. KM activities improves the processes by identifying and eliminating the previous mistakes, reusing the knowledge of previous projects thereby optimizing the process time, developing coordination among the team and most important KM encourages innovations in the process and helps the organizations to sustain and survive in this dynamic business environments. Thus, process is another vital driver for knowledge management.
6. Personnel: This driver focuses on the personnel specific area, the employees of the organization also termed in this era as knowledge workers. KM focuses on creating cross-functional teams of these knowledge workers. Today, there is a need of collective and collaborative approach rather than departmental division of knowledge workers. KM tends to upgrade the knowledge of every individual and make him multi-disciplinary knowledge worker. This approach increases the strength of an individual and overall organization. Second aspect of KM is to reduce the damage caused by knowledge walk outs or brain drain when employees shifts job or retire. KM concentrates on capturing the expertise of every individual and stores it in explicit form for further reuse and thus reduces the disasters of knowledge walk out. Third aspect of KM is to nurture the culture of trust and harmony among the employee and also reduce the knowledge gap between the management and employee. This develops coordination among the employees and creates a healthy knowledgeable culture of the organization and results in employee retention.

2.6.1 KM-Models/Framework:

A knowledge management framework or model describes the sequence in which the KM activities will be performed. Every author describes this sequence in different forms such as, spiral, matrix, sequential or even overlapping KM-process. In the following paragraph there are three different models are explained though their sequence formation is different but overall they cover the same given set of process knowledge capture, store, organize and disseminate activities.

2.6.2 Nonaka SECI Model:

Ikujiro Nonaka and Hirotaka Takeuchi proposed the SECI model which is perhaps the most widely published and discussed model for knowledge management. The SECI model which is abbreviation of Socialization, Externalisation, Combination and Internalization, concentrated on the knowledge creation and interaction process between the tacit and explicit knowledge. The model is spiral in nature where there is an interaction between the tacit and explicit knowledge in a continuous process. Nonaka has stressed that the model should not be misunderstood as circular rather it is spiral where the interaction begins from one stage and ends at another stage. The core thought of this model is that there is knowledge sharing between individuals and ends up in creation of new knowledge. The amount of knowledge creation increases with every round in the spiral of model. The SECI models also helps to understand and manage this dynamic and continuous process of knowledge sharing and creation of knowledge within the organization.
Figure 2.9 SECI model

Following are the four modes of knowledge sharing and conversion:

1. **Socialization (Tacit to Tacit)**: This mode of the model represents sharing of tacit knowledge between people. The transfer of tacit knowledge between people can happen with social interactions, face to face meetings, brainstorming, informal social networking sites where employees tend to interact and share tacit knowledge, trainings by experts. Sharing of tacit knowledge is difficult to formalize it can be acquired when individuals spent time with each other and share their experiences or expertise within the same environment. Successful transfer of tacit knowledge between individuals need trust among each other and also trust on other persons knowledge. Socialization also takes place when an individual learn through practical experiences.

2. **Externalization (Tacit to Explicit)**: Externalization is the process in which tacit knowledge is captured and converted into explicit such as publishing articles, insights, images, written documents, blogs, webinars etc. This is the process where an individual’s tacit knowledge is transformed into physical resource in any form. Thus once captured and made explicit, the tacit knowledge becomes crystallized and can more easily be shared and disseminated throughout the organization and finally results in creation of new knowledge.

3. **Combination (Explicit to Explicit)**: This is the process of converting one source explicit knowledge into another form of explicit knowledge. Combination is the process of organizing, summarizing, integrating, editing, or filtering the explicit knowledge available
and develops new form of explicit knowledge. The process involves gathering explicit form of knowledge from various sources within the organization or outside the organization and later combining and modifying it to develop new form of explicit knowledge. The advancement in technology such as data mining and warehousing helps to integrate extract and represent knowledge in new form. This new generated explicit knowledge is again shared and disseminated within the organization thereby resulting in new knowledge.

