CHAPTER - 1

Introduction to Knowledge Management

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Chapter – 1

Introduction to Knowledge Management

“Knowledge is the perception of the agreement or disagreement of two ideas”
- John Locke (1689)

“You cannot manage knowledge – nobody can. What you can do is to manage the environment in which knowledge can be created, discovered, captured, shared, distilled, validated, transferred, adopted, adapted and applied.”

Chris Collison and Geof Parcel, Learning to fly: Practical Knowledge Management from Leading and Learning Organizations

A little knowledge that acts is worth infinitely more than much knowledge that is idle.
Kahlil Gibran (1883 - 1931)
Lebanese-American Poet, Philosopher & Artist

1.1. Introduction

The concept of knowledge is not new as it has been the basis for development of culture, business, philosophies and religions. Today people are contemplating to harness knowledge energies for better management irrespective of their fields of work. In the world of knowledge economy, the prosperity of nation in terms of employment, employability, corporate and personal success depend on the individuals and society to understand the existing knowledge, generate the new knowledge and use the knowledge. This statement holds good for the entire world, nation and its subsets like industrial sector, education sector, etc. In order to understand the meaning of knowledge, it is necessary to understand the underlying terms responsible of evolution of knowledge (Figure 1.1).

![Figure 1.1: Evolution of Knowledge](image-url)
Some people define knowledge as a process which is dynamic, may be in the minds of people, in the files (hard & soft), or may be stored anywhere. This knowledge is different from data (which is discrete, symbolic and unorganized) and information (which is means of communication). Data is one of the most commonly known and used but least understood in words. Data is nothing but simple descriptions like name, address, designation of employees of a University or mechanical measurements of values such as air temperature observations that are recorded at a particular time. Data has a single correct value or a set of few closely related interrelated values. To analyse and further process the data, there needs to be ‘meaning’ attached to these values. Some authors define data as collection of raw facts which on processing becomes information. Information is a critical resource in the operations and management of organizations. Timely availability of relevant information is very important for effective functioning of any organization. Information consists of data that have been processed and are meaningful to a user. Information is generated by organizing data within contexts. Information relates to description, definition or perspective (what, when, who, where)\(^\text{[1]}\). Knowledge now can be defined as the interpretation of information which is structured, organized and ready to use. In fact, data and information are building blocks for knowledge. Information generation is an intermediate step of knowledge creation process. Knowledge process is the intellectual activity that is performed by people by acting on data, information and knowledge to discover various options of providing knowledge. We can now say that knowledge comprises of strategy, practice, method or approach (how).

The information has a limited value; the associated context provides necessary intent. This knowledge can be subdivided into blocks which can be coded, shared and used. Knowledge is a valuable resource in sustenance of an organization. Knowledge is so powerful that its use would depend totally on the perception and depth of the person himself. Knowledge is an intangible phenomenon which depends on the individual and the society as to how to use
it. This concept is at times represented as a pyramid (Figure 1.2) as shown below:

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Figure 1.2 : The Knowledge Pyramid
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Nowadays, knowledge is considered to be an asset to an organization with economic value. Knowledge can be differentiated into two categories, namely: Tacit (experiential) and Explicit (codified or codifiable). Originally, the differentiation of knowledge into these categories was given by Michael Polanyi, a Scientist turned Philosopher in 1966. His work was carried forward by Ikujiro Nonaka and Hirotaka Takeuchi. Their work was presented in the article in Harvard Business Review in 1991 and later in their book ‘The Knowledge Creating Company’. In 1994, Peter Drucker, noticed how knowledge was a primary resource for a society and he believed that the implications of this shift would prove significantly for organizations. 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." — Peter F. Drucker in *The New Realities*. Knowledge is now considered as a capital which has economic value; and it is a stability factor in an unstable and dynamic competitive environment and it is a decisive competitive environment. Knowledge is an intellectual capital and organizations try to implement technology driven methods for accessing, controlling and delivering information that can transform the organization’s culture into knowledge. Intellectual capital consists of three
components, namely human resources (employee experience, skills, expertise, etc.), intellectual assets (clearly defined knowledge like inventions, designs, approaches, etc.), intellectual property (which can be legally protected viz. copyrights, trademarks, etc.)\(^\text{[45]}\).

Knowledge is a fluid mix of contextual information, values, experiences, and rules. It comes in many forms, including process knowledge (how to), catalogue knowledge (what is) and experiential knowledge (what was)\(^\text{[43]}\).

The advent of the knowledge economy, globalization, the rapid advance of technology, the changing demands of increasingly sophisticated customers, and turbulent competition place increased pressures on organizations [Wiig]. In order to handle these pressures, organizations need to have a policy to respond faster, should have flexibility in their dealings and should have latest technology to attract the customers i.e. they should have a collection best possible knowledge assets and efficient management to handle these assets. We now present the modified diagram in (Figure 1.3) in reference to Figure 1.2.

