CHAPTER – 2

Knowledge Management and Knowledge Management Systems: An Overview

2.1 Knowledge

The word knowledge is described as “justified true belief.” In a psychological context, whenever one thinks an idea is generated, which when conserved by human mind gives rise to knowledge. Ever since the man has become the thinker, knowledge has been growing (Husain, 2005).

Knowledge is a part of a gamut of data, information, knowledge, and wisdom. The Quote of T.S Elliot “Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information?” resonances the model of Data, Information, Knowledge and Wisdom (DKIM). Mostly the data are structured, and factual. Lot of times its numeric also. Combining data with interpretation, give rise to information, which is nothing but a meaningful data and becomes information when formatted, filtered. The same when combined with action and application becomes knowledge because it is closer to action it has more value, it is an ability to understand and to share understandings. In some instances, knowledge is nothing but memorization, which includes familiarity, awareness, and understanding gained through experience, education, discovery, intuition, and insight, in nutshell knowledge guide actions and decisions (Kumar & Gupta, 2012).

According to Webster’s third new international dictionary, Knowledge is:

“The fact or condition of knowing something, with a considerable degree of familiarity gained through experience of or contact or association with the individual or thing so known.”

Beckman (1998) came up with many other definitions of knowledge and organizational knowledge; some of them are as follows:

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“Knowledge is organized information applicable to problem solving” (Woolf, 1990).

“Knowledge is information that has been organized and analyzed to make it understandable and applicable to problem-solving or decision making” (Turban, 1992).

“Knowledge consists of truths and beliefs, perspectives and concepts, judgments and expectations, methodologies and know-how” (Wiig, 1993).

“Knowledge is the whole set of insights, experiences and procedures which are considered correct and true and which, therefore, guide the thoughts, behaviors, and communication of people” (Van der Spek & Spijkervet, 1997).

“Knowledge is reasoning about information to actively guide task execution, problem-solving and decision making in order to perform, learn and teach” (Beckman, 1997).

“Organizational knowledge is processed information embedded in routines and processes which enable actions. It is also knowledge captured by organization’s systems, processes, products, rules, and culture” (Myers, 1996).

“Organizational knowledge is the collective sum of human-centered assets, intellectual property assets, infrastructure assets and market assets” (Brooking, 1996).

Knowledge often remains documented in many organizations as: “routines, processes, practices, and norms” (Jennex, 2006).

2.2 Types of Knowledge

Generally, the word ‘knowledge’ comes to our minds as a document or something that is codified (Kumar & Gupta, 2012). Knowledge is something gained through experiences and expertise. Some experiences are tabbed in a document form (explicit) and some part of it remains embedded in the minds (tacit).
2.2.1 Explicit Knowledge

The tacit knowledge cannot be understood without first understanding the explicit knowledge. Explicit knowledge is described in a formal language and is acquired through proper education or well-thought-out study (Smith, 2001). The online version of Cambridge Dictionaries has defined explicit knowledge as

“knowledge that can be expressed in words, numbers, and symbols and stored in books, computers, etc. and the knowledge that can be articulated and easily communicated between individuals and organizations”

In addition to it, from the law dictionary, knowledge can be considered which is recorded, expressed, shared, and stored in such a form that makes its retrieval easy. This Knowledge in itself is easily available in books, or in any other documented source. Being formal in nature, explicit knowledge may possibly be found in databases wherefrom it is accessed with highly sophisticated and reliable information retrieval systems. In this modern technology ridden era there are different ways including Print, electronic and other formal means which are used for sharing this “know-what,” or systematic knowledge (Hansen, Nohria & Tierney, 1999).

2.2.2 Tacit Knowledge

The use of tacit knowledge in many fields of research and activity proves its applicability in a broader spectrum. Tacit knowledge simply is that part of knowledge which is deeply engrained in human minds as, skills, thoughts, ethics, and feelings (Gourlay, 2002). Its concept is traced back to philosopher Michael Polanyi’s theory of knowledge in mid-1990’s. The theory put forth the concept of tacit knowledge in a different perspective, it says that the knowing more than we can communicate is implied knowledge or doing anything without thinking of it, the best example can be of a driver, who while driving keeps changing the gear of a vehicle without thinking about it (Virtanen, 2009).