4. **Internalization (Explicit to Tacit):** Internalization is the process where an individual gains new tacit knowledge from explicit knowledge and application of this new knowledge is seen. This process results in increase in individual’s knowledge asset and thereby benefits the organization. Internalization can occur by reading articles, insights, books, on-site observation, webinars etc. Internalization process leads to increase in organization’s intellectual asset.

Thus overall the SECI covers every aspect of knowledge creation and transfer in the organization. This model is very beneficial to understand the dynamic nature of knowledge sharing and provides the framework to manage this conversion and sharing effectively. The Nonaka’s model is based on study of Japanese organizations, which relies on tacit knowledge of the employees and is feasible when employees stay with organization for lifetime but in case of frequent walkouts or brain drain the model may not be that much fruitful.

2.6.3 **Shwartz A.O.D Model (2000):**

Shwartz developed the Acquisition Organization and Distribution (A.O.D) Model for knowledge management. The A.O.D model views Internet-based knowledge management as dealing with three tenets Acquire, Organize and Distribute. The model defines these three elements as follows:

1. **Acquisition: Gather, Inquire, Verify/Validate, Encode (GIVE):**

Acquisition is the phase to collect knowledge from members of the organization or other resources and store that knowledge in an organizational memory. This process begins with a gathering and inquiring knowledge and information from every possible source. Gathering involves collecting knowledge available in both explicit and tacit form. Methods such as brainstorming, bulletin board, meetings, personal interactions etc. can be used to gather the tacit knowledge that is present in the mind of the people. Explicit
knowledge which is present in physical form such documents, spreadsheet, white paper, archives, databases etc can be easily gathered. Inquiring goes complimentary with gathering process, it is the process of triggering inquiry for new knowledge either from the user or automatically within the system. Whenever there is an inquiry for new knowledge need that is identified and captured. Gathering knowledge is followed by verification and validation process. The knowledge gathered will be stored in the organizational memory to be used by all the members of the organization hence, the knowledge must go through verification and validation process so only authentic, reliable and quality knowledge goes into organizational memory. Once the validation of knowledge is completed it needs to be encoded into a format which can be manipulated and reused by other members of the organization. “The challenge is to codify knowledge and still leave its distinctive attributes intact, putting in place codification structures that can change as rapidly and flexibly as the knowledge itself.”23

2. Organize : Profile, Associate, Rank, Classify (PARC) :

Organization phase deals with organizing , indexing and formatting of the knowledge acquired. There are four steps in this phase as, Profile, Associate, Rank and Classify. Profile step involves creating detailed information in the form of meta data about the knowledge being stored in the organizational memory for further reuse. Meta data can be created in two form context wise or content wise. Profile step deals with creating context wise information such as author, title, date of creation, subject related to, history etc. Profiling is followed by Association where the knowledge is associated with other similar or related knowledge or knowledge associated to a particular group of users. Classification is a process of classifying the similar coherent knowledge together so that the collected knowledge can be easily distinguished and further becomes easy to search and retrieve required. Classification is more content based grouping of similar knowledge can be done on the basis of some keywords in the content. Ranking is the process of ranking the collected knowledge on the basis of its intellectual contents. The ranking process presents the quality of the knowledge.

3. Distribute : Awareness, Identification and Delivery (AID)

The main goal of Distribute phase is to present the collected and organized knowledge to the right user at the right time. The most important point in distribution of knowledge is creating awareness among the users about its availability. Awareness is perhaps more a function of management than it is of technology. The KM project team found that the first
step required was generating awareness among the project team – awareness that had to span six different organizations involved in the project. Identification process involves identifying the right knowledge available, this step is more user dependent but a collaborative approach by system and user makes the identification more efficient. According to Schwartz, “for identification to become truly efficient, we must move towards systems that have internal representations of the users alongside the knowledge so that automatic view generation can not only consider the available memories, but also the characteristics of the user”. The final step is to deliver the right knowledge to the right user at the right time. Delivery depends on the system and its use of technology. Efficient use of technology such web, groupware, intranet etc can make this delivery more seamless and optimised. Thus, delivery is highly system and technology dependent step which may disseminate the knowledge within the members of the organization.