![Figure 1.3: The Knowledge Graph\(^\text{[26]}\)](image-url)
We have already discussed in the preceding pages about the taxonomy data, information and knowledge. Wisdom is defined as the ultimate level of understanding. It is for the researchers who would like to enhance the present research for ‘Wisdom’.

1.2 Basic Types of Knowledge

1.2.1 Tacit Knowledge

Tacit Knowledge is a knowledge that an individual is unable to articulate and thereby convert to information. This type of knowledge lies in the minds of the people. It has two components i.e. technical component and cognitive element. Technical component comes from the experience of the individual and can be demonstrated practically. The cognitive element is the belief and viewpoint of the individual which is very difficult to express or codify and hence to share. Tacit knowledge is of four types: embrained (know that), embodied (know how), embedded, and encultured[10].

- Embrained knowledge (know that), which is dependent on conceptual skills and cognitive abilities. This type of tacit knowledge can be explicated with relative ease.
- Embodied knowledge (know how), which is action oriented and is acquired by doing and is rooted in a specific context. This type of knowledge is difficult to explicate.
- Embedded knowledge, which resides in the relationships between organizational constituents such as technologies, roles, formal procedures and emergent routines.
- Encultured knowledge, which is the shared understanding that is socially constructed and re-constructed.
Achterbergh, Jan & Vriens Dirk have defined tacit knowledge and its two dimensions in the following manner:

Tacit knowledge is personal knowledge embedded in individual experience and involves intangible factors, such as personal beliefs, perspective, and the value system. Tacit knowledge is hard to articulate with formal language (hard, but not impossible). It contains subjective insights, intuitions, and instincts. Before tacit knowledge can be communicated, it must be converted into words, models, or numbers that can be understood. In addition, there are two dimensions to tacit knowledge:

- **Technical Dimension (procedural):** This encompasses the kind of informal and skills often captured in the term know-how. For example, a craftsperson develops a wealth of expertise after years of experience. But a craftsperson often has difficulty articulating the technical or scientific principles of his or her craft. Highly subjective and personal insights, intuitions, hunches and inspirations derived from bodily experience fall into this dimension.

- **Cognitive Dimension:** This consists of beliefs, perceptions, ideals, values, emotions and mental models so ingrained in us that we take them for granted. Though they cannot be articulated very easily, this dimension of tacit knowledge shapes the way we perceive the world around us.

According to Polanyi, when we acquire skills, we acquire corresponding understanding that defies articulation. This becomes a part of tacit collection. The theory of tacit knowledge was developed in Japan based on the idea of “we know more than we can say”.

1.2.2 Explicit Knowledge

Explicit Knowledge is the knowledge that individuals are able to express using language or other type of communication. This type of knowledge can be expressed in formal language and can be codified. Transfer of explicit knowledge is very straightforward. This type of knowledge can be easily shared between various sources. As the explicit knowledge can be stored, there are less chances of losing it due to employee relocation. We can thus define it as knowledge transferred from one’s head into the storable forms like papers, printed documents, digitized form and so on.

Locke has defined knowledge in following three different aspects:

- **Intuitive Knowledge** involves direct and immediate recognition of the agreement or disagreement of two ideas. It yields perfect certainty, but is only rarely available to us. For example, I know intuitively that a dog is not the same as an elephant.

- **Demonstrative Knowledge** is when we perceive the agreement or disagreement indirectly through a series of intermediate ideas. For example, I know that A is greater than B and B is greater than C, thus I know demonstratively that A is greater than C.

- **Sensitive Knowledge** is when our sensory ideas are caused by existing things even when we do not know what causes the idea within us. For example, I have known that there is something producing the odour I can smell.

1.2.3 Knowledge Typology

The knowledge typology is shown in Figure 1.4. It shows that facts are converted into data which is in turn processed and with specific context constitutes information. By giving meaning to information, we get knowledge
which is of two types, namely: explicit and tacit. Explicit Knowledge is gathered from concepts, process, procedures and principles whereas the tacit knowledge is gathered by experience, subjective insights and by actions. Then the process of knowledge conversion takes place with the help of processes like internalization, socialization, externalization and combination which leads to understanding which is called wisdom.

![Knowledge Typology](image)

**Figure 1.4 : Knowledge Typology[25]**

### 1.2.4 Knowledge Creation and Usage in an Organization

Knowledge creation includes all activities which bring to light knowledge which is new. This knowledge may for an individual, for the group or for the entire world. Knowledge creation includes activities like activities, synthesis, fusion and adaptation. Codification of knowledge includes the processes like capturing and representation of knowledge that can be used by an individual or
an organization. The process of acquiring knowledge and using it by the personnel of an organization depends upon different aspects like inclination of the employees and stakeholders towards creating, sharing and using the stored knowledge. We are referring to tacit knowledge that is stored in the minds of people in terms of their experience, expertise and so on. The support of the organization plays a crucial role where the employees and stakeholders need to be mentored, motivated, awarded and appreciated for recognizing the knowledge they have created. Many management gurus have stated that ICT has nothing to do with Knowledge Management but technology plays a vital role in storing and disseminating knowledge at the right time to right people. The knowledge created should be actionable which helps in proper usage of the knowledge. Computerised Knowledge Management System with proper feedback system helps any organization to progress proactively.