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According to Random House Dictionary of the English language, tacit knowledge is “being understood without being openly expressed.” It is “technical or cognitive, and is made up of mental models, values, beliefs, perceptions, insights, assumptions and is usually grouped according to content, context, and orientation” (Smith, 2001). Tacit knowledge lives in varied academic disciplines including Philosophy, Psychology, Sociology, Management, Economics etc. Most of the philosophers, as well as the psychologists, relate the idea of tacit knowledge with the human body and its association with the world of practices – somatic tacit knowledge, despite the fact that sociologists and economists have different perceptions of tacit knowledge than philosophers and psychologists. Sociologists put emphasis on having enough personal contact to enable things that are not spoken to be passed on in ways that may not be visible or apparent. Economists may believe about implicit knowledge in terms of approaches for tabbing intangible expertise by engaging those who have already needed it (Collins, 2010).

2.3 Explicit vis-a-vis Tacit Knowledge:

People being most progressed of all conception have a great power of thinking and implying the knowledge in a different way to solve the problems. (Smith, 2001) defined the role of both the tacit as well as explicit knowledge used in the workplace in ten categories as given below:  

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### Table 2.3: Use of the explicit and tacit Knowledge in the workplace

<table>
<thead>
<tr>
<th>Explicit Knowledge</th>
<th>Tacit Knowledge</th>
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<tbody>
<tr>
<td>“Academic knowledge or ‘‘know-what’ that is described in formal language, print or electronic media, often based on established work processes, use people-to-documents approach”</td>
<td>“Practical, action-oriented knowledge or ‘‘know-how “based on practice, acquired by personal experience, seldom expressed openly, often resembles intuition”</td>
</tr>
<tr>
<td><strong>Work process</strong> - organized tasks, routine, orchestrated, assumes a predictable environment, linear, reuse codified knowledge, and create knowledge objects</td>
<td><strong>Work practice</strong> - spontaneous, improvised, web-like, responds to a changing, unpredictable environment, channels individual expertise, creates knowledge</td>
</tr>
<tr>
<td><strong>Learn</strong> - on the job, trial-and-error, self-directed in areas of greatest expertise; meet work goals and objectives set by organization</td>
<td><strong>Learn</strong> - supervisor or team leader facilitates and reinforces openness and trust to increase sharing of knowledge and business judgment</td>
</tr>
<tr>
<td><strong>Teach</strong> - trainer designed using syllabus, uses formats selected by organization, based on goals and needs of the organization, may be outsourced</td>
<td><strong>Teach</strong> - one-on-one, mentor, internships, coach, on-the-job training, apprenticeships, competency based, brainstorm, people to people</td>
</tr>
<tr>
<td><strong>Type of thinking</strong> - logical, based on facts, use proven methods, primarily convergent thinking</td>
<td><strong>Type of thinking</strong> - creative, flexible, unchartered, leads to divergent thinking, develop insights</td>
</tr>
<tr>
<td><strong>Share knowledge</strong> - extract knowledge from person, code, store and reuse as needed for customers, e-mail, electronic discussions, and forums</td>
<td><strong>Share knowledge</strong> - altruistic sharing, networking, face-to-face contact, videoconferencing, chatting, storytelling, personalize knowledge</td>
</tr>
<tr>
<td><strong>Motivation</strong> - often based on need to perform to meet specific goals</td>
<td><strong>Motivation</strong> - inspire through leadership, vision and frequent personal</td>
</tr>
<tr>
<td><strong>Reward</strong> - tied to business goals, competitive within workplace, compete for scarce rewards, may not be rewarded for information sharing</td>
<td><strong>Reward</strong> - incorporate intrinsic or non-monetary motivators and rewards for sharing information directly, recognize creativity and innovation”</td>
</tr>
<tr>
<td><strong>Relationships</strong> - may be top-down from supervisor to subordinate or team leader to team members</td>
<td><strong>Relationships</strong> - open, friendly, unstructured, based on open, spontaneous sharing of knowledge</td>
</tr>
<tr>
<td><strong>Technology</strong> - related to job, based on availability and cost, invest heavily in IT to develop professional library with hierarchy of databases using existing knowledge</td>
<td><strong>Technology</strong> - tool to select personalized information, facilitates conversations, exchange tacit knowledge, invest moderately in the framework of IT, enable people to find one another</td>
</tr>
<tr>
<td><strong>Evaluation</strong> - based on tangible work accomplishments, not necessarily on creativity and knowledge sharing”</td>
<td><strong>Evaluation</strong> - based on demonstrated performance, ongoing, spontaneous evaluation”</td>
</tr>
</tbody>
</table>
2.4 Importance of Knowledge to Society in Modern Era