2.6.4 The N-Form Knowledge Management Model:

Hedlund Gunnar proposed this model of knowledge management for the N-Form organizations. The author has stressed that, the knowledge management practices are more efficient in N-Form in comparison to M-form (Multi-divisional form) organization structure which is hierarchical form of structure. Hedlund said “As an alternative, I suggest the 'N-form.' 'N' stands for 'new,' and 'novelty,' and comes after M”. Hedlund expressed in his article “Other attributes of the N-form are: temporary constellations of people, the importance of personnel at 'lower levels', lateral communication, a catalytic and architectural role for top management, strategies aimed at focusing and economies of depth, and hierarchical structures”.

The model distinguishes between knowledge and agents or carriers of knowledge. First distinctions between knowledge shows two types of knowledge tacit and articulated (explicit ) and second distinction shows the carriers of knowledge at different levels such as individuals, small groups, organizational and inter-organizational. The model distinguishes between three forms, perhaps better-aspects of knowledge: cognitive knowledge in the form of mental constructs and precepts, skills, and knowledge embodied in products, well defined services or artefacts.

He injects into these a set of dynamics related to knowledge creation, development transfer and use, yielding a structure that is build around basic dimensions:
The Three tenets of internet-based Knowledge Management

**Acquire**
- Stages: Gather, Inquire, Verify/Validate, Encode
- Tools & Techniques:
  - Corporate Database
  - Email Messages
  - Policy manuals
  - Interviews
  - Interaction with KM system
  - Information Retrieval
  - Automated Acquisition

**Organize**
- Stages: Profiling, Association, Classification
- Tools & Techniques:
  - Indexing
  - Categorization/Catalogue
  - Keyword Insertion
  - Information Retrieval
  - Combining Knowledge

**Distribute**
- Stages: Awareness, Identification, Delivery
- Tools & Techniques
  - Emails
  - Web-site pull
  - Web-site Push
  - Databases
  - Printed Reports
  - Querying

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**Figure 2.10 : A.O.D Model**


- Two types of knowledge (tacit and articulated) and within each type three forms of knowledge (Cognitive, Skill, embodied).
- Four levels of carrier (individuals, small groups, organizations, the inter-organizational domain.)
- The dynamics of knowledge transfer and transformation, which are articulated by the following processes namely Articulation and Internalization the interaction of which is reflection, Extension and appropriation, the interaction of which is dialogue and Assimilation and dissemination.

![Knowledge Management and N-Form Corporation Diagram](image)

**Figure 2.11: N-Form Knowledge Management Model.**
(Source: Gunnar Hedlund “A Model of Knowledge Management and the N-Form Corporation”, Strategic Management Journal, Vol. 15, pp. 73-90, 1994.)

### 2.7.1 Implementation of Knowledge Management System:

The Knowledge Management System supports and enhances the firm’s knowledge process. “Knowledge management system can be defined as information systems developed to support and enhance the organizational knowledge processes of knowledge creation, storage, retrieval, transfer and application.”

Implementation of knowledge management in an organization is an evolutionary process rather than a ‘big bang’ approach. Companies may take years to evolve from one stage to another stage and a well planned steady approach can make the knowledge management system implementation successful. Many failures in implementing KMS suffer from ‘All Flight Magazine Syndrome’ which means a manager or an officer reads an article on KM
in a magazine during his flight and he lands up in office and suddenly implements KMS. These types of implementation are subject to failure as they lack proper planning and strategy. Implementation of KMS requires a planned strategy with a collaborative involvement from all the layers of organizations. Implementation of KMS can be summarized into following five stages:

**Stage 1 : Advocate and Learn**:

In the first stage it is required that the concept of Knowledge Management is introduced at the highest level of the organization. It is the stage when top management people of the organization develop interest in Knowledge Management practices and explores the benefits of KM. There few members in the organization who can vouch for capabilities of KM. Once the top management are convinced with the benefits of KM and takes the decision to implement KMS, there begins the need to advocate the term among other members of the organization and develop initially a small group of KM supporters. Initiatives are taken to make everyone in the organization aware of KM, its role and its importance for the organization. Seminars, workshops, conferences, webinars or presentations can be used to advocate and let others learn about KM and its benefits. Once KM is made aware to everyone, next step is to pick up the KM team. A KM team is formed by identifying employees who can give a fruitful contribution in implementing KMS. Further step leads to learning from the experiences of other organizations who have implemented KMS. The main goal of this stage is to create awareness and convince benefits of KM among the staff of the organization. Once the goal of this stage is achieved the process shifts to the later stage.

**Stage 2: Develop a Strategy**:

The overall goal of this stage is to develop a KM-strategy along with its goal and objectives which suits the organizational model and then a task force is formed to execute the activities defined in the KM-strategy. The KM-team formed in the previous stage remains at core of task force with more members joining the team preferably from cross-functional members from different departments or divisions. The task force must have a member from executive group or champion, so that it can communicate with the top management and also the staff at lower levels. Once the task force is formed, next step is to identify and classify the knowledge asset of the company. The KM task force has to prepare design for KM – pilot project, identify and provide various financial,
infrastructural, information technology and human resources. By the end of this stage the pilot KM-project is ready to be implemented with all the resources needed being provided.

Figure: 2.12 Knowledge Management Implementation System Stages.

Stage 3: Design and Launch KM initiatives:

This stage is implemented when a KM-pilot is all set to be implemented with all the resources being facilitated. The KM-pilot project is launched and its results are monitored. At this stage, the real benefits of capturing, storing and sharing knowledge are gathered. This stage turns the benefits of KM-implementation into tangible and visible form. Lessons are learned from the results produced by this pilot KM initiative. Launching of
pilot project, gathering its results, making the KM benefits visible and learning lessons from the project implementation marks the conclusion of this stage.

Stage 4: Expand and Support KM- initiatives:

The commencement of this stage begins when all the activities of previous stage are carried out successfully. Once the pilots are successfully executed and the organization have evidently realised the tangible benefits of managing knowledge and also by this time the organization have gained experience in managing knowledge. Now, it is the time the organizations decide to expand its KM initiatives throughout various departments of the organization. Once the KM-expansion is finalised, the KM task force team has to keep constant evaluation and Return on Investment (ROI) criteria need to be demonstrated. The stage ends up with proper KM-expansion strategy, its marketing in various departments, formalising and training new team members, proper assessment of KM strategy, subjecting KM to ROI criteria and arrangement of further resources needed for the expansion of KM initiatives.

Stage 5: Institutionalize KM

This is the final stage of KM implementation and is commenced when KM initiatives have expanded throughout the organization. This stage involves making Knowledge Management an integral part of the organizational process. The organizational structure, budget and business model are aligned with KM- strategy, all the executives, managers and employees are conversant in using KM tools. Sharing knowledge becomes norms, incentive and reward system is part of KM strategy. Organizations now consider KM as a business strategy and not an extended database. Constant monitoring and assessment of KM system is performed and finally the KM journey is continued.

2.7.2 Success Factors in Implementation of KMS :

Successful implementation of KMS depends on many factors. The factors include top management support, functional aspect of implementation and the proper management of human resource of KM. Dr. B. Rathan Reddy, 2007 has listed out following success factor for implementation of KMS :

- **Workforce Planning**: The organization must have a well planned workforce. This planning should be linked to organization’s strategic planning efforts. The efforts are taken to create a citizen-cantered, result oriented and market based organization
- **Workforce Deployment:** The workforce is positioned both geographically and organizationally to serve citizens and helps the organization to achieve its goal and missions.

- **Leadership Planning and Implementation:** This relates to organization’s recognition of leadership competency and establishes objectives and strategies to address them.

- **Change Management:** Here, the role of leaders is important in understanding what it takes to effectively bring changes so as there is significant and sustained improvements in performance.