1.3 Knowledge Management

Knowledge Management is defined differently by various authors. Some authors have defined it as a method for assembling information and making it available to others by capturing, organizing and storing.

Knowledge Management consists of methodology practices, new software systems, processes, and operating procedures that are developed to validate, evaluate, integrate, and disseminate information for users to make decisions and learn\[^3\]. The main objective Knowledge Management aims at identifying and locating knowledge and knowledge sources within the organization. The knowledge is then translated into explicit knowledge called codified knowledge in order to facilitate dissemination of knowledge.

In our opinion, the definition stated by Nonaka and Takeuchi is the one which fits well for any type of organization. It states that successful Knowledge Management program should be able to convert internalised tacit knowledge into explicit codified knowledge in order to share it, but also on the other hand
for individuals and groups to internalise and make personally meaningful codified knowledge once retrieved from the Knowledge Management System. Knowledge Management involves identification of categories of knowledge needed to support the overall business strategy, assessment of current state of the firm’s knowledge and transformation of current knowledge base into a new and more powerful knowledge base by filling knowledge gaps. Knowledge Management combines indexing, searching and push technology to help the institutions organize data stored in multiple sources and deliver only relevant information to users. Knowledge Management facilitates autonomous coordination of decentralized subsystems that can state and adapt their own objectives. The drivers of Knowledge Management include pressures of competitions, internal inefficiencies, improvement in ICT, globalization, knowledge hoarding, need of effective decision making, resource based theory and its impact and so on.

The work done by an individual could be a part of the organizational management or core activities which requires knowledge. The complete knowledge organized for the functioning of the organization is called organizational knowledge. Hence lack of organizational knowledge leads to dysfunctioning of the organization. In this fast moving world, the organizations will have to pay a lot in case of information loss. Hence we can say that Knowledge Management is an asset for sustenance and competitiveness. In 1997 Knowledge Management emerged from academia and proliferated into corporate, business and technology. Practically, Knowledge Management has risen like a phoenix and morphed into various applications like portals, e-learning, e-analysis, content management and so on. Knowledge Management enables taking informed action in previously unknown circumstances. Organizations are valued and succeed not just for what they know, but their ability to leverage what they know creatively and proactively. When the world witnessed the rise of Internet, it was Sun Microsystems’ ability to quickly reposition a stalling, virtually unknown platform-independent interface and
programming language product as the Internet programming language Java that exemplifies the value of Sun- not the Java product itself. This type of innovation is the fruit of Knowledge Management as it is a critical element in the success of any business/organization[5].

Knowledge Management helps in identifying, acquiring, storing, accessing, diffusing, reusing and maintaining the external and internal knowledge. One of the approaches to manage knowledge is creating repositories which can be accessed in need. These repositories which contain abundant knowledge should be available to the concerned persons in the organization. The role of IT steps in at this juncture where appropriate knowledge base should be created with appropriate and timely search functions which satisfy the fired queries. Knowledge generation, codification and transfer is a continuous process and these actions are not created by the management.

Former CEO of Hewlett Packard Mr. Lew Platt once said “If HP knew what HP knows we would be three times more profitable.”

This statement clearly shows the importance of managing knowledge in a company.

1.3.1 Common Knowledge Management Initiatives include:

- Sharing Knowledge and best practices
- Instilling responsibility for sharing knowledge
- Capturing and reusing best practices
- Embedding Knowledge in products, services and processes
- Producing Knowledge as product
- Driving Knowledge generation for renovation
- Mapping networks of experts
- Building and mining customer base
- Understanding and measuring the value of knowledge
- Leveraging intellectual aspects
1.3.2 Benefits of Knowledge Management:
Knowledge Management is beneficial to employees, communities of practice and to the organization itself. It helps the employees to carry out their jobs efficiently by saving time, the employees are updated with the latest knowledge, provides opportunities. Knowledge Management develops professional skills, promotes peer-to-peer mentoring and more effective networking and collaboration. Knowledge Management helps drive strategy, solves problems quickly, diffuses best practices, and provides opportunities for innovation, build organizational memory. The organizations always strive to acquire and utilize the intellectual capital that resides in the minds of individuals and groups. The importance of intellectual capital has encouraged the field of Knowledge Management.