It is the man’s naturally gifted intellect and his continual quest for knowledge that distinguishes him from the other living creatures on the earth. The progress from the Stone Age to this modern technology ridden digitized world is an outcome of his pursuit to knowledge. This intellectual journey from what’s known to unknown has opened up new ventures and today he is busy in exploring the outer space and searching more and more knowledge to make use of research outcomes for his own development.

Knowledge of today is as authentic as it was yesterday. This day we don’t have armchair philosophers and unscientific theories but valid knowledge. It has sound arguments and erased any possible voids of confusions. This world has made it necessary for all of us to know the things, especially those involved in our day to day exercises and in our endeavor to follow. The present era focuses on the consolidation of knowledge and its dissemination in complex ways. To have the first-hand knowledge of this intricate knowledge network makes one’s sustenance easier and likely his way of living. Employing the positive outcomes of knowledge the peace stability and order of society is ensured in this modern era.

However, we have the other face of the knowledge as well. It has been juxtaposed for centuries. Every time in the society and even in this modern era, the combat is essential and indispensable. The negative face has once again to redesign, forcing the other side to struggle and come up with new shields. This process of knowledge goes on and from centuries altogether. But fact remains that each struggle opens up new pathways to add the existing knowledge. The sole process can be consolidated in the quest, order, and development.

2.5 Knowledge Management: Aim, Definition and Scope

Knowledge Management, as the name depicts, is the management of knowledge that organizations have, it is the process through which an organizational knowledge can be made available for those who need it. KM promotes different knowledge processes (knowledge identifying, its tabbing, its organization, its retrieval, and its use). It also provides a collaborative knowledge sharing platform with the objectives to enhance learning and performance in the organization (Kumar
& Gupta, 2012). KM emphasizes on turning the internal and external knowledge into the actionable structure. It is “a new dimension of strategic information management.” (White, 2004) From a management point of view, KM is considered as a most valuable concept of bringing all the unnoticed knowledge on such a platform where it gets its value and helps the organization to reach to new heights of excellence by converting almost vanished knowledge into most prolific power and value.

According to Frost,

“Knowledge Management is the systematic management of an organization’s knowledge assets for the purpose of creating value and meeting tactical & strategic requirements; it consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge.”

In addition to it, Cambridge online dictionary defines Knowledge Management

“as the way in which knowledge is organized and used within a company, or the study of how to effectively organize and use it”

Oxford dictionary also defines Knowledge Management as

“Efficient handling of information and resources within a commercial organization”

“There are various features and objectives of KM which can be stated as:

• It focuses on creativity and innovativeness
• It is incorporated to achieve organizational goals efficiently
• It is based on personal experience
• It is action oriented
• It is founded on a strong culture of knowledge sharing
• It is a positive way to achieve organizational goal

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• It embraces both tacit and explicit knowledge
• It lays emphasis on having a central knowledge repository
• It requires a system to capture staff tacit knowledge
• It is the capability of and process by organizations to create, collect, capture the value of information which when disseminated, used and understood leads to knowledge and development” (Jain, 2007).

Because of its multidisciplinary nature, KM results in input from people of different fields including Management, Sciences, Social Sciences, Law and many other disciplines. As far as its scope is concerned many companies have put forth it in different ways, some define it as a tool for management of information (knowledge management mechanics), some see knowledge as a society activity (Knowledge management culture), and some define it as KM Systems.

2.6 Processes of Knowledge Management

Knowledge Management is a continuous development comprising of many processes, the processes may include “acquisition, creation, packaging, and application or reuse of knowledge” (Davenport, 1993). The processes that have been discussed are stated below:

![Fig 2.6: Knowledge Management Processes](Image)

The cycle of knowledge process begins through the creation of knowledge created whether by Socialization or by any other process. After the creation of both tacit as well as explicit Knowledge takes place, it is then identified and collected,
followed by its proper observation. Next phase of the cycle is knowledge scrutinizing after this the knowledge is processed for storing. Now the active phase of the process begins when the knowledge is retrieved either by technology or collectively. Knowledge is then attained for making its appropriate use which further gives birth to new knowledge, hence starting a cycle of the process again (Wiig, 1997).

### 2.7 Models of Knowledge Management: An Overview

It is because of the work done on theoretical models of KM this field has established more convincingly in academic and in professional fields as well. Taking the complex and dynamic nature of knowledge into account, different KM models have been developed, among which various models are in use.

#### Table 2.7: Knowledge Management Models

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name</th>
<th>Developed By</th>
<th>Country</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“Boisot I-Space KM Model”</td>
<td>Max Henri Boisot</td>
<td>UK</td>
<td>1987</td>
</tr>
<tr>
<td>2</td>
<td>“European Foundation for Quality Management (EFQM) KM Model”</td>
<td>European companies</td>
<td>Europe</td>
<td>1989</td>
</tr>
<tr>
<td>3</td>
<td>“Wiig Model for Building and Using Knowledge”</td>
<td>Karl Wiig</td>
<td>USA</td>
<td>1993</td>
</tr>
<tr>
<td>4</td>
<td>“Nonaka and Takeuchi Knowledge Spiral Model”</td>
<td>Nonaka and Takeuchi</td>
<td>Japan</td>
<td>1995</td>
</tr>
<tr>
<td>5</td>
<td>“Von Krogh and Roos Model of Organizational Epistemology”</td>
<td>Von Krogh and Roos</td>
<td>Norway</td>
<td>1995</td>
</tr>
</tbody>
</table>

However, the ones that have been discussed mostly in the literature are presented below:

- Nonaka - Takeuchi model
- Von Krogh and Roos model
- Boisot model
- Choo model
- Wiig model
2.7.1 Nonaka - Takeuchi Model

Nonaka & Takeuchi (1995) in their book “The Knowledge-creating company” put forth a theory that explains the processes of knowledge creation in any organization. According to the theory the knowledge creation always takes place at individual level and further reaches to audience or in different section of the association. They identified 4 modes of knowledge conversion as knowledge activities; namely Socialization mode, Externalization mode, Combination mode, and Internalization mode (Figure 2.7.1), which is called the SECI model (Mclean, 2002). The proposed SECI model is the outcome of research that was carried out in Japanese organizations to know their success of attaining ingenuity and improvement (Cristea & Capatina, 2009). This model consists of “tacit and explicit” essentials in which tacit is unarticulated and non-verbalized, while explicit is expressed through different means (Haslinda & Sarinah, 2009).

![Fig 2.7.1: SECI Model of knowledge dimensions](image)

**Socialization (From Tacit to Tacit):** People share their knowledge at an individual level which in turn gives rise to new knowledge (Kumar & Gupta, 2012). Knowledge sharing occurs typically in social interactions. Many companies encourage socialization through “brainstorming camps” (a sort of an event that promotes creativity and advancements in knowledge) usually carried outside the workplace. Socialization process may be augmented by Forums and comments, Chats, Events, User messages, and friendships.
Externalization (From Tacit to Explicit): Knowledge (tacit) created through Socialization is converted or transformed into explicit one by simply writing it down, or giving it a tangible shape by means. Once this is done, knowledge gets fixed or permanent. In such a form, knowledge can be shared in an organization with others. To facilitate externalization process, Lectures, Blogs, publications, library, tutorials, and textbooks, wiki, and tagging can be implemented.

Combination (From Explicit to Explicit): In Combination activity, it is the recombination of pieces of already existing knowledge (explicit) giving it a new form, excluding the formation of new knowledge. This process is supported by the implementation of RSS, News, and Ratings etc.

Internalization (From Explicit to Tacit): Internalization is the last process of conversion where the original peripheral knowledge using a common platform is communicated inside the corporation. This process is sturdily allied to “learning by doing” by which people create implicit knowledge from documented knowledge resulting in the continuous conception of knowledge and may thus start the spiral again (Santos, 2012).

2.7.2 Von Krogh and Roos Model

Subsequent to an epistemology approach vis-à-vis Knowledge Management, the model highlights a clear difference among personal and public knowledge. As per the model, below features must be studied:

- “Why and how the knowledge gets to the employees of a company
- Why and how the knowledge reaches the organization
- What does it mean knowledge for the employee/organization
- What are the barriers to organizational knowledge management”¹¹

From this model, logical processed information is gathered by the organization from its environment and can also be generated internally from the social interaction of the employees. It is not only the mind of these people where knowledge is present

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but it is the connection (links) between them which results in the formation of the network thus representing the core of organizational KM.

In Krogh and Roos Model, knowledge is inhabited in both minds of the people as well as in the connections linking them. Conexionist ideas state that it can’t be possible to contain knowledge devoid of a knower whereas; cognitive approach sees knowledge as an abstract. Further adding to it, Krogh and Roos examined KM on various perspectives where various factors were identified that can generate problems, hence preventing KM strategies e.g. the employees are considered the main asset of an organization if they are not perceiving the knowledge the quality of the company will be affected. It can be said that the Conexionist approach may act as a base for theoretical KM model, because the association between people and the their knowledge seems to be permanent (Cristea & Capatina, 2009).

### 2.7.3 Boisot I-Space KM Model

Boisot in 1987 developed a model, based on the conception of information advantage. In this model information and data were distinguished from each other, and was emphasized that it is all upon the observer’s knowledge and past experiences that how information is extracted from data. Boisot proposed three key points thus giving form to a theoretical structure known as “I-space” (Cristea & Capatina, 2009). It can be predictable as a cube which includes following scope: “From Un-codified to Codified” “From Concrete to Abstract” “From undiffused to Diffused.”

![The Boisot I-Space KM Model](image)

**Fig 2.7.3:** Boisot I-Space KM Model
Although this model has potential to manage knowledge assets of an organization, but it is not very well known.\textsuperscript{12}

### 2.7.4 Wiig Model for building and using Knowledge

This model is based upon some principles given by Karl Wiig in (1993). The principles state that the knowledge has to be structured and synchronized so that to make it functional and imperative. Some of the essential proportions in the model are: “Completeness” “Connectedness” “Congruency” “Perspective and Purpose.”

Completeness deals with problem referring as to how applicable can be the knowledge accessible as known resource. The basis might exist different from individual minds to knowledge bases. While as connectedness dimension of the model emphasize the concrete associations among diverse knowledge matter.

The congruent dimension of the model is active in itself whilst the entire “facts, concepts, perspectives, values, judgments, and relational links between the objects” are regular in a knowledge base. Lastly, the Perspective and purpose is an experience all the way through which we come to know about anything from a particular source for a definite reason (Dalkir, 2005).

### 2.7.5 Choo Sense-Making KM Model

The model was developed in 1998 and had a focus on, Sense Making, Knowledge creation, and decision making skills and with no doubt all the said processes are main elements in pointing the organization’s knowledge vision (D, Souza, Queiroz & Chipp, 2009). It is only this model that can act as a guide in selection of informational elements and then applied into organizational procedures.

2.8 Knowledge Management Systems and Technologies: An Overview

In order to be familiar with the KM systems and technologies, an attempt should be made to have a brief overlook of Knowledge Management System. KMS "is an ICT based system that combines and integrates functions for the contextualized handling of both, explicit and tacit knowledge, throughout the organization. It supports the networks of knowledge workers in the creation, construction, identification, capturing, acquisition, selection, valuation, organization, linking, structuring, formalization, visualization, distribution, retention, maintenance, refinement, evolution, accessing, search, and one of the most important elements is the application of knowledge, anytime anywhere which aims to support the dynamics of organizational learning and organizational effectiveness" (Lecturer & Bertolt, 2007). In addition to this, “A KMS is an amalgamation of various activities that enables to identify, capture, disseminate, the experiences either in person’s mind or in organizational practices and processes.”13 The KMS is built on an already existing platform and some of the technologies required are web server, network, KM Portals,

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visitor tracking and many other requirements, web-based discussion forum, blogs, wikis, expert systems etc. (Rah, Gul & Wani, 2010).

In this era of the modernity, the KMS has to play a key role in providing access to the knowledge what is required. Every organization should have their KMS to support their work and decision-making power by providing the access to an individual’s experiences. It is necessary to carry out research on Knowledge Management and KMS. It will be of great significance for developing knowledge economy and service institutes by application of such systems. Below are discussed some of the systems comprising the whole KMS.

2.8.1 Knowledge Application Systems

Systems that help individuals to acquire knowledge, which has already been procured from different people in a controlled manner are called Knowledge Application Systems (KAS). These systems are supported by both mechanisms and technologies. The main mechanisms which help in giving the direction to such systems are hierarchical relationships, help desks, and support centers. Other important aiding mechanism which plays an important role in such systems is policies of organization, work practices and principles. Whereas, technology used to give proper direction and smoothness includes expert, decision, advisor, help desk and fault diagnosis systems, which in turn facilitates Knowledge Application (KA) either within or across organizations. KA is an amalgamation of Rule-based systems (RBS) and Case-based reasoning (CBR) (Becerra-Fernandez, 2015).

To the extent that the work process of KAS is concerned, it needs the knowledge which is exclusively elicited from the domain experts, using the interview as a tool all the way through the process of knowledge engineering and presents it in such a form that is usable by computers. Many of Knowledge Application systems are based on CBR methodology. CBR is an artificial intelligence method with the main purpose of problem solving. This method has its base in dynamic memory model proposed by Schank in 1982 and works same as the humans work to solve the problems they encounter. In the case of humans, they try to solve the problems from recalling the past experience; in the same sense CBR is also designed in such a way that it can also utilize the old cases or experiences for the same cause. For the development of KA Systems, its implication requires an intensive thought out
methodology. One of the methodologies is case method cycle which through its processes illustrates an interactive approach to successfully develop CBR and its processes include: system development process, case library development process, system operation process, database mining process, Management process, and Knowledge transfer process (Kitano and Shimazu 1996).

2.8.2 Knowledge Capture Systems

The systems that are designed to extract and store knowledge which inhabits in many minds, objects, or in corporations units are called as Knowledge Capture Systems (KCS). These systems include different mechanism and technologies to facilitate and maintain externalization and internalization processes. In the process of knowledge capture, externalization enables the expansion of models, and enunciation of stories, while as, internalization learning is being facilitated by inspection, and personally meetings. For the sake of smooth flow of these processes, the support of technology is a must. Knowledge engineering is one of the technological supports for externalization; it is this engineering concept which is necessary for intelligent technologies such as expert system and CBR systems. And on the other hand, the technology that facilitates internalization includes computer-based communication and computer-based simulation.

Knowledge mining from the experts or specialists: In this context, two systems are identified which are based on special procedures with sharp technologies. The primary one depends on utilization of conception map as knowledge modeling tool, while another one depends on utilization of context based logic to stimulate human behavior. Cmap tools are one of the tools of concept maps which can be used to capture the knowledge from expert’s domain and can transfer for the use by student’s domain. Cmap tools are one of the tools of KCS, which have been developed on the basis of concept maps. The aim behind their deployment is to capture the knowledge of specialists and provide effective platform through which the knowledge is made available for the students to learn from their subject domain specialists. These tools facilitate the virtual collaboration and creation of concept maps, stored on public servers accessed by means of the Internet. In point of fact, concept maps provide an effective platform for the interaction among the knowledge engineers and domain specialists in order to collectively build the shared conceptual
or theoretical model which ultimately becomes concept map for the multimedia system. This theoretical model can be used by the users through the Cmap tools which help them to implicitly get the experts view of the field. By the virtue of the conceptual maps and their hierarchical organization, it is possible to scale large quantities of information, so that to make the simply incorporation of domain concepts together. Secondly, the KC system which is based on CBR works on the theme of artificial intelligence. Since this system has hierarchical and modular character provides itself well to automate the knowledge capture procedure. The system which is based on the CxBR is called “Context-based intelligent tactical knowledge acquisition;” the system employs knowledge base of its domain to create able inquiries to draw out strategic knowledge of the specialist. The tactical knowledge recorded once used with the CxBR reasoning engine is able to manage the concerned task. In this, the query session only takes place with the expert and knowledge engineer here the knowledge engineer has got every privilege to make access or editing to the context base (Becerra-Fernandez, 2015).

2.8.3 Knowledge Sharing Systems

These are the systems which facilitate users to share their knowledge. In other words, it can be said that knowledge Sharing (KS) Systems allow acquiring both forms of knowledge within a group. As of now, most of the organizations have designed Knowledge Management Systems to share explicit knowledge which then is referred as knowledge repositories. There are many KS Systems classified according to their characteristics, which may include: Incident report database (IRD), Best practices databases (BPD), Alert Systems (AS), Expertise locator systems (ELS) and Lessons learned systems LLS), among them the two KS systems which are explicitly being discussed in the literature are LLS and ELS. These are used in space agencies of America, Europe, and Japan (Weber et al. 2001). To be entrenched with the knowledge regarding these systems, one must be familiar with the main aim of these systems and their role in Knowledge sharing processes. To make it more understandable both the systems must be well known. As much as the (LLS) are concerned, it is the knowledge gained by experience. According to Weber and Aha (2003)
“Lessons learned systems (LLS) are knowledge management (KM) initiatives structured over a repository of lessons learned (LL). Lessons learned are knowledge artifacts that convey experiential knowledge that is applicable to a task, decision, or process such that, when reused, this knowledge positively impacts an organization’s results. For this reason, LLS is ubiquitous in governmental organizations that need to leverage knowledge, such as the Department of Defense (DOD), where military operations may risk human lives, the Department of Energy (DOE), where accident prevention is a major concern, and space agencies (e.g., American space agency [NASA], European Space Agency [ESA], Japanese Space Agencies [NASDA] due to their potential for incurring costly mission failures.”

It can be drafted from the above lines that LLS supports organizational processes and involve six possible content collection methods which are outlined as “Passive, Reactive, After-action collection, Proactive collection, Active collection, and interactive collection” (Becerra-Fernandez, 2015). In context, to the same, many organizations found it important to develop expertise locator system. These systems can be well illustrated as the systems which are designed to catalog knowledge competencies including information which later could be queried across the organization. Although it is having the same function, a number of characteristics are their which distinguish these systems from each other which include: Purpose of the system, Access method, Self-assessment, Participation, Taxonomy, levels of competencies (Becerra-Fernandez 2006).

Above discussed systems are those ones that are used exclusively for sharing explicit knowledge in the organizations. Now an attempt will be made to put light on the systems that are employed for sharing tacit knowledge. According to Dignum (2002) some organizations are creating knowledge communities also known as knowledge network which act as a platform for all the experts to share knowledge without being bind with geographical or organizational boundaries, no matter they have met before or not, but they communicate with each other to discuss concerns of common significance. Some well developed examples of Communities of Practice are: “a tech club at Daimler Chrysler”, which comprises of technical experts from
different locations, meets regularly to discuss the things pertaining to their subject matter, and other is of a strategic group of people of IT experts at Xerox, who also assemble for the same purpose. All systems pertaining to Knowledge sharing have the main motive to support communities of practice.

In the same context, IBM in 1995 started to support the growth and development of Communities of Practice and World Bank also took an initiative by developing a website supporting virtual discussion called the ‘Development forum’ (Dev forum) (Gongla & Rizzuto, 2001). These all efforts are made to support virtual communities of practice through technology.

2.8.4 Knowledge Discovery Systems

Knowledge Discovery Systems (KDS’s) prop up the development of innovative knowledge from data, information or from already existing knowledge. KDSs depend on mechanism and tools same as Knowledge Capture Systems did, thus supporting the combination, Socialization practices. Socialization plays a great role in KD as it facilitates the knowledge sharing between individuals or group of people which leads to new knowledge creation, and this usually happens through a collaborative conscience rather than documented instruction. It is usually used to create new tacit knowledge from the group of experts, which is more often than not done through brainstorming. The brainstorming facilitates the discovery of tacit knowledge, that didn’t exist between individuals, but only created within the group by the team, one of the examples of Honda Company of Japan can be quoted (Nonaka and Takeuchi 1995), where they encourage socialization through brainstorming, where all experts meet outside their workplace to discuss their area of interest, thus facilitating the creation of tacit knowledge, which in other KM processes converts to explicit one. Other than the tacit knowledge, Knowledge Discovery Systems can also support the combination process (explicit to explicit); here already accessible documented knowledge is re-contextualized to produce new explicit knowledge. Data mining is one of the processes, which is used to discover new explicit knowledge it can be Witnessed from the literature that in what essence these techniques are utilized to produce innovative explicit knowledge. Besides the use of data mining tools for the scientific purpose, it has been found that data mining tools are gaining popularity in business also.
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References:


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