- **Integrity and Inspiring Employees Commitment:** Leaders should be such that they set an example for others and become role model for his team and employees. It is about the qualities of leader which shows the honesty and ethics and inspires others to follow same. A good leader can promote teamwork, develop trust among the employees and get an honest and ethical feedback from them.

- **Strategic Knowledge Management:** Organizations must provide all the resources and tools required for the knowledge sharing within the organization which is main mission of knowledge management system.

- **Continuous Learning and Improvement:** The employees are provided an environment and leadership which foster continuous learning culture and explore more opportunities for them. Leaders invest in training, education and other development activities to support self-development in the employees. This also helps in employee retention and his loyalty towards the organization.

- **Result Oriented Performance Culture:** This relates to human capital of KMS, the workforce should be result oriented, dedicated and determined towards their job. A good performance management system can facilitate in identifying the low and high performing employees.

- **Performance Management:** A good performance management system helps organization to identify individual and teams with respect to their performance and thereby helps the organization to encourage good performance by rewarding or appreciations and motivate low performing teams or employees.

- **Diversity:** An organization constitutes diverse group of employees, efficiently managing this diversification can yield fruitful results. Efficient management of this diversification and differences in the culture of employees will help company to achieve goals.
• **Employee/Labor Management Relations**: A proper strategy to manage Employee and Management relations can increases cooperation, communication, unions among the employees, reduces employee related disputes, keeps harmony among them and as a result helps in smooth functioning of the organization towards achieving its goals.

• **Workforce Analysis**: There is systematic process developed to identify mission critical occupations and competencies needed in the current and near future of workforce and also develop strategy to fill the gaps.  

### 2.7.3 Challenges in KM Implementation:

- **Getting Employees On-Board**: This is perhaps biggest challenge to make employees participate in the knowledge management process. It is challenge to compel employees to share their knowledge and skills because of which they are surviving in the organization. Some psychological barriers such as fear of developing competency, losing the job because their knowledge is no more unique, jealousy or complex. All these factors may become a barrier in KM implementation.

- **Allowing Technology to Dictate**: KM is highly influenced by Information Technology but not to be misunderstood as an Information Technology concept. IT only facilities efficient functioning of KM activities. Because of overshadowing of IT on KM, the real essence of KM might be lost and misunderstood as an Information technology discipline.

- **Not Having Specific Business Goals**: The end result of KMS is to bring best out of the organization so as it can successfully achieve its goals. If goals are not properly defined the complete process of KMS will head towards a wrong direction and result in a mess and wastage of time and money.

- **Not all information is Knowledge**: KMS is all about knowledge gathering, organizing and sharing. It is very important to identify which knowledge needs to shared and which not. Sharing wrong knowledge can result in disaster. Thus, organization must scrutinize the knowledge before being disseminated.

### 2.8.1 Information Technology tools for KM:

Knowledge Management is highly influenced by technology, often KM is mistaken as an IT concept. But in true essence of KM, IT is only an aspect of KM which can make the
KM-process more efficient and bring the best out of KM effectively. There are many technology tools which enable the KM-process. There are many software available in the market which enable the KM-process of creating, capturing, organizing and sharing knowledge. Following are the technology tools:

**Figure 2.13 : KM-Tools**

### 2.8.2. Groupware Systems:

Groupware is a technology that help people to collaborate, communicate and other wide range of applications.

- **Communication tools:** These tools can be used for various communication within the organization such as for sending messages and files, including email, webpublishing, wikis, filesharing, etc.

- **Conferencing tools:** These are special tools which facilitates conferencing between people separated at different geographical areas e.g. video/audio conferencing, chat, forums, etc.

- **Collaborative management tools:** Special tools used for managing groups and group activities, e.g. project management systems, workflow systems, information management systems, etc.
The best known groupware system are Lotus Notes, Web 2.0/KM 2.0/Enterprise 2.0 and Microsoft SharePoint.