1.3.3 Organizational Learning and Knowledge Management:
Organizational Learning in reference to Knowledge Management is defined as the process of responding proactively to a rapidly challenging environment. It helps in improving organizational actions through better knowledge and understanding. Organizational Learning can be thought of as the manner in which an organization builds supplements, and structures knowledge and actions centring around their core activities and within their cultures. Organizational Learning contributes to building, development, enhancement and sustenance of an organizational memory.

1.3.4 Knowledge Management & Business Intelligence
Knowledge Management and Business Intelligence (BI) systems complement each other. Knowledge Management Systems are human oriented. Human beings create, share, disseminate, use and apply knowledge. Business Intelligence comprises of variety of tools and technologies, but the decisions and actions are taken and employed by the people. Analysis includes tasks like querying, searching, exploring, drill-down, visualizing, modelling and mining.
Although people play crucial role in both the systems, thus the distinguishing fact is: in Knowledge Management Systems people use knowledge from various knowledge sources and apply them to address the problems while in Business Intelligent Systems the insights and choice are mostly data driven (Figure 1.5)\cite{44}. 

![Figure 1.5: KM and BI Tools\cite{44}](image)

Knowledge Management is concerned with creating, codifying, and storing, sharing, using and applying knowledge. Hence we can say that “Knowledge” is an entity that connects Knowledge Management and Business Intelligence. Human resource in any type of organization is Knowledge Asset for the organization. To have the understanding of the organization in terms of work culture, various processes, different technologies, stakeholders, resources, etc. This knowledge is stored in their minds in the tacit form. However, Knowledge Management helps to make it available in the explicit form. If Knowledge Management and Business Intelligence are integrated, the outcome will have better insight to the stakeholders. Various approaches to Knowledge Management are tried by various people/organizations of which technological is widely used and accepted.
1.4 Various Models of Knowledge Management[7]

1.4.1 SECI Model: (Socialization, Externalization, Combination, Internalization) Nonaka & Takeuchi Model

The theory of Knowledge Creation was developed by Professor Ikujiro Nonaka and his colleagues in 1994. Ikujiro Nonaka and Hirotaka Takeuchi proposed a model (Figure 1.6) of the knowledge creating process. According to them, the knowledge creation process is dynamic in nature and suggested methods to manage such a process effectively. There is a spiral of knowledge involved in their model, where the explicit and tacit knowledge interact with each other in a continuous process, which leads to creation of new knowledge. The central thought of the model is that knowledge held by individuals is shared with other individuals so it interconnects to a new knowledge. The amount of knowledge grows continuously when more rounds are done in the model.

1.4.1.1 Socialization

Socialization involves sharing of tacit knowledge in personal communication or by shared experience e.g. teaching the students by practical examples. This process focuses on tacit to tacit knowledge linking. Tacit knowledge goes beyond the boundary and new knowledge is created by using the process of interactions, observing, discussing, analysing, spending time together or living in the same environment. The socialization is also known as converting new knowledge through shared experiences. Organizations gain new knowledge from outside its boundary also like interacting with customers, suppliers and stakeholders.

1.4.1.2 Externalization

In this process, the tacit knowledge is converted to explicit knowledge by perceptions and by developing models which should be in understandable and interpretable form and can be used by others. New knowledge is created as tacit knowledge comes out of its boundary and becomes collective group knowledge.
knowledge. The experience of the people working on a task helps in giving quality solutions for any problem in the organization.

![SECI Model](image)

**Figure 1.6: SECI Model**

### 1.4.1.3 Combination

Combination is a process where knowledge transforms from explicit knowledge to explicit knowledge. The finance department collects all financial reports from each department and publicizes a consolidated annual financial performance report. Creative use of database to get business report, sorting, adding, categorizing are some examples of combination process.

### 1.4.1.4 Internalization

Internalization means understanding explicit knowledge. It happens when explicit knowledge transforms to tacit and becomes a part of individual’s basic information. Cycle continues now in the spiral of knowledge back to socialization when individual shares his tacit knowledge silently. This is how amount of knowledge grows and the previous conceptions might change.

The creation of knowledge is a continuous process of dynamic interactions between tacit and explicit knowledge. The four modes of knowledge conversion interact in the spiral of knowledge creation. The spiral becomes larger in scale as it moves up through organizational levels, and can trigger new spirals of knowledge creation.
By internalization explicit knowledge is created using tacit knowledge and is shared across the organization. When this tacit knowledge is read or practiced by individuals then it broadens the learning spiral of knowledge creation. Organization tries to innovate or learn when this new knowledge is shared in Socialization process. Organizations provide training programs for its employees at different stages of their working with the company. By reading these training manuals and documents employees internalize the tacit knowledge and try to create new knowledge after the internalization process.

**Benefits of the SECI Model**

Appreciates the dynamic nature of knowledge and knowledge creation. It provides a framework for management of the relevant processes.

**Disadvantages of the SECI Model**

It is based on a study of Japanese organizations, which heavily rely on tacit knowledge: employees are often with a company for life. The linearity of the concept: can the spiral jump steps? Can it go counter-clockwise?

**1.4.2 Wiig Model**

Wiig(1993) proposed his Knowledge Management model with a principle which states that, knowledge can be useful if it is well organized. There are some useful dimensions to be noted in Wiig Knowledge Management model. They are:

- Completeness
- Connectedness
- Congruency
- Perspective and purpose

Completeness refers to check how much relevant knowledge is available from given source. The source of knowledge may be implicit or explicit (from human brains or knowledge bases). Connectedness refers to well defined
relation between different knowledge objects. A knowledge base possesses congruence when all facts, concepts, values and relational links between the objects are consistent. Perspective and Purpose is a phenomenon through which we know something but from a particular point of view for a specific purpose.

Wiig Knowledge Management model is one of the powerful theoretical Knowledge Management models which are in existence today. This model helps the practitioners to adopt a refined approach to managing knowledge based on the type of knowledge. Wiig has defined three forms of knowledge as **Public Knowledge** which is explicit, taught and routinely shared and available in the public domain; **Shared Expertise** refers to proprietary knowledge assets that are with knowledge workers and shared in their work; **Personal Knowledge** is least accessible which is more a tacit knowledge than explicit. Wiig has also defined four types of knowledge: **Factual Knowledge** which deals with data; **Conceptual Knowledge** which involves concepts, system and perspectives; **Exceptional Knowledge** is related with judgements, hypotheses and expectations by the people who know; **Methodological Knowledge** refers to reasoning, strategies, decision-making methods and other techniques. The hierarchy of knowledge forms is shown in Figure 1.7.

![Figure 1.7: The Wiig Model](image-url)
1.4.3 ZACK Model

Michael Zack (Zack, 1999) proposed an approach to identify the selection of Knowledge Management strategy. He proposes a framework which helps an organisation make an explicit connection between its competitive situation and a Knowledge Management strategy to help the organisation maintain or establish its competitive advantage. He makes it clear that while each organisation will find its own unique link between knowledge and strategy, any such competitive knowledge can be classified on a scale of innovation relative to the rest of the particular industry as: core, advanced or innovative:

- **Core knowledge** is a basic level of knowledge required by all members of a particular industry. It does not represent a competitive advantage, but is simply the knowledge needed to be able to function in that sector at all.

- **Advanced knowledge** gives an organisation a competitive edge. It is specific knowledge that differentiates an organisation from its competitors, either by knowing more than a competitor or by applying knowledge in different ways.

- **Innovative knowledge** is that which enables a company to be a market leader. It allows an organisation to change the way a sector works and represents a significant differentiating factor from other organisations.

Having identified the organisation's competitive knowledge position, Zack's approach is to use a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) to identify the strategic gaps in an organisation's knowledge. This allows the organisation to identify where it has knowledge which it can exploit and where it needs to develop knowledge to maintain or grow its competitive position. This is achieved by analysing the organisation's knowledge position along two dimensions:
• **Exploration vs. Exploitation**
  This is "the degree to which the organisation needs to increase its knowledge in a particular area vs. the opportunity it may have to leverage existing but under-exploited knowledge resources."

• **Internal vs. External Knowledge**
  This refers to whether the knowledge is primarily within the organisation or outside. Some organisations are more externally-oriented, drawing on publications, universities, consultants, customers, etc. Others are more internally-oriented, building up unique knowledge and experience which is difficult for competitors to imitate.

Putting these two dimensions together, Zack describes organisations which are more exploitative of internal knowledge as having a "Conservative” KM Strategy while those that are more innovative (exploring external knowledge) have a more "Aggressive” KM Strategy. However, he points out that a KM Strategy cannot be made without reference to competitors. Thus, some industries (where knowledge is changing more rapidly) tend to be characterised by more aggressive firms, while other industries are generally more conservative.

1.4.4 **Von Krogh and Roos Model of Organizational Epistemology (1995)**

The Von Krogh and Roos model differentiates between individual knowledge and social knowledge and follow the philosophical concept of knowledge to manage organizational knowledge. Hence it is called organizational epistemology Knowledge Management model. This model uses the connectionist approach which is more holistic and assumes that the brain does not process the symbols sequentially but to perceive “wholeness”. This model states that knowledge resides both in the individual of an organization and in the relations between individuals at the social level. Knowledge cannot exist without a knower. This model also emphasizes on the need to maintain links
between the objects and those who are knowledgeable about them. As per this model, the success of Knowledge Management depends on individual mindset, communication in organization, organizational structure, relationship between members, and resource management. These five factors could help in successful management of organizational knowledge. Organizations need to put knowledge enablers in place that will stimulate the development of individual knowledge, group sharing of knowledge and organization retention of valuable knowledge-based content. The connectionist approach followed in this model makes the foundation for theoretical model of Knowledge Management which truly emphasizes that the linkage between knowledge and those who absorb and make use of the knowledge is an unbreakable bond.

1.4.5 The Choo Sense-Making Knowledge Management Model (1998)

The Choo Knowledge Management model focuses on how information elements are selected and subsequently into organizational actions. Organizational action results from the concentration and absorption of information from the external environment into each successive cycle (Figure 1.8). In the sense making stage, one attempts to make sense of the information streaming in from the external environment. Priorities are identified and used to filter the information. Individuals construct common interpretations from the exchange and negotiate information fragments combined with their previous experiences. Knowledge creating refers to the transformation of personal knowledge between individuals through dialogue, discourse, sharing and storytelling. Knowledge creation widens the spectrum of potential choices in decision making by providing new knowledge and new competencies. Individuals can be bound in a decision process by limits in knowledge, skills, habits and responsiveness, availability of personal information and knowledge, values and norms held by an individual.

The strength of Choo model is holistic treatment of key Knowledge Management cycle processes extending to organizational decision making.
which lack in theoretical Knowledge Management approaches. This model is well suited to simulations.

![Diagram](image)

**Figure 1.8 : The Choo Model**

### 1.5 The Knowledge Management Cycles

In order to manage knowledge effectively in any organization, one has to identify, create, obtain, disseminate and capture the benefits of knowledge that provide benefits to the organization. Knowledge Management life cycle can be thought of as the path through which information can be transformed into a valuable knowledge.

#### 1.5.1 The Meyer & Zack Knowledge Management Cycle

The Meyer & Zack Knowledge Management Cycle (Figure 1.9) consists of information products i.e. information sold to internal and external customers such as databases, news synopses and customer profiles. Zack proposes that research and knowledge about design of physical products can be extended into
intellectual area to serve as the basis of Knowledge Management cycle. In this cycle product platform is called knowledge repository; information process platform is called knowledge refinery. They are used to highlight the idea of value-added processing required in order to control the knowledge of an organization. This cycle stresses on creating a higher value-added knowledge product at each stage of processing, e.g. a basic database can be created and then value can be added by extracting trends from this data. The original information is repackaged to provide trend analysis that serves as the basis for decision making. In the same way competitive intelligence can be collected and combined in order to repackage raw data into meaningful, interpreted and validated knowledge. The processes in this cycle are composed of technologies, facilities, and processes for manufacturing products and services. The information content in the repository provides the building blocks for the resulting information product. The content differs from business to business and organization to organization. Apart from that, the other important elements determine the overall structure and approach to store the content to manipulate and retrieve it. The authors of this cycle have laid stress on the importance of product architecture for sustained competitive success. Architectures are a basis for product innovation. Knowledge Management is not about exhaustive collection of voluminous content but rather more collective sifting and modification of existing captured content. The Information units are unique for various businesses. They have different key attributes which are used to search, select, and retrieve specific knowledge and knowledgeable persons in the organization. The structure of the repository also contains schemes for labelling, indexing, linking and cross-referencing the information units that form the content. The repository is the foundation on which the information and knowledge products are created for an organization. Hence such repositories form organizational memory or corporate memory for the company. The cycle consists of various stages like acquisition, refinement, storage/retrieval, distribution and presentation/use. Acquisition of data or information involves finding sources of input, which should be of highest
quality. Refining refers to restructuring, relabeling, indexing, integrating, and cleaning of data. This stage of the cycle adds value by creating more readily usable knowledge objects. Storage/retrieval includes physical i.e. files, printed information or digital storage i.e. database. Distribution process involves delivering of knowledge through various mediums like fax, print, e-mail, etc.

Presentation is the final step of this cycle. The evaluation of the preceding steps is involved here. The refined repository gives valuable knowledge to the management. These repositories should be supported by ICT. This model stresses on the need of continually renewing the repository and refining to avoid obsolescence.

**Figure 1.9 : The Mayer and Zack KM Cycle**

**1.5.2 The Bukowitz & Williams Knowledge Management Cycle (2000)**

In the framework suggested by Bukowitz & Williams, they describe that knowledge consists of repositories, relationships, information technologies, communication infrastructure, functional skill sets, process know-how, environmental responsiveness, organizational intelligence, and external
sources. The get, learn, and contribute phases are tactical in nature which are triggered by market driven demands and they result in day-to-day use of knowledge to respond to these demands\cite{7}. The first stage ‘Get’ refers to the knowledge that is asked by the user for various reasons e.g. decision making, problem solving or for innovations (Figure 1.10). In the plethora of information, one has to identify the correct knowledge and then to manage it efficiently and effectively. To ‘Get’ knowledge involves both the tacit and explicit knowledge.

This means that the knowledge seekers should be connected not only to the content but also to the experts/people where most of the valuable tacit knowledge lies. Now the role of knowledge professional is to organize knowledge content, maintain timeliness, completeness, and accuracy, profile users’ needs, access/navigate/filter content in order to respond to users’ need and help train users’ with new knowledge repository technologies. The next stage ‘Use’ deals with the process of combining information and presenting in an innovative form. Here the individuals are considered rather than the groups. In the ‘Learn’ stage refers to the process of learning from experiences as a means of creating competitive advantage. Creation of Organizational memory is necessary for organizational learning. This is important as it is a transition between application of ideas and generation of new ideas. Learning is crucial for getting and using the content; otherwise the content lies unused in the

![Figure 1.10 : The Bukowitz & Williams KM Cycle](image)

\begin{figure}[h]
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\caption{The Bukowitz & Williams KM Cycle}
\end{figure}
warehouse without any usage. The contribute stage of the Knowledge Management Cycle deals with getting the employees put their knowledge to the Knowledge Base. This is the way the knowledge is made visible globally. The employees should be encouraged to contribute by sharing best practices and lessons learned. Various ways are suggested to promote knowledge sharing by deploying knowledge brokers, good organizational memory management system, in the form of an intranet. The next stage ‘Assess’ is concerned with group and organizational level which aims to evaluation of intellectual capital. In this stage, the organization has to define mission critical knowledge and map current intellectual capital against future knowledge needs. The organization must develop metrics to demonstrate it is growing its knowledge base and profiting from its investment in intellectual capital. The organization should identify the knowledge from human capital, customer capital, organizational capital, and intellectual capital. The build and sustain stage ensures that organization’s future intellectual capital will keep the organization feasible and ready for action. The final stage ‘Divest’ implies that the assets that do not create any value should not be held by the organization.

This cycle introduces two critical phases i.e. learning of knowledge content and the decision as to whether to maintain this knowledge or divest the organization of this content. This cycle is more comprehensive then the Meyer Zack Cycle as the explicit and tacit Knowledge Management has been incorporated.

1.5.3 The McElroy Knowledge Management Cycle (1999)

The Knowledge Management Life Cycle (Figure 1.1) suggested by McElroy consists of processes of knowledge production and knowledge integration with a series of feedback loops to organizational memory, beliefs and claims and the business processing environment[7]. He states that the organizational knowledge resides subjectively in the minds of individuals and groups and objectively in explicit forms. The knowledge is used in business processing environment depending on its utility to the users. If the knowledge matches the
requirement of the users then it is reused whereas mismatches lead to adjustments. Multiple mismatches of knowledge accessed by the user will lead to rejection from using the accessed knowledge. The formulation for problem claim attempts to learn and state the specific nature of the detected knowledge gap. This formulation is the result of response to validated problem claims via information acquisition and individual and group learning. New knowledge claims are tested and evaluated via knowledge claim evaluation process. Experience gained from the use of the knowledge in the organizational knowledge base gives rise to new claims and resulting beliefs, triggering the cycle to begin all over again.

**Figure 1.11 : The McElroy KM Cycle**

The main processes in knowledge production are individual and group learning, knowledge claim formulation, information acquisition, codified knowledge claim and knowledge claim evaluation. Individual and group learning represents the first step in organizational learning. Knowledge is information until validated. Knowledge claim validation involves codification
Harnessing Knowledge Management through ICT

Chapter -1 Introduction to Knowledge Management

at organizational level. The individual and group innovations are received and codified using a standard procedure. Information acquisition is the process by which an organization acquires knowledge claims which in turn plays a fundamental role in formulating new knowledge claims at the organization level, e.g. competitive intelligence, subscription services library services, research initiatives, think tanks, consortia, and personalized information services. Knowledge claim evaluation involves the process by which the knowledge claims are evaluated to determine their truthfulness and value. This shows that their value is more as compared to the existing knowledge in organizational knowledge base. Knowledge integration process involves introduction of new knowledge claims to its operating environments and deleting the old ones. This includes all knowledge transmission such as teaching, knowledge sharing, and other social activities to integrate newly produced knowledge.

McElroy Knowledge Management Cycle gives clear description of how knowledge is evaluated and a conscious decision is made to whether or not it will be integrated into organizational memory. The validation is a step that clearly distinguishes Knowledge Management from document management. This Knowledge Management cycle focuses on processes to identify knowledge content that is of value to the organization and its employees.

1.5.4 Wiig Knowledge Management Cycle (1993)

Wiig has described three conditions that need to be present for an organization to conduct its business successfully. The organization must have a business, customers and resources (people, capital and facilities) and must have ability to act. Wiig has stated that Knowledge Management is an effort to make enterprise intelligent-acting by facilitating the creation, cumulating, deployment and use of knowledge. The cycle shows how process of building knowledge and its usage by the individuals and groups. The four major steps
involved in this cycle include Building Knowledge, Holding Knowledge, Pooling Knowledge and Applying Knowledge (Figure 1.12).

![Knowledge Management Cycle](image)

**Figure 1.12 Wiig Knowledge Management Cycle**

The cycle focuses on identifying and relating functions and activities that we engage in to make products and services as knowledge workers. Building Knowledge refers to the activities ranging from market research to focus groups, surveys, competitive intelligence and data mining applications. It consists of obtaining, analysing, synthesizing, codifying and modelling and finally organizing knowledge. Knowledge may be created through R&D projects, experiments, knowledge importing, observing the real world. Knowledge Analysis consists of extracting of knowledge from materials, abstracting materials, identifying patterns extracted, explaining relations between knowledge fragments, verifying the extracted materials. Knowledge synthesis implies generalizing analysed material, generating hypotheses to explain observations, establishing conformance between new and existing knowledge and updating the total knowledge pool. Codifying and modelling knowledge involves representation of knowledge that resides in the minds of people, books & manuals, and encoding and posting of knowledge into knowledge repository. Then knowledge is organized for specific uses and
according to an established organizational framework. Holding knowledge consists of remembering, accumulating knowledge in repositories, embedding knowledge in repositories and archiving knowledge. Remembering knowledge means that the individual has retained or remembered that item of knowledge. Accumulating knowledge in repository means that the knowledge is stored in computerized knowledge base. Embedding knowledge consists of ensuring that it is part of business procedures. Archiving Knowledge involves creating scientific library, removing outdated knowledge.

Knowledge pooling consists of coordinating, assembling and accessing and retrieving knowledge. Coordination of knowledge requires the collaborative teams to work with particular content in order to create person specific knowledge i.e. “who knows what”. After identifying the knowledge sources, they are assembled into background references for a library or repository like computerized knowledge base for decision making. The knowledge may be pooled by different ways in an organization i.e. by collaborating with other organization, finding experts who can help. The knowledge thus acquired can be validated with help of experienced knowledge workers.

The application of knowledge takes place in various forms like established knowledge can be used for routine task; general knowledge is used to survey exceptional situation; relevant knowledge can be used to handle the situation; special knowledge can be used to observe and characterize the situation, knowledge can also be used to analyse the situation, synthesize the alternative solution, evaluate potential alternatives, decision making and to implement selected alternative.

1.5.5 Comparison of the Cycles

The Meyer and Zack model has complete description of the key elements involved in the Knowledge Management model. The strength of this cycle is comprehensive information processing which is completely adaptable to
knowledge-based content. The concept of refinement is also included which is very important.

This cycle introduces two critical phases i.e. learning of knowledge content and the decision as to whether to maintain this knowledge or divest the organization of this content. This cycle is more comprehensive than the Meyer Zack Cycle as the explicit and tacit Knowledge Management has been incorporated.

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The advantage of WIIG Knowledge Management cycle is the clear and detailed description of how the organizational memory is put to use to generate value for individuals, groups and organization. In this cycle the use of knowledge and skill, usage of that knowledge, the constraints that may prevent the knowledge to be fully used, opportunities and alternatives to managing that and the expected value added to the organization is explicitly shown.

### 1.6 Knowledge Management in the Universities

As a part of our research, we have taken Sardar Patel University as the base model of our study. We have studied the existing scenario of Knowledge Management and the problems related to acquiring, accessing and generating new knowledge in the University. In the following chapters, we presented different frameworks related to KM like Knowledge Acquisition Framework, Knowledge Storing Framework, Knowledge Dissemination Framework, Knowledge Generation Framework. We have also suggested some of the ICT tools that are freely available and can be used in the Knowledge Portal that will
be a single window for acquiring knowledge on different aspects of the University.

1.7 Conclusion

The proliferation of Information in Universities and difficulties in providing knowledge to the stakeholders at the right time has suddenly increased the importance of Knowledge Management. This chapter provides an insight in Knowledge Management and related models. This chapter presentation includes our study about evolution of Knowledge Management. Key concepts in Knowledge Management are discussed with examples. There are various definitions of Knowledge Management relative to specific areas. The definition of Knowledge Management given by different authors is analysed and suitable for Knowledge Management in the present context definition is taken as a base throughout the thesis. Various existing models of Knowledge Management are discussed. For example, SECI (Socialization Externalization, Combination and Internalization) is a well known model developed by Nonaka and Takeuchi (1995). In this model, knowledge is created dynamically and is processed effectively. Other Knowledge Management models and Knowledge Management cycles that are studied include ZACK model (1999), Wiig model (1997), Bukowitz and Williams Knowledge Management Cycle (2003) and McElroy Knowledge Management Cycle (1999). Review of literature about Knowledge Management is also presented in this chapter. Some of the definitions and work of different authors is stated in their words which are taken from various books, journals, articles in order to explain various concepts, models and cycles of Knowledge Management.