2.8.3. Intranet/Extranet:

Intranet is smaller version of internet which operates only within a particular organization. Normally referred internet owned by a firm/organization. Intranet provides communication collaboration and other facilities which are provided by the internet. The main functions supporting this are:

- **Publishing**: e.g., homepages, newsletters, documents, employee directories.
- **Searching**: The intranet can integrate different search functions, e.g. through a search engine or using a system of categorization.
- **Transacting**: Allows user to make transactions with other web/intranet homepages.
- **Interacting**: Collaborative applications and other groupware, expert finders, directories, etc.
- **Recording**: It can be used as a storage medium for such elements as procedures, best practices, and FAQs.

2.8.4. Decision Support System:

A decision support system (DSS) is a computer program application that analyzes business data and presents it so that users can make business decisions more easily. A decision support system may present information graphically and may include an expert system or artificial intelligence (AI). It may be aimed at business executives or some other group of knowledge workers. DSS are crucial for knowledge management activities, it helps in the knowledge discovery process. Kiku emphasizes that a decision support system must be designed in light of KM.

Decision Support application gather and present information in various forms which help in decision making. For example DSS might gather and display information in the form of weekly sales figures, consequences of different decision alternatives, given past experiences, comparative analysis of sales for different time period etc.
2.8.5. Content Management System:

Content management systems are very relevant to knowledge management (KM) since they are responsible for the creation, management, and distribution of content on the intranet, extranet, or a website.

“A content management system may have the following functions:

- Provide templates for publishing: Making publishing easier and more consistent with existing structure/design.
- Tag content with metadata: i.e. Allowing the input of data that classifies content (e.g. keywords) so that it can be searched for and retrieved.
- Make it easy to edit content
- Version control: Tracking changes to pages and, if necessary, allowing previous versions to be accessed
- Allow for collaborative work on content
- Integrated document management systems
- Workflow management: Allowing for parallel content development
- Provide extensions and plug-ins for increased functionality.”

2.8.6. Document Management System:

Document Management System is software system that facilitates publishing, storage, indexing and retrieval of documents. These systems deals with explicit form of knowledge, the abundance of document within the organization makes it necessary for the organizations to have a document management system. Document Management System are sometimes part of Content Management Systems.

The functions of document management system are as follows:

1. **Capturing**: In order for paper documents to be useable by the document management they must be scanned in. For companies that need to carry out this process and who have numerous paper documents this may be time consuming and expensive.

2. **Classification using metadata**: Metadata (data about data) is used to identify the document so that it can be retrieved later. It can include keywords, date, author, etc. The user is often asked to input this metadata or the system may extract it from
the document. Optical character recognition may be used to identify text on scanned images.

3. **Indexing:** There are many different forms, and a good indexing system is crucial. The index function will use metadata.

4. **Searching & retrieval:** The document management system’s search function is one of its most important elements. Search functions can be more or less sophisticated, allowing for searches by elements of the document’s metadata, or by searching the actual document for key words/phrases and using semantic analysis to determine relevance.

5. **Versioning:** Storage and management of different versions of documents - useful for documents that require frequent updating. Allows authorized users to return to earlier versions.

6. **Administration & security:** Any IT system needs to be regulated and policed. Users require different levels of authorization, with certain more sensitive functions/documents being available only to selected users/administrators. Document management systems will also have backup systems in place in case of mishaps.30

**2.8.7. Data Mining and Data Warehousing :**

Data warehousing is repository of historical data needed for analysis and decision making. Data warehouse is defined as large centralized repository of subject oriented, time variant, integrated and non-volatile data required for decision making and analysis. Data warehousing helps to collect and gather data from various sources of the organization. Once the data is loaded in data warehouse, Data mining techniques and other analytical tools can be used to extract knowledge from this data repository. Thus from KM perspective, data warehousing and data mining helps in storing and organizing the knowledge as well as the knowledge discovery achieved by data mining helps in creation of knowledge towards the benefit of the organization.

There are number of Data Mining algorithms which are applied on historical data available in data warehouse. These algorithms reveal knowledge in graphical representation form. Thus, both data ware housing and data mining can be considered crucial in the knowledge management process.
References:


