CHAPTER 2
THEORETICAL ORIENTATION
AND REVIEW OF THE PAST STUDIES
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2.1 INTRODUCTION
Most companies are focused on producing a product or service for customers. Educational institutes are also focused on students' learning outcomes. One of the most significant keys to value-creation comes from placing emphasis on producing knowledge. The production of knowledge needs to be a major part of the overall production strategy. The productivity depends on how effectively people share their competence with those who can use it. People with the highest knowledge have the potential for high levels of value creation.

Knowledge Management (KM) is a discipline that improves the ability of organizations to solve problems better, adapt, evolve to meet changing requirements, and survive disruptive changes. Knowledge Management recognizes that organizations are a complex system made up of both the people that work for the organization, and the processes, procedures and information systems that drive actions.

The revolution in communications (i.e. e-mail, internet, telephone and fax) now allows people to talk directly to each other without the use of intermediaries. This allows organizations to be more efficient by bringing together needed expertise and knowledge on demand.

Modern organizations need to build a new culture that promotes knowledge sharing and constant learning while preserving and recording appropriate information. This is essential in order for corporate knowledge to be effectively retained and enhanced. Evidence shows that organizations are increasingly paying attention to knowledge management to ensure that they are capturing, sharing and using productive knowledge within their organizations to enhance learning achievement and improve performance. It is needed to be able to understand knowledge management better, and to identify best practices in this area.

For more understanding about knowledge management practice, this chapter provides the theoretical orientation concerned to the definition of knowledge and knowledge management (KM), types of knowledge, knowledge management process, knowledge management practices, components of knowledge management,
important of knowledge management, knowledge management in organization and knowledge management in education. The review of the past research studies related to knowledge management practices, which have been done in Thailand and in foreign countries also included in this chapter.

2.2 BASIC UNDERSTANDING ABOUT KNOWLEDGE

2.2.1 Definition of knowledge

Knowledge is a body of facts, information and principles accumulated by mankind in the course of time to advance to a better life. The success of organizations in an increasingly competitive marketplace depends critically on the quality of knowledge which those organizations apply to their working processes. There are many thoughtful definitions of “knowledge”.

Harris, D.B. (1996)\(^1\) stated that knowledge is the combination of information, context and experience. Context is an individual’s framework for viewing life. This includes influences like values, religion, cultural heritage and gender. Experience is previously acquired knowledge. When knowledge is transferred from one person to another, the knowledge is drawn into the receiver’s context and experience. The knowledge is interpreted according to the receiver’s context and experience.

Davenport and Prusak (1998)\(^2\) give a broader definition of knowledge that knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experience and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms.

Kidwell et al. (2000)\(^3\) argued that knowledge is a combination of data, information and experience. Knowledge starts as data, raw facts and numbers. Everything outside the mind that can be manipulated in any way can be defined as ‘data’. Information is data put into context of relevance to the recipient as when human place it in context through
interpretation that might seek to highlight patterns, causes, or relationships. Collections of messages, composed in various ways, may be considered as 'information resources' of various kinds - collections of papers in a journal, e-mail messages in an electronic 'folder', manuscript letters in an archive, or whatever. Generally, these are regarded as 'information resources'. Information can be shared or hoarded and is readily captured in documents or in databases; even large amounts are fairly easy to retrieve with modern information technology systems. When information is combined with experience and judgment, it becomes knowledge. Knowledge can be highly subjective and hard to codify. It includes the insight and wisdom of educators. It is the understanding that develops as people respond to and use the information that is available to them. Knowledge can be described as a belief that is justified through discussion, experience, and perhaps action.

Probst et al. (2005) explained that knowledge is the entirety of proficiency and skills that individuals use for problem solving. That means all theoretical skills, as well as rules on how to act. Knowledge uses data and information, but is always connected to individuals. Knowledge is developed from individuals and represents the expectations about cause-and-effect relations. In the same year, Gorelick, C. (2005) mentioned that knowledge is a dynamic combination of experience, expert insight, values and contextual information. It can be intangible, personal, elusive, and immeasurable. Knowledge constitutes a foundation for evaluating new experiences and information and is continually shaped through new experiences.

From the definition of knowledge mentioned above, it can be concluded that knowledge is a combination of data, information, context and experience. Knowledge can be described as a belief, values, religion, cultural, entirety of proficiency and skill that individuals use for problem solving and justified through discussion and action. Knowledge can be shared with others by exchanging information in appropriate contexts.
2.2.2 Types of knowledge

Numerous authors introduce distinctions between types of knowledge. One of the most referred ways is by splitting knowledge into two parts and define them separately; Tacit Knowledge and Explicit Knowledge (Braf, E., 2000).

(1) Tacit knowledge

Wilson (2002) argued that “tacit” means “hidden”, tacit knowledge is hidden knowledge, hidden even from the consciousness of the knower. Thus, this hidden knowledge is inaccessible to the consciousness of the knower, and can not be 'captured'.

Nonaka (1991) and Nonaka & Takeuchi (1995) used the term “tacit” to denote particular knowledge that is difficult to express, that is, difficult to articulate. Tacit knowledge is difficult to codify and it consists of skills and competencies, experiences, relationships, beliefs and values, and ideas. It is highly personal and embedded in the individual's mind.

According to Kidwell et al. (2000), tacit knowledge is know-how and learning embedded within the minds of the people in an organization. It involves perceptions, insights, experiences, and craftsmanship. Tacit knowledge is personal, context-specific, difficult to formalize, difficult to communicate, and more difficult to transfer. Therefore, tacit knowledge is of limited representation to learners since it is difficult to articulate and codify in documents. Moreover, it is difficult to communicate tacit knowledge to them. As a result, educators try hard to apply narration, animation and commentary to represent individual knowledge as effectively as they could (Wilson, 2002).

Tacit knowledge is rooted into actions, procedures, ideas, values and emotions. This type of knowledge only exists into the human mind/body (Sanchez, 2005). It is difficult to communicate tacit knowledge and teach other of that knowledge. Tacit knowledge is
taught by the concept “learning-by-doing”. One has to experiment or be trained to gain the experience. There are two dimensions of tacit knowledge:

(i) Technical Dimension (procedural): This encompasses the kind of informal and skills often captured in the term know-how.

(ii) Cognitive Dimension: This consists of beliefs, perceptions, ideals, values, emotions and mental models.

(2) Explicit knowledge

Nonaka & Takeuchi (1995)\textsuperscript{13} defined explicit knowledge as the codified knowledge that can be articulated and in formal language including grammatical statements, mathematical expressions, specifications, and in manuals. Such explicit knowledge, they concluded, can be transmitted easily and formally across individuals.

Choo (1998)\textsuperscript{14} suggested that explicit knowledge is knowledge that is made manifest through language, symbols, objects, and artifacts. Explicit knowledge can appears in the form of object based i.e. documents, software code, databases, technical drawings and blueprints, chemical and mathematical formulas, business plans, and statistical reports, or rule based, i.e., expressed as rules, routines, and procedures.

Explicit knowledge is the knowledge that can easily be codified (transformed into verbal or written form) and stored. It can be readily transmitted others. Also, it can easily be processed by a computer, transmitted electrically, books, manuals and formulas that are easily shared amongst people (Little et al., 2005)\textsuperscript{15}.

Nonaka (1994: 17)\textsuperscript{16} and Wiig (1993)\textsuperscript{17} distinguish between various types of knowledge into four types, namely personal knowledge, public knowledge, shared knowledge and organizational knowledge. The various types of knowledge are discussed here.

♦ Personal knowledge

Personal knowledge is the combination of an individual's experiences and expertise. An organization cannot create knowledge without individuals. According to Nonaka (1994: 18)\textsuperscript{18} organizations have to support creative individuals and have to provide
a context for such individuals to create, develop and share their knowledge. Personal knowledge exists in an individual’s mind and is used unconsciously in work and daily life.

According to Allee (1997) personal knowledge is seen as a “web” of knowing where many thoughts, feelings, concepts, ideas and beliefs are woven together. Personal knowledge is arranged according to a person’s mental models of how the world is working. Personal or tacit knowledge is the most basic form of knowledge. In most cases, it is detailed, complete and integrated knowledge. Wiig (1993: 147) indicates that the two other types of knowledge - public knowledge and shared knowledge - are derived from personal knowledge through long-term knowledge acquisition and codification.

- **Public knowledge**
  
  Public knowledge is generally available in the public domain. Polanyi (cited in Wiig, 1993) describes public knowledge as articulated knowledge. Public knowledge is shared broadly and taught routinely. Public knowledge is more general and abstract and less detailed than personal knowledge. It often requires extensive personal interpretation and personal knowledge before it can be used.

- **Shared knowledge**

  Shared knowledge consists of knowledge of all types and is more detailed than public knowledge. It is knowledge that is shared among individuals or professionals in a specific domain or field. Shared knowledge often deals with how a particular type of work should be performed and is structured as the “know-how” of organizations. This knowledge form also includes knowledge that is embedded in technology and work practices. According to Wiig (1993) shared knowledge and embedded knowledge constitute the major knowledge assets of any organization.

- **Organizational knowledge**

  Organizational knowledge is a combination of shared and personal knowledge. Organizational knowledge is embodied in two main forms - in products and processes. One of the challenges facing those who lead knowledge initiatives in their organizations is how to classify and codify knowledge. Theorists offer many classifications. For example Wiig (1993) lists four main types:

  - Factual knowledge - facts, data, observations
  - Conceptual knowledge - concepts, intuition, insights
• Expectational knowledge - judgement, hypotheses, expectations
• Methodological knowledge - procedural knowledge

Factual knowledge is retrieved from memory and is knowledge of what people “know to be true”. Conceptual knowledge entails abstract models of the world for complex situations, built from observations and available facts and data. Expectational knowledge is accumulated experiences and associations. Beliefs are formed by expectations and based on perspectives and confirmed data. Methodological knowledge provides the meta-knowledge for how to think and reason within a particular context.

Quinn, Anderson and Finkelstein (1998)\textsuperscript{24} describe four types of knowledge that incorporate some of Savage’s categorizations:

• Cognitive knowledge (know-what) - the basic mastery of a discipline.
• Advanced skills (know-how) - beyond book learning into practical execution.
• Systems understanding (know-why) - “a deep knowledge of the web of cause and effect”, the ultimate expression of which is high intuition.
• Self-motivated creativity (care-why) - the knowledge and motivation to succeed.

Know-what is the basic sense of knowing and represents experience. Know-how is the knowledge of how to get things done. Some of this knowledge is made explicit in organization procedures. In practice, much of this knowledge is “tacit” and in people’s heads. Know-why allows individuals to go about unstructured tasks in the most appropriate ways. An example is of doing what is right for a customer rather than slavishly following procedures. Care-why is the knowledge and motivation to succeed.

There is, however, another dimension of knowledge that is more closely aligned in theory and practice. According to Taylor (1996),\textsuperscript{25} knowledge is formulated in the minds of individuals through experience. Knowledge is shared between groups and communities through shared experience and through the transfer of knowledge, both tacitly and explicitly.

Zajchowski and Martin (1993)\textsuperscript{26} distinguished knowledge into four types: situational knowledge, conceptual knowledge, procedural knowledge, and strategic
knowledge.

- **Situational knowledge**: Situational knowledge is knowledge about situations as they typically appear in a particular domain. Knowledge of problem situations enables the solver to sift relevant features out of the problem statement (selective perception) and, if necessary, to supplement information in the statement (Braune & Foshay, 1983). It may serve to create a representation of the problem from which, if the organization of knowledge is adequate, additional knowledge (conceptual, procedural) can be invoked.

- **Conceptual knowledge**: Conceptual knowledge is static knowledge about facts, concepts, and principles that apply within a certain domain. Conceptual knowledge functions as additional information that problem solvers add to the problem and that they use to perform the solution.

- **Procedural knowledge**: Procedural knowledge contains actions or manipulations that are valid within a domain. Procedural knowledge helps the problem solver make transitions from one problem state to another. It can have a specific, domain-bound (strong) character, or it can be more general (weak).

- **Strategic knowledge**: Strategic knowledge helps to organize their problem-solving process by directing which stages they should go through to reach a solution. A strategy can be seen as a general plan of action in which the sequence of solution activities is laid down (Posner & McLeod, 1982). Elements of knowledge belonging to the first three types are specific, applicable to certain types of problems in a domain, whereas the last type, strategic knowledge, is applicable to a wider variety of types of problems within a domain.

From the above discussion, two types of knowledge i.e. tacit knowledge and explicit knowledge are used in this study.

**Tacit knowledge** refers to 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. It contains subjective insights, intuitions, and hunches. Before tacit knowledge can be communicated, it must be converted into words, models, or numbers that can be
understand. Therefore, tacit knowledge is personal, context-specific and hard to formalize and communicate. On the other hand, tacit knowledge is highly personal and is a comprehensive cognizance of the human mind. Therefore, tacit knowledge is of limited representation to learners since it is difficult to articulate and codify in documents. Moreover, it is difficult to communicate tacit knowledge to others.

Explicit knowledge refers to the knowledge that is easily to codify and transmittable in formally across individuals and systematic language. Explicit knowledge can be expressed in words and numbers and can be easily communicated and shared in the form of hard data, scientific formulae, codified procedures or universal principles.

Base on objectives of the present research, the study is interested to increase the amount of tacit knowledge for primary school personnel to solve problems and improve the effectiveness with which they teach, and learners to improve their learning outcomes. Nonaka & Takeuchi (1995) argued that a successful Knowledge Management programme needs to convert internalized tacit knowledge into explicit codified knowledge in order to share it. On the other hand, individuals and groups need to internalize the codified knowledge and convert it into meaningful tacit knowledge. Furthermore, Nonaka (1991), Nonaka & Takeuchi (1995) argued that tacit knowledge can be captured and converted into explicit knowledge. In education, explicit knowledge is formal knowledge that is easy to transfer from educators to learners. It is frequently articulated through syllabuses, study guides, and course materials. Thus, explicit knowledge is processed, transmitted and stored in databases with relative ease.

Knowledge management practice is an attempt to make tacit knowledge more explicit in the knowledge creation process. The goal of the implementation of knowledge management in an educational institution is to increase the amount of tacit knowledge for educators to solve problems and improve the effectiveness with which they teach, and learners to improve their learning outcomes. On the other hand, individuals and groups need to internalize the codified knowledge and convert it into
meaningful tacit knowledge, once it is retrieved from the Knowledge Management system.

2.2.3 Knowledge conversion

Nonaka (1991), Nonaka & Takeuchi (1995) investigated the relationship between tacit knowledge and explicit knowledge and have described four phases of knowledge conversion: Socialization, Internalization, Externalization, and Combination.

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<th>To tacit knowledge</th>
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<td>From tacit knowledge</td>
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(1) **Socialization**: from tacit to tacit

Socialization is the process where tacit knowledge is converted or transferred into new tacit knowledge to several persons at the same time through observation, imitation and practices. Tacit knowledge is difficult to communicate, formalize and share since it is connected to a specific time and space. The conversing process of socializing is therefore a learning-process where the new knowledge is taught via shared experience (Alvesson et al. 2004). A typical example of the socialization-process is the apprenticeship where a mentor via observing, imitation and practice teaches the one in the learning-process. Socialization also occurs during the informal meetings, both inside and outside the workplace, such as the informal "meetings" at the coffee-machine (Villalba 2006). Therefore, socialization is the sharing experiences to create tacit knowledge, such as shared mental models and technical skills. This also includes observation, imitation, and practice.
(2) **Externalization**: from tacit to explicit

When tacit knowledge is made explicit, and easily shared amongst others, the knowledge has been externalized. In the dialogues and discussions when the knowledge conversion is made, the tacit knowledge is expressed with metaphors (Little et al. 2005)\(^{36}\). A limitation while externalize knowledge is because the tacit knowledge is explained by metaphors the explanations are seldom perfect and they are often insufficient. The socialization and the externalization is important since in order to express the tacit knowledge to other individuals (Nonaka and Takeuchi 1995)\(^{37}\).

(3) **Combination**: from explicit to explicit

The conversion-process of combination is when explicit knowledge is made more complex though combination, editing and processing systematically with more explicit knowledge (Nonaka and Takeuchi 1995)\(^{38}\). The process can be divided into two parts; the codification and the disseminating (Little et al. 2005)\(^{39}\). The new knowledge, that has been codified, is then spread throughout the organization via different sources such as documents, meeting, telephone conferences, manuals, images, bulletin boards, communities or databases (Villalba 2006)\(^{40}\). It can be said that combination is a process of systemizing concepts into a knowledge system. Individuals exchange and combine knowledge through media, such as documents, meetings, and conversations. Information is reconfigured by such means as sorting, combining, and categorizing. Formal education and many training programmes work this way.

(4) **Internalization**: from explicit to tacit

When explicit knowledge is transmitted into tacit knowledge via simulations and experimentations, the process is called internalization. It is often related to the process of “learn by doing”, mental model or technical know-how in cross-functional teams. According to Villalba (2006)\(^{41}\), internalization occurs when experiences through socialization, externalization and combination are internalized into individual’s tacit knowledge bases in the form shared mental models or technical know-how, they become valuable assets".
Frappalo & Toms (1997)\textsuperscript{42} suggested that there is a fifth phase, Cognition, which is the application of knowledge that has been exchanged through the other phases:

1. **Socialization**: Transfer tacit knowledge from one person to another person.

2. **Externalization**: Translate tacit knowledge into explicit knowledge in a repository.

3. **Combination**: Combine different bodies of explicit knowledge to create new explicit knowledge.

4. **Internalization**: Extract the explicit knowledge from a repository that is relevant to a particular person’s need and deliver it to that person where it is translated into tacit knowledge.

5. **Cognition**: Apply tacit knowledge to a problem.

### 2.3 KNOWLEDGE MANAGEMENT

#### 2.3.1 Definition of management

Management is the important factors in effective manner to achieve goals. Management converts disorganized resources of men, machines, money etc. into useful enterprise. Management provides maximum utilization of scarce resources by selecting its best possible alternate use in organization from out of various uses. It makes use of experts, professional and leads to use of skills, knowledge, and proper utilization and avoids wastage.

McFarland, D.E. (1968)\textsuperscript{43} defines management as a process by which manager creates, direct, maintain and operate purposive organizations, through systematic coordinated and cooperative human effort.

Donnelly, Gibson, and Ivancevich (1997)\textsuperscript{44} support the view of management as a process. But their stress is more on coordination. According to them, management is a process by which individual and group effort is coordinated towards group goals. In
order to achieve the goals, coordination is essential and management involves securing and maintaining this coordination.

Drucker and Peter (2005)\textsuperscript{46} stated that management is the process by which individual and group organize and coordinate to achieve the desired objectives. Management is often included as a factor of production along with machines, materials, and money. According to the management guru the basic task of management includes both marketing and innovation. Management in all organizational activities is the act of getting people together to accomplish desired goals and objectives using available resources efficiently and effectively. Management consists of the interlocking functions of creating corporate policy and organizing, planning, controlling, and directing an organization's resources in order to achieve the objectives of that policy.

Brainy Dictionary (2012)\textsuperscript{46} defines management as the act or art of managing; the manner of treating, directing, carrying on, or using, for a purpose; conduct; administration; guidance; control; as, the management of a family or of a farm; the management of state affairs.

It can be concluded that management is a process by which leader or manager create, direct, maintain and operate purposive organization through systematic coordinated. It is an individual and group effort which is coordinated and cooperates towards group goals to achieve or accomplish the desired goals and objectives using available efficiently and effectively resources such as machines, materials, and money.

\textit{2.3.2 Definition of Knowledge management}

Knowledge has become a valuable resource and knowledge worker play a vital role. Knowledge is believed to be the major source of competitive advantage in many organizations. Thus, knowledge management (KM) is regarded as core competitive competence on which the success of organizations relies (Skyrme and Amidon, 1998)\textsuperscript{47}.

There is plenty of debate on the definition of knowledge management.
Quinn (1992) stated that knowledge management is the conceptualizing of an organization as an integrated knowledge system, and the management of the organization for effective use of that knowledge.

Wiig (1993) explained that the central premise behind knowledge management is that all the factors that lead to superior performance - organizational creativity, operational effectiveness, quality of products and services - are improved when better knowledge is made available and used competently. What knowledge management involves is a systematic approach to nurturing, protecting and exploiting that knowledge, which is important to the success of the organization.

Demarest (1997) defines knowledge management as the explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organizing, diffusing, using and exploitation. It requires turning personal knowledge into organizational knowledge that can be shared widely throughout an organization and applied appropriately.

Davenport (1997) stated that knowledge management (KM) is the processes of capturing, distributing and effectively using knowledge. It is the management process of ensuring that the organization’s knowledge needs are met and exploiting the organization’s existing knowledge assets.

Beckman (1997) refers knowledge management as formalization of and access to, experience, knowledge and expertise that create new capabilities, enable superior performance, encourage innovation and enhance customer value.

Allee (1997) explained that knowledge management is managing the corporation’s knowledge through a systematically and organizationally specified process for acquiring, organizing, sustaining, applying, sharing and renewing both the tacit and explicit knowledge of employees to enhance organizational performance and create value.

O’Dell and Grayson (1998) defined knowledge management as a conscious strategy of getting the right knowledge to the right people at the right time and helping
people share and put information into action in ways that will improve organizational performance.

Martinez (1998) said that knowledge management (KM) can be thought as encouraging individuals to communicate their knowledge by creating environments and systems for capturing, organizing, and sharing knowledge throughout the company. Its goal is to identify and leverage collective knowledge in an organization to help the organization compete (Von Krogh, 1998; Alavi & Leidner, 2001).

American Productivity and Quality Centre defines knowledge management as “the strategies and processes of identifying, capturing and leveraging knowledge” (APQC, 1996 cited in Atefeh et al., 1999).

According to Alavi & Leidner (2001), knowledge management has three goals:
(1) make knowledge and its role visible in an organization through maps, database, and communications; (2) develop knowledge intensive culture by encouraging knowledge sharing; (3) build a knowledge infrastructure: a technical system and a web connection among people by providing space, time, tools, and encouragement.

Firestone and McElroy (2003) stated that knowledge management (KM) is a management discipline that seeks to enhance organizational knowledge processing. The Knowledge management process is an ongoing, persistent, purposeful interaction among human-based agents through which the participating agents manage (handle, direct, govern, control, coordinate, plan, organize, facilitate, enable and empower) other agents, components, and activities participating in basic knowledge processing (knowledge production and knowledge integration), with the purpose of contributing to the creation and maintenance of an organic, unified whole system, producing, maintaining, enhancing, acquiring, and transmitting the enterprise’s knowledge base.

Knowledge management according to Bounfour (2003) is a set of procedures, infrastructures and technical and managerial tools, designed towards creating, sharing, leveraging information and knowledge within and across organizations. It is a systematic and integrative process of coordinating organization
wide activities of acquiring, creating, storing, sharing, diffusing and deploying knowledge by individuals and groups, in pursuit of organizational goals. Knowledge management is regarded as collection, distribution and efficient use of knowledge resources. It is a process of knowledge creation, validation, presentation, distribution and evaluation.

Bounfour (2003)\textsuperscript{62} also stated that knowledge management is a multi-dimensional construct with a large number of interrelated attributes. However, its three components or attributes that are commonly found in the literature are: knowledge acquisition or adaptation, knowledge dissemination or sharing and responsiveness to knowledge or knowledge use. The knowledge management practices in the organizations depend on some prerequisites. One of the important pre-condition for effective knowledge management is organizational culture.

From the above it is clear that knowledge management is a set of integrative process of coordinating infrastructures and technical and managerial tools, designed towards creating, storing, sharing, capturing, diffusing, and effectively using knowledge by individuals and groups, in pursuit of organizational goals by providing space, time, tools, and encouragement. It is a management discipline (i.e. handle, direct, govern, control, coordinate, plan, organize, facilitate, enable and empower) that seeks to enhance organizational knowledge processing, with the purpose of contributing to the creation and maintenance of an organic, unified whole system, producing, maintaining, enhancing, acquiring, and transmitting the enterprise’s knowledge base.

2.3.3 Principles of knowledge management

According to Davenport (1997)\textsuperscript{63}, ten principles of knowledge management are summarized below.

(1) Knowledge management is expensive: Knowledge is an asset, but its effective management requires investment of money and labour, including the following:

- Knowledge capture, e.g. creation and moving of documents onto computer systems.
- Adding value to knowledge through repackaging and editing.
• Developing information technology infrastructures for the distribution of knowledge and educating people on the creation, sharing and use of knowledge.

(2) Effective knowledge management requires hybrid solutions of people and technology: While computers and communications help with the capture and flow of knowledge, humans come into their own in interpreting it within a broader context for problem solving and decision-making.

(3) Knowledge management is highly political: “Knowledge is power” and thus a highly political undertaking. Davenport (2001) argues that if knowledge is associated with power, money and success, then it is also associated with lobbying, intrigue and backroom deals. If there are no politics going on, then the organization does not perceive the value of knowledge.

(4) Knowledge management requires leadership: Knowledge will not be well managed unless some senior person or group is given responsibility for it. Managing knowledge and learning necessitates a type of leadership that differs fundamentally from the customary view of leader as central actor. The new type of leaders are seen as facilitators that promote knowledge sharing and learning by their own personal action and behaviours (Davenport, 2001).

(5) Knowledge management benefits more from maps than models, more from markets than hierarchies. Recently many organizations’ approach to structuring knowledge was hierarchical, rather than thesaurus-based.

(6) Sharing and using knowledge are often unnatural acts: To enter knowledge into a system and to seek out knowledge from others is threatening and employees have to be highly motivated to undertake such work. Davenport (2001) suggested that encouragement for individuals to share knowledge is needed.

(7) Knowledge management means improving knowledge work processes: Improvements must be made to those processes that involve the creation, use and sharing of knowledge. While is important to address and improve the knowledge process, it should be kept in mind that knowledge is generated, used and shared intensively in a few specific processes. According to Davenport (2001), the specific processes vary
from organization to organization and can include market research, product design, and transactional processes. If real improvements are to be made in knowledge management, improvements must be made in these key processes.

(8) Knowledge access is just the beginning: Knowledge access is important, but successful knowledge management also requires attention and engagement. In order for knowledge customers to pay attention to knowledge, they must become more than passive recipients. More active involvement with knowledge can be achieved through reporting it to others, through activities based on usage of the knowledge, and receiving the knowledge through close interaction with other providers of knowledge. This is particularly important when the knowledge to be received is tacit, as Nonaka (1998) has noted.

(9) Knowledge management never ends: The tasks of knowledge management are never-ending. Like human resource management, there is never a time when knowledge has been fully managed. It is not a once-off initiative: it is an ongoing management task. One reason that knowledge management never ends is that the required knowledge is always changing. New technologies, management approaches, regulatory issues and customer concerns are always emerging. Organizations change their strategies, organizational structures and product and service emphases. New managers and new professionals have new needs for knowledge (Wiig, 1993). Davenport (2001) noted that this rapid change in knowledge environments means that organizations should not take considerable time in mapping or modelling a particular knowledge environment. By the time they have finished, the environment will no longer be the same or will no longer exist.

(10) Knowledge management requires a knowledge contract: With much knowledge in employees’ heads, and increasing mobility, organizations must clarify who owns and who has rights to employee knowledge. Many organizations have held employee knowledge (at least that developed between nine and five) to be the property of the corporation. Many environmental changes make such an approach difficult. Employees move more often to new jobs and new organizations and the distinction between home life and work life has become blurred. As knowledge become a more highly valued resource, organizations can expect to see
more attention to the legalities of knowledge management (Davenport, 2001).  

Summary: The principles of knowledge management summarize many of the challenges that are faced by knowledge-based organizations. Knowledge management is expensive, requires hybrid solutions of people and technology, is highly political, requires knowledge leadership, and benefits more from maps than models and more from markets than from hierarchies. The sharing of knowledge is often seen as an unnatural act. Knowledge management means improving knowledge work processes. It requires knowledge contact and the activities are never-ending tasks.

2.3.4 Key objective of knowledge management (KM)

The key objective of knowledge management is to enhance knowledge processing. Organizations will have realized this objective when they:

- Correctly identify problems that need solving as they occur
- Have robust information location and retrieval channels to enhance individual decision making
- Embrace effective knowledge creation processes
- Ensure that created knowledge is shared with and integrated across the whole of the organization

Methods that can help to achieve these goals include:

- Making better use of collaboration and communication tools
- Creating and promoting internal communities of practice
- Fostering the identity of virtual teams
- Using KM techniques such as Before Action Reviews (BAR), After Actions Reviews (AAR), pre-mortems, and retrospects during change activities
- Encouraging the use of a common language (e.g. corporate glossary, classification and/or taxonomies)

Benefits of implementing effective Knowledge Management include:

- Fully and accurately informed employees, clients, and stakeholders
- Improved team effectiveness and delivery of outcomes
- An organizational culture devoted to continuous improvement
- An organization that is resilient and adaptable in the face of change
2.3.5 Knowledge management process

The management and processing of organizational knowledge are increasingly being viewed as critical to organizational success. A number of studies have addressed knowledge management processes; they divide knowledge management into several processes as follow:

Ruggles (1998) divided knowledge management processes by four categories including generating and accessing, facilitating and representing, embedding and usage, and transferring and measuring. Knowledge management processes that he presents are the (a) generating new knowledge, accessing valuable knowledge from outside sources (a generating and accessing process); (b) facilitating knowledge growth through culture and incentive and representing knowledge in documents, databases, and software (a facilitating and representing process); (c) embedding knowledge in processes, products, and/or services and using accessible knowledge in decision making (an embedding and usage process); and (d) transferring existing knowledge into other parts of the organization and measuring the value of knowledge assets and/or impact of knowledge management (a transferring and measuring process).

Kim (1999) pointed out that knowledge management practices aim to draw out the tacit knowledge people have, what they carry around with them, what they observe and learn from experience, rather than what is usually explicitly stated. Knowledge management process involves the creation, capturing, sharing and utilization.

Knowledge creation: Knowledge creation is a particularly important process of knowledge management. It focuses on the development of new skills, new products, better ideas and more efficient processes (Probst, Raub & Romhardt, 2000). In addition, knowledge creation refers to the ability to originate novel and useful ideas and solutions (Bhatt, 2001). In education, knowledge can be created through understanding the user needs and requirements as well as understanding the school's
curricula. Teachers can become part of the knowledge creation process through participating in the teaching.

**Knowledge capturing and acquisition:** Capturing and acquiring knowledge is crucial to the success and development of a knowledge-based organization. Organizations often suffer permanent loss of valuable experts through dismissals, redundancies, retirement and death (Probst, Raub & Romhardt 2000). The reason for this is that much knowledge is stored in the heads of the people and it is often lost if not captured elsewhere. The way to avoid collective loss of organizational memory is to identify the expertise and the skills of staff and capture it. Knowledge worker need to develop ways of capturing its internal knowledge, devise systems to identify people’s expertise and develop ways of sharing it.

**Knowledge sharing:** Expertise exists in people, and much of this kind of knowledge is tacit rather than explicit (Branin, 2003), which makes it difficult to be shared. At its most basic, knowledge sharing is simply about transferring the dispersed know-how of organizational members more effectively. Knowledge sharing is based on the experiences gained internally and externally in the organization. Making this know-how available to other organizational members will eliminate or reduce duplication of efforts and form the basis for problem solving and decision-making. In the context of education, it can be noted that a great deal of knowledge sharing is entirely uncoordinated and any sharing of information and knowledge has been on an informal basis and usually based on conversation.

The expertise and know-how of organizational members should be valued and shared. Probst, Raub & Romhardt (2000) have pointed out that it is vital that knowledge should be shared and distributed within an organization, so that isolated information or experience can be used by the whole organization. In reality, distribution and sharing knowledge is not easy task (Davenport, 2001). However, it is important for organizations to motivate why knowledge is being shared. The importance of knowledge sharing should be based on the capability of knowledge worker to identify, integrate and acquire external knowledge.

**Knowledge utilization:** Knowledge utilization or application is an important process of knowledge management. Indeed, knowledge utilization needs and types
may vary depending on the targeted users. Research indicates that knowledge utilization needs, as well as the appropriate messages and formats for transmitting knowledge, differ greatly depending on whether users are practitioners, programme administrators, or political decision-makers. One of the key questions in promoting better utilization is to sort out whether knowledge-translation processes differ according to types of users, and if so what are the nature of processes at hand.

Alavi & Leidner (2001) identifies that knowledge management practices involves four stages i.e. (1) knowledge creation; (2) knowledge storage/retrieval; (3) knowledge transfer; and (4) knowledge application.

Knowledge creation means developing or replacing the content of an organization’s tacit and explicit knowledge. Davenport and Prusak (1998) propose five options available to knowledge creation:

- Acquisition; refers to knowledge acquired by the organization from external sources including knowledge internally generated. This is not necessarily new knowledge; it includes knowledge copied from competitors or other organizations.
- Rental; e.g. through an external research unit or hiring a consultant with specific expertise
- Dedicated resources; utilizing resources exclusively for this purpose e.g. R&D units
- Fusion; the deliberate introduction of complexity, diversity and conflict to create new synergy
- Adaptation; external changes causes organization to “adapt or die”; warns against the complacency, “core rigidities” or the tendency to stay on well-known paths.

Knowledge storage or retrieval involves explicit knowledge embedded in a variety of forms like written documentation, electronic database, expert systems, documented organization procedures and processes; and tacit knowledge acquired by individuals and their network. Alavi (2000) asserts that to create new knowledge is not enough; people and organizations simply forget and mechanisms are needed to store acquired knowledge and to retrieve it when needed. One such mechanism identified by the knowledge management community is “organizational memory”. Organizational
memory includes individual memory (individual experiences) as well as shared knowledge and interpretations resulting from social interactions, including organizational culture, work processes and procedures, structure, ecology and archives. It is fair to assume that the organization that keeps track of its experiences, e.g. by recording and retrieving knowledge about best practices, internal and external to the organization, stands to benefit as opposed to one that keeps on reinventing the wheel.

Knowledge transfer occurs at various levels between individuals, from individuals to explicit resources, from individual to groups, between groups; across groups, and from groups to organizations. Alavi (2000)\textsuperscript{63} is of the opinion that the knowledge transfer process, despite its importance, is under-studied. He postulates that the knowledge transfer or distribution process is subject to the same influences as the communication process that is often neglected in organizations. Transfer or distribution of knowledge is arguably where most of the knowledge management activities occur. It is also in this sphere that technology is playing a significant role, referring to the use of intelligent agents to customize information delivery, e-mail, data mining, Intranets and Web portals.

Knowledge application will create competitive advantage for the firm. Three mechanisms can integrate knowledge to create organizational capability: directives, organizational routines, and self-contained teams. Alavi (2000)\textsuperscript{84} stated that the knowledge itself does not constitute a competitive advantage; it is the process of application and integration. He identifies the following three mechanisms for integrating knowledge into the organization:

- Directives; sets of rules, standards, procedures and instructions converted from tacitly held specialist knowledge into explicit forms for communication to non-specialists
- Organizational routines; relate to patterns for task performance and coordination, interaction protocols and process specifications
- Self-contained task teams; refer to the creation of teams to attend to tasks where a high degree of uncertainty exists and where group synergy can be exploited. Group problem solving often requires coordination and facilitation of frequent interaction and intense collaboration
Bryan Bergeron (2003) explained that knowledge management is considered a key part of any strategy using expertise to create a sustainable competitive advantage in today’s business environment. Knowledge management contains several processes:

- **Creation or acquisition** – knowledge is created or gathered by knowledge workers;
- **Modification** – knowledge is modified in order to suit immediate or future needs;
- **Use** – the knowledge is employed for some specific, useful purpose;
- **Archiving** – knowledge is stored in a form and format that will survive in time and will still be accessible and usable for knowledge workers in the organization, into the future (codification);
- **Transfer** – transfer or communication of knowledge from one person or place to another;
- **Translation/repurposing** – knowledge is translated from its original form into a new form more suitable for some new purpose;
- **User access** – provision of limited access to knowledge workers according to their position in the company and their needs;
- **Disposal** – It is important to identify which information/knowledge to keep and which to destroy.

Daud & Abdul Hamid, (2006) and Liao & Wu (2009) investigated knowledge management processes at a public organization of higher-education level and found five processes of knowledge management as follow:

**Knowledge identification**: Knowledge identification is an action of discerning the location and value of knowledge, restraints to knowledge flow, and opportunities to leverage the value of knowledge. Either looking at this perspective, knowledge can be identified by individual employees or organization. Therefore, knowledge identification is well known as the initial stage of managing knowledge. This dimension also captures all that is related to determining core competencies, recognize strategic capabilities, and
assess the expertise level for each knowledge domain. In short, determining the knowledge gaps between the existing and needed.

Once needed knowledge is identified, it has to be acquired for utilize. Thus, acquisition process is this oriented to obtain needed knowledge from both internal and external sources. This requires accessing to knowledge in knowledge-based resources to capturing the new knowledge, and exploiting the available knowledge. There are two activities through which organization acquires knowledge, which are; searching and organization learning. Knowledge acquisition through searching can be achieved via three means such as scanning, focused research, and performance monitoring. Meanwhile, organization learning takes a fundamental part in knowledge acquisition since there is a need for organization to enhance its performance constantly. This further stresses how significant it is for organizations to determine the best practices to be adopted in order to achieve excellent performance.

**Knowledge Storage:** It is generally believed that if knowledge is valuable, then storing such valuable assets should be given an utmost concern. After obtaining the required knowledge, it is expected to be coded and recorded to enable easy access to such knowledge. From competitive advantage perspective, there is no way one can talk about knowledge storage without mentioning special kind of database is called the Knowledge Base, which allows collection, organization and retrieval of knowledge to be carried out in a computerized manner. Knowledge base can be categorized into two major types: The Machine-readable and the Manual knowledge base.

**Knowledge sharing:** Knowledge sharing involves the exchange of information and knowledge from one source to another. The success of any knowledge management processes in any organization relies on the effectiveness of the knowledge sharing. The general problem in knowledge management is that most of the large organization is not conscious of valuable knowledge they have. With effective knowledge management processes, hidden knowledge can easily be discovered, and such process mostly facilitated via sharing.

**Knowledge Application:** Knowledge application concerns the process of using of knowledge that has been stored in organization. Knowledge as a process
cannot be separated from its respective action-application. Meaning that knowledge without application process is considered as information. Within knowledge management context, the concept of application has another interpretation, sometimes in literature where it is referred to as utilization. Nonaka and Takeuchi (1995) argued that the process of applying knowledge happens when new knowledge is acquired and put to use. Lee and Lee (2007) described knowledge application as the effective retrieval mechanisms that enable access to knowledge. They further revealed that the knowledge application is the actual process of knowledge retrieval and knowledge dissemination. This means knowledge application involves effective retrieval mechanisms that enable organization’s members to access relevant knowledge.

It can be seen that various studies have addressed knowledge management processes with a view to identify the key dimensions of knowledge management processes. These dimensions include generating and accessing, facilitating and representing, embedding and usage, and transferring and measuring (Ruggles, 1998); creation, capturing and acquisition, sharing, and utilization (Kim, 1999); creation, storage, transfer, and application (Alavi & Leidner, 2001); creation, modification, utilization, archiving, transfer, translation, user access and disposal (Bryan Bergeron, 2003); identification, acquisition, storage, sharing, and application (Daud & Abdul Hamid, 2006 and Liao & Wu, 2009).

After examination of these diverse views, it enables the researcher to group them into six knowledge management processes for knowledge management practices in this study.

1. Knowledge identification
2. Knowledge creation and acquisition
3. Knowledge codification
4. Knowledge transferring or sharing
5. Knowledge storage and retrieval
6. Knowledge application or utilization

### 2.3.6 Knowledge management practices

Managing knowledge efficiently and effectively is considered a core
competence for organizations to survive in the long run. The capability of organizations to leverage their knowledge resources seems to be one of the most important and depends on effective knowledge management practices. The knowledge practices must be involved the effective knowledge management process. In the present study, six processes of knowledge management i.e. knowledge identification, knowledge creation and acquisition, knowledge codification, knowledge transfer or sharing, knowledge storage and retrieval, and knowledge application or utilization are used in the knowledge management practices.

(1) Knowledge identification

Knowledge identification is to determine what knowledge has to be taken into account. As knowledge management is an improvement activity, a current state analysis is needed in order to find out what the current state is, upon which improvement steps can then be developed. The current state analysis has to take into account different aspects: what knowledge is already available, how is knowledge handled at the moment, and what kind of culture exists in the organization. These different steps are explained in the following sections.

Knowledge management aims at improving the knowledge creation and sharing processes in an organization. Before knowledge can be created and shared, the need for knowledge has to be identified. Further requirements on it have to be determined to allow finding the right knowledge in the case of sharing and to enable the creation of the right knowledge in the case of creation.

Needs for knowledge arise when starting work in a new field - for example, when starting to use a new tool, technique or technology. These needs are brought out when improving current work practices by implementing a new component and when changing the area of work. Identifying the need for knowledge, however, does not provide information on what kind of knowledge is needed. Subsequently, there arises a need to specify the requirements on the needed knowledge. Defined requirements allow an accurate search for the knowledge or a need-driven creation of new knowledge. Steps of knowledge identification are as follow:
(1.1) Scope definition: One major influence on knowledge management practices is the scope in which they are performed. Generally it seems desirable to take into account as much knowledge and parts of the organization as possible. Knowledge management should always start small, i.e. with pilot projects, and then be widened after operation in a small scope has shown successful (Davenport and Prusak, 1998). General knowledge about the organization and knowledge management can be internal and external knowledge.

(1.2) Identification of need: There are various possibilities that may lead to the identification of a need for knowledge, such as:

- An analysis of the working processes can identify shortcomings that lead to a need for additional knowledge.
- When starting a new task, the question whether (existing) knowledge can help in performing it must be answered.
- Starting work in new working areas implies a need for new knowledge – for example, when starting work with a new programming language generation.
- Changes in the environment, like e.g. new versions of programming languages, new development methods, etc. are likely to act as triggers for needs of new or at least changed knowledge.
- An analysis of projects (measurement analysis) can help to identify a need for knowledge to solve specific problems that have occurred.
- Two types of need identification can be differentiated: identification in advance during planning (e.g. planning the change to another programming language) and identification during performance.

(1.3) Determination of requirements: Before knowledge can be searched for, one need to determine what exactly is needed. Depending on the desired type of knowledge, the approach to the definition of requirements may vary. The determination of the need has to meet these specifications to allow an accurate search or creation.
The determination can be done on what kind of knowledge and requirements are needed, what is the input and/or output a process should have, what scope a method should deal with, what operation needs to provide, etc. The determination optimally includes cost estimation for the creation of new knowledge. This is for such a case in which no existing knowledge matches the requirements. This provides a basis for the decision whether to reuse or to create the needed knowledge.

(1.4) Identification of knowledge maps: To identify the current knowledge generators, holders and storage places, a knowledge map needs to be generated that shows the creation and storage places and main holders of knowledge. Depending on the scale of the defined scope, it might be necessary to create several knowledge maps including existing and relevant documentation about the organization, such as organizational diagrams, process descriptions, job descriptions, records from the human resource department, existing knowledge maps, specifications of databases and knowledge management related tools etc. As knowledge changes over time, the knowledge map needs to be updated whenever knowledge changes and/or people gain additional knowledge.

(2) Knowledge creation and acquisition

Organizations create a great amount of data and information in their daily activities. It would be essential for them to have a system of managing the newly created information so it can be reused to solve new problems or leveraged to value-add to other activities. Knowledge creation can only be achieved in a creative environment that encourages teamwork and the use of creative potential. If manage successfully, the process can expand or change the organization's knowledge base to meet the organization's current and future needs.

Knowledge creation and acquisition aims to focus on the development of new skills, new products better ideas and more efficient process. Steps of creation and acquisition can be done as follow:

(2.1) Identify new ideas: This process aims at identifying arising new ideas, and collecting as well as evaluating candidates for identified requirements on the knowledge needed to realize the idea. New ideas - innovations - often arise from everyday work. They need to be identified to possibly develop them further.
(2.2) Search and selected new ideas: This process aims to search the internal and external sources or relevant data and information for possible approaches to the needed knowledge or the new idea. In this step, the knowledge acquisition can be started to point of knowledge management which can be acquired through:

- Establishing knowledge links or networking with other organizations and with institutions of all kinds;
- Attending training programmes, conferences, seminars and workshops;
- Subscribing to online or virtual communities of practice;
- Buying knowledge products or resources in the form of manuals, blueprints, reports and research reports.

- Knowledge externally can be acquired from customers, suppliers, competitors, partners, and mergers.
- Wide range of tools can be used for knowledge acquisition i.e. common IT systems, common projects, interaction and socialization, involvement of partners in certain organizational processes, cultural alignment (for mergers or joint ventures), and setting up the right incentive systems.

(2.3) Analysis of knowledge management: To be able to create knowledge inside an organization it is important to understand the processes and methods currently used for communicating the existing knowledge. This leads to the need of an intensive investigation on how knowledge is generated and spread by the people and by the organization. This means to internally analyze both the vertical up-down communication from the management to the employees and the horizontal communication between the employees, and additionally take into account such external knowledge-relations as consulting or research partners. Also communication not usually defined that takes place for example during coffee breaks, festivities and leisure-time activities needs to be taken into account because such occasions are important in the context of knowledge transfer. The results from this analysis have high impact on the definition of the processes later on. The value of analyzing and modelling these processes lies not in reaching an exact understanding of them but in identifying possibilities to influence them (Davenport and Prusak, 1998)
(2.4) Analysis of knowledge culture: The analysis of the current cultural situation in an organization needs to be determined to assess if the surroundings are suitable for knowledge to develop and flow, because otherwise any attempt to knowledge management is likely to fail (Davenport and Prusak, 1998). This means one should consider questions such as whether hoarding is seen as something good, whether admitting to have a problem is considered as weakness or incompetence, and whether the presentation of individual performance (bragging) is accepted. If a 'yes' is provided answer to any of these, there is obviously a need for changes in the environment, as it is not enough just to provide technology to share knowledge. Environmental changes for their part need careful planning and can be introduced only over time. Therefore, to ensure that the environment develops in such a way that knowledge management is possible needs to be the important step of knowledge creation.

(2.5) Create knowledge: After identify new idea, search/select new idea, analyze knowledge management and knowledge culture have been performed, then knowledge creation is determined. The primary thing to do in knowledge creation is to learn the ideas and improve on them. Secondarily, one can promote the ideas, spread the word, hire people to work on it, publish on the topic, and so on. This will help people as well as creating a bigger community with more people to contribute improvements.

(2.6) Establish collaboration: Sometime, knowledge also addresses problems. Problems aren't necessarily a bad thing but would include any question one has, or anything one wants to get and isn't sure how to get it. Just find anything that one thinks could be better in any way. Brainstorm ideas might solve the problem; make guesses. Criticize the ideas is also can be used. If anything at all is wrong with them, that's grounds for criticism. A criticism is an explanation of a flaw in an idea.

Collaboration is extremely important and valuable for two reasons. But first let's consider how difficult it is. Actually, people can frequently work together to create knowledge in an efficient and effective way. All they have to do is share what problem(s) they are working on, share any brainstormed ideas for a combined list, and share their criticisms. This is simple to organize since the basic outline of knowledge
creation involves two lists associated with each problem, and anyone could add to the list, all they’d need to do is read it first to avoid duplicates.

To collaborate, people also need to explain their ideas clearly enough for others to understand them. This does take some effort but on the other hand clarifying one’s ideas is important even if one is doing individual thinking. Making them clear instead of vague improves their quality and addresses the criticism of the vagueness flaw. The benefit of collaboration is that if there is weaknesses problem or blind spots, someone else might be good at brainstormed idea, or criticism.

(3) Knowledge codification

Data and information need to be collected and analyzed in order to turn them into useful knowledge. This is the stage where tacit knowledge is converted into explicit knowledge and is very critical to the success of the other two stages - application and transfer. Without documenting and codifying tacit knowledge, its transfer for the purposes of learning and utilization, both internally and externally, will be difficult to achieve. These valuable knowledge assets can only be done if the knowledge has been codified.

As mentioned above, knowledge codification means converting tacit knowledge to explicit knowledge in a usable form for the organizational members. Thus, Knowledge codification serves the pivotal role of allowing what is known in the organization to be shared and used collectively. By converting knowledge into a tangible, explicit form such as a document, knowledge can be communicated much more widely and with less cost. Knowledge must be codified in order to be understood, maintained and improved upon as part of corporate memory. People always used some type of knowledge codification during their everyday activities to make communication and discussions more effective. Work or business jargon, e-mail as well as computer programmer’s technical language are only some examples. However, it is impossible to codify in a document or a database the knowledge, skills, expertise, understanding and passion of an employee. In this case, the best solution is to provide a link to the sources of knowledge using a knowledge maps, company yellow pages or a company guide.
The codification of explicit knowledge can be achieved through a variety of techniques such as cognitive mapping, decision trees, knowledge taxonomies, and task analysis:

(3.1) Cognitive Maps: Once expertise, experience, and know-how have been rendered (made) explicit, the resulting content can be represented as a cognitive map. A cognitive map is a representation of the "mental model" of a person's knowledge and provides a good form of codified knowledge. In the map, the nodes represent the key concepts, while the links between them show the interrelations between concepts. Thus, cognitive mapping is based on concept mapping, and allows experts to construct knowledge models. They could show multiple perspectives or views on the content.

(3.2) Decision Trees: Typically in the form of a flowchart, with alternate paths indicating the impact of different decisions being made at that juncture point. A decision tree can represent many "rules," and when execute the logic by following a certain path.

(3.3) Knowledge Taxonomies: Concepts can be viewed as the building blocks of knowledge and expertise. Taxonomies are basic classification systems that enable to describe concepts and their dependencies – typically in a hierarchical fashion. The higher up the concept is placed, the more general or generic the concept is. The lower the concept is placed, the more specific an instance it is of the higher-level categories. This approach allows lower or more specific concepts in the taxonomy to directly incorporate the attributes of the higher level or the parent concepts.

(3.4) Task analysis: This is the analysis of how a task is accomplished, including a detailed description of both manual and mental activities, task and element durations, task frequency, task allocation, task complexity, environmental conditions, necessary clothing and equipment, and any other unique factors involved in or required for one or more people to perform a given task. Task analysis emerged from research in applied behaviour analysis and still has considerable research in that area. Information from a task analysis can then be used for many purposes, such as personnel selection and training, tool or equipment design, procedure design (e.g., design of checklists or decision support systems) and automation.
The term "task" is often used interchangeably with activity or process. Task analysis often results in a hierarchical representation of what steps it takes to perform a task for which there is a goal and for which there is some lowest-level "action" that is performed. Task analysis is often performed by human factors and ergonomics professionals.

Task analysis may be of manual tasks, such as bricklaying, and be analyzed as time and motion studies. Cognitive task analysis is applied to modern work environments such as supervisory control where little physical work occurs, but the tasks are more related to situation assessment, decision making, and response planning and execution.

Task analysis is also used in education. It is a model that is applied to classroom tasks to discover which curriculum components are well matched to the capabilities of students. The results of task analysis are often represented in task models, which clearly indicate the relations among the various tasks. Task analysis for instructional design is a process of analyzing and articulating the kind of learners’ performance (Jonassen et al, 1999)\(^9\). Instructional designers perform a task analysis in order to: (Jonassen et al, 1999)\(^{10}\).

- Determine the instructional goals and objectives;
- Define and describe in detail the tasks and sub-tasks;
- Specify the knowledge that characterizes a job or task;
- Select learning outcomes that are appropriate for instructional development;
- Prioritize and sequence tasks;
- Determine instructional activities and strategies that foster learning;
- Select appropriate media and learning environments;
- Construct performance assessments and evaluation

(4) Knowledge transferring or sharing

One of the advantages of knowledge is that knowledge is dynamic. Knowledge can be adapted and evolved through the processes of transfer and sharing. Knowledge transfer and sharing is an important part of knowledge management. It
refers to activities associated with the flow of knowledge from one party to another, from one person or place to another (Szulanski, 1996)\textsuperscript{101}.

Earl & Scott (1999)\textsuperscript{102} stated that successful organizations are those that “consistently create new knowledge, disseminate it through the organization, and embody it in technologies, products, and services”. Zander & Kogut (1995)\textsuperscript{103} regard organizations as social communities that enhance new skills’ transfer. It is said that new knowledge is difficult to replicate if there is no “social capability”.

Through the knowledge transfer and sharing process, practices are improved when replicated across common communities of practice (Wolford, 1999)\textsuperscript{104}. He further states effective knowledge transfer can take place when replicated across common communities of practices. This includes communication, translation, and conversation.

When Lave & Wenger (1991)\textsuperscript{105} first mentioned the term communities of practice in the literature, they defined them as “a set of relations among persons”. A more practical approach is presented by Wenger (1998)\textsuperscript{106}, who describe a community of practice as a group of individuals who share a common interest for a defined subject, and who exchange information and knowledge across and beyond organizational boundaries, with a motivation to develop new knowledge.

In order to cultivate communication practices, a quick start up guide suggested by Wenger (1998)\textsuperscript{107} is as follow:

- Set strategic context: A strategic context lets communities find a legitimate place in the organization. The practice can be done as follow:
  - Articulate a strategic value position
  - Identify critical work problem
  - Articulate need to leverage knowledge

- Communities of practices are a familiar experience, but people need to understand how they fit in their work. The practice can be done as follow:
  - Conduct workshops to educate management and potential members about the approach
Help people appreciate how communities of practice are inherently self-defined and self-managed.

Establish a language to legitimize communities and establish their place in organization

- Communities of practices can use some light-handed quick guidance and technology infrastructure. The practice can be done as follow:
  - Provide some process support, coaching, and logistic assistance.
  - Identify needs and define adequate infrastructure without undue emphasis in fancy technology
- Start to cultivate communities of practices as early as possible to crate early examples that allow people to learn by doing. The practice can be done as follow:
  - Have a few pilot communities going as soon as possible
  - Find communities to start with by identifying areas where there is potential and readiness
  - Interview some prospective members to understand issues, start discussing a community, and identify potential leaders
  - Gather a core group to prepare and initiate a launch process
  - Help members organize a initial series of value-adding activities
  - Encourage them to take increasing responsibility for stewarding their knowledge
- Practitioners usually see the value of working as a community but may feel the organization is not aligned with their understanding. The practice can be done as follow:
  - Find sponsor to encourage the participation
  - Value the work of communities
  - Publicize success
The formal organization must have processes and structure to include these communities while honouring their root in personal passion and engagement. The practice can be done as follow:

- Integrate communities in the way the organization work
- Identify and remove obvious barriers
- Align key structural and cultural elements.

The purpose of communities of practices is to share knowledge and experience, so that each individual can operate more effectively. Communities of practices are the owners of knowledge in that particular area of knowledge. By exchanging stories, problems and solutions, the communities of practices can bring their collective knowledge to bear on individuals’ problems. The communities of practices can also take various experiences and solutions from around the organization and build a knowledge asset representing best practice.

Communities of practices consist first and foremost of practitioners; specialists who perform the same job or collaborate on a shared task. The Community acts like an in-house professional society, cutting across team and divisional boundaries.

Intense face to face communities of practices should not grow larger than 50 people. However, small local communities of practice can be bound together into a wider community by communications technology, and a membership of up to 100 or more is not uncommon.

Communities of practices often form spontaneously, driven by the need of the members for operational knowledge. A workshop or conference often provides the catalyst. Communities of practice can also be deliberately encouraged in areas where it is known there is a need for knowledge transfer and share. Communities of practice do not facilitate themselves. They need a facilitator; someone they see as an 'insider' and who has the respect of the community. Communities of practice require organizational recognition to be really effective, and face to face meetings strengthen the communication and relationships.
They may rely on electronic communication. E-mail distribution lists and online discussion groups help strengthen relationships that have developed at face to face meetings and provide ‘meeting points’ for members.

Communities of practices are form of a network, but not every network is a communities of practice. A network could be considered communities of practices if it is informal, open to all practitioners, works as a mutual help society rather than having a shared performance contract, and has a means of constant virtual communication rather than relying on occasional formal meetings.

Knowledge transferring and sharing has always been a challenge for organizations. Its importance has grown in recent decades for three related reasons. First, knowledge appears to be an increasing proportion of many organizations’ total assets. Second, organizations have moved away from hierarchical methods of control toward more decentralized organizational structures and increased employee involvement. This has resulted in more creativity by frontline employees and subunits, but fewer obvious organizational paths through which the transfer can occur. Finally, advances in information technology have created new means of knowledge transfer. Innovations such as Internet and intranets all hold the potential for increased diffusion of innovations. However, technology alone cannot solve the problem of knowledge transfer; organizational structures and practices must facilitate and motivate transfers (Levine, 1995)108.

Peter Holdt (2007)109 described four types of knowledge to be transferred and shared as follow:

- Professional knowledge is limited to the practice of being an operation supporter, and has also been referred to as know-how (Brown and Duguid, 2000)110. Professional knowledge originates from for instance a person’s formal education in combination with his experience in performing his job. Professional knowledge is a prerequisite for being able as a specialist to contribute to organizational activities, but in itself it does not produce any organizational outcome.
Coordinating knowledge is embedded in rules, standards and routines for how jobs are supposed to be performed. Coordinating knowledge guides the application of for instance professional knowledge, in order to secure the efficient transformation of input to organizational output. In other words, coordinating knowledge shapes who is going to perform what and when – not necessarily how (which is rather guided by the professional knowledge).

Object-based knowledge is knowledge related to a certain object passing through the production line of the company. In situations of interdependencies the central organizational task is clustering the contribution from various specialists (and their specialized knowledge). Often, the combination of specialized knowledge and coordinating knowledge is applied to a certain object such as a patient, a machine or a customer. Know-who is knowledge about where knowledge exists.

Know-who enables the identification of who might be able to help solve specific problems.

The four types of knowledge are all a prerequisite for organizational activities – without some level of professional knowledge no activities are performed, without coordinating knowledge no organizational outcome is produced, lacking object-based knowledge can lead to numerous situations of reinventing the wheel, and without knowing who knows what – or where knowledge exists – knowledge transferring and sharing will not take place.

In principle, knowledge transfer and sharing can be broken down into five stages i.e. idea creation, sharing, evaluation, dissemination, and adoption. These five stages of knowledge transfer and sharing can be encouraged within an organization through the use of training, incentives, organizational structures, and technology (Levine, 1995). Training: The practice of knowledge and sharing through training can be done as follow:
For effectively generate new ideas, employees need to be trained in problem solving, including an ability to think "outside the box." A typical programme should include how to identify problems, prioritize, analyze root causes, identify possible counter-measures, implement the solution, and check whether the solution actually works.

Organization must also provide people information on the work and its environment so their ideas are appropriate. In addition, employees need modern organizational skills such as how to work effectively as a team.

In order to share articulated or explicit knowledge, employees need to be literate in the languages in which ideas are expressed in their work.

Leaders and workers must be trained to evaluate new ideas. Just as importantly, they must be trained in systematically understanding what evidence should be convinced.

Training workers to both disseminate and adopt new ideas may revolve around making them aware of where else in the organization their ideas may be useful and where else ideas may arrive from. Workers must also know how to use technology to post and search for new ideas.

One difficulty with existing training efforts is their lack of integration. To be most effective, training on creativity should include designing solutions that include opportunities for validation and dissemination of ideas.

Incentives: To create an environment that encourages the generation of new ideas, managers should consider the following policies:

Incentive should pay for ideas generated by groups or individuals; no layoffs for productivity improvements that follow from new ideas; job duties that include tinkering; permitting or encouraging experiments that are well-conceived but fail; and giving credit to employees who generate new ideas.

Employees are most likely to spend energy sharing what they know if they are in a single workplace with group incentives. Thus, extra incentives can be helpful when employees are in different units without common objectives. Both monetary rewards and recognition can prompt people to be more open with information and can create corporate cultures in which sharing of information is valued.
In order to encourage not only transfer and sharing but also **evaluation** and **dissemination** of ideas, knowledge-creating divisions must be rewarded for creating knowledge that other divisions use. Corporate headquarters cannot monitor the value of the knowledge transfer and sharing between units, or even whether any knowledge is transferred and shared. Knowledge-creating divisions face costs of creating an idea, posting it to the corporate computer network, posting it carefully, and helping the knowledge-using unit implement the idea.

**Structure:** The practice of knowledge and sharing through structure can be done as follow:

- The most important structural component that encourages creativity or idea generation is often providing time to experiment and tinker. This may run counter to other productivity measures that emphasize efficiency. Also, formal employee involvement structures such as brainstorming, suggestion programmes, quality circles, and self-directing teams support both creating, transferring and sharing knowledge. People need the power and the responsibility to make improvements.

- To promote **evaluation**, companies must institutionalize means of learning from past experience: "Organizations must review their successes and failures, assess them systematically, and record the lessons in a form that employees find open and accessible.

- A variety of organizational structures can promote the **dissemination** and **adoption** of ideas. Despite the current emphasis on technology and new methods of idea transmission, much knowledge remains tacit and is most efficiently transmitted in person, renewing the importance of decidedly low-tech practices including job rotation across units, cross-functional meetings, cross-unit or cross-group meetings (e.g., sales convention), mentoring, training, and free time during coffee breaks.

**Technology:** One way in which technology may promote idea generation is through its ability to provide information. The practice of knowledge and sharing through technology can be done as follow:

- Groupware promotes **transferring and sharing** by tracking the status of ideas and communicating them across a group, or further with wide-area networks. Technology helps the quick **evaluation** of new ideas by capturing actions and
transactions and computing their effectiveness. Personal computers can assist through the use of statistics.

- Technology can help with the dissemination of ideas by making it easier to target appropriate recipients such as: (a) a group defined formally by a common product, job title, or project, (b) a group formed by management, or (c) a group formed by workers such as a mailing list, with either public or private membership. As the technology develops, the groupware itself should help determine who is likely to need a piece of information. Some examples are bulletin boards, Web pages, and newsgroups, e-mail, and Internet where people self-select to read.

- Those adopting new ideas can use e-mail to communicate with the disseminators of new ideas and ask for help in implementation.

Saliha Ziam (2010) described that knowledge transferring and sharing is critical to improve policies and practices in education. He suggested that linkage agents are central actors in the knowledge transferring and sharing process. In order to improve the knowledge transfer process, linkage agents also have to use a language that is simple and common to practitioners. He also said that to perform knowledge transfer activities effectively, organizations need to have sufficient autonomy to recruit experienced knowledge transfer staff on a competitive basis. Increased mobility between the public and private sectors will help leaders to identify shared needs among staff. Top management support has been very effective in the educational organization indicated by the existence of knowledge management technologies such as collaborative tools. An important factor in the effective knowledge diffusion depends on the degree of information and communication technologies in the organization. The explicit and tacit knowledge in the organization is transferred and shared through knowledge sharing practices as follow:

- Explicit knowledge in an organization is represented in the form of databases, documents, best practices or processes in the organizations. The knowledge sharing is encouraged by creating ‘knowledge repository’ where employees contribute their expertise electronically to the organization in a way that can be accessed by other employees. The organization believes that it is better to learn from
past and the success which provides valuable guidelines for future endeavors. This knowledge repository can be accessed at the convenience of employees, and well suited even for the busy employees. Management of explicit knowledge is done through content and document management system and using data-mining techniques for retrieval.

- Tacit knowledge is not structured and more concrete in invisible form. It resides in the knowledge worker’s head and is more difficult to transfer. In this case, the transmission of sensations, feelings or values plays an important role. This knowledge can be quickly and effectively harvested in a conversation with the experts. Face to face interaction is then usually required since it provides a ‘broader bandwidth’ that can accommodate all types of non-verbal communications. The tacit knowledge is subconsciously understood and applied, difficult to articulate, developed from direct experience and action. Usually, shared through highly interactive conversation, story-telling and sharing of experiences. The knowledge directories help in locating the experts in the organization. Also, it helps to identify the existence, location, and means of retrieval of information held by group of individuals, and connect the knowledge owners and user. Knowledge acquired is appropriately categorized and tagged. There is a clear map of different categories of knowledge stored in the repository. Knowledge directories are particularly important when linking personal expertise, as tacit knowledge cannot be easily codified and accessed independent of knowledge contributors. It is observed that the tacit knowledge is shared through the events like:

  - Innovation Day – this is an internal annual event and a platform for knowledge sharing across various divisions in the organization. The technologies those are currently in use and those that are going to be adopted in the future are displayed and demonstrated.

  - Organization’s internal conference – the papers selected for conference go through a review process like any academic conference. Employees’ present novel concepts, insights, and experience gained in organization in the form of technical papers. It also encourages intra-division interaction among employees. All the technical papers are disseminated through conference proceedings with other subsidiaries.
- Storytelling – this session gives emphasis on knowledge sharing. Both external and internal knowledge is shared in this event. The external knowledge is imported through external speaker while internal knowledge is disseminated by the employees. Interesting topics on technical and non-technical subjects are covered in storytelling.

- Technology show – this is a technology event. It presents the future of organization’s research and development activities. The speakers are invited from the organization along with its worldwide subsidiaries.

- Best practices are shared through a dedicated repository. Employees share their achievements and experiences with best practices.

- Internal trainers conduct training sessions for the employees. This leads to the development of mentors one of the objectives of which is to make fresh recruits to be project-ready with domain knowledge and process expertise relevant to their roles.

(4) Knowledge storage and retrieval

Knowledge storage or retrieval involves explicit knowledge embedded in a variety of forms like written documentation, electronic database, expert systems, documented organization procedures and processes; and tacit knowledge acquired by individuals and their network (Alavi & Leidner, 2001). Whenever new knowledge is generated this needs to be recognized first to be able to collect and store it. As knowledge may arise unconsciously from everyday work, it is not principally identified, except in the case of consciously driven knowledge generation. After new knowledge has been identified, an evaluation is needed to determine whether the knowledge is worth integration to the repository. If the knowledge has been decided to be worth making it available using a knowledge repository, then a knowledge package needs to be designed, the knowledge needs to be codified to it and the package needs to be integrated to the repository. Any further changes in the knowledge environment require the knowledge map of the organization to be updated. The according processes are described in the following.
- **Identification of Knowledge**: This process identifies knowledge that has been created. Also knowledge that already exists but is not yet identified can be identified. Mechanisms for the purpose include e.g. according interviews and questionnaires aimed at finding knowledge.

- **Evaluation of Knowledge**: After knowledge has been identified, an evaluation is needed to determine whether this knowledge is worthy of an implementation to the organization’s knowledge repository.

- **Package Design**: Depending on the type of knowledge that is to be integrated, a medium for its storage has to be decided upon. While explicit knowledge can well be kept in documents, implicit knowledge might require that it be packaged in a more indirect form like a story telling video etc. Depending on the defined infrastructure, one medium out of the possible ones has to be decided upon. The number of available media depends on the storage system and might therefore be limited.

- **Package Codification**: After analyzing knowledge and determine a suitable medium for it, the knowledge is codified into a package. Knowledge codification describes the task of turning knowledge into a code that can be processed in the knowledge management system. Package codification concerns the meta-information stored with the knowledge that is used for finding it, which needs to be fitted to the systems needs to enable an effective search and retrieval.

  To enable this kind of search, the codification of a package has to produce an extensive characterization of each package. The following gives an example structure for characterization (Basili and Rombach, 1991):

  - **Name**: The name of the package according to the naming standard of the System.

  - **Function**: A short description of the package according to the description standard of the system.
- **Use**: A description of the way the package can be used according to the systems standards, e.g. product, process, management, other knowledge, etc.

- **Type**: The type of the knowledge package according to the systems standards, e.g. document (specification, code), method (inspection, testing), etc.

- **Granularity**: The granularity of the package according to the systems standards describing its scope, e.g. level (function, product, project), process stage (specification, design, testing), etc.

- **Representation**: The representation of the package according to the systems standards, e.g. code fragment, set of guidelines, format mathematical description, etc.

- **Relations (Input / Output)**: The relations of the package describing the needed input and the provided output, e.g. input parameters needed for code execution, input specifications needed for testing, output format, etc.

- **Dependencies**: Dependencies describing what the possible use of the package is depending on, e.g. knowledge about a specific programming language to understand the code, or knowledge about the environment underlying the project management to understand a cost prediction model, etc.

- **Application Domain**: The domain in which the package has its origin, e.g. embedded SW for mobiles, ground-lying SW for satellite base-stations, etc.

- **Solution Domain**: The environment in the package can be developed in form of model, e.g. waterfall model, V-model, Software Process Improvement and Capability Determination (SPICE), GQM method, etc.

- **Object quality**: A description of the object’s quality, e.g. response time of code, average correctness of the cost prediction model, etc.
Package Integration: After a package has been designed and codified, it needs to be integrated to the repository. It may be necessary to announce the new package and thus inform relevant people about its existence.

Update of the Knowledge Map: The existing knowledge map needs to be updated whenever knowledge is added, discarded or changed. To identify the changes needed to knowledge, the changes that happen to the environment on which the knowledge depends have to be identified first. This can be done by audits on the knowledge which can be performed regularly at specific intervals, or when specific indicators point out the possibility of outdated knowledge, like e.g. feedback. An evaluation of the impact of the change is undertaken to determine what kind of update is needed on what knowledge. This means identifying all affected knowledge packages as well as defining the type of change each of them requires. The needed update on knowledge is performed. Accordingly, the knowledge map might also need an update; also, a notification of the update might be sent. Within discarding knowledge, it seems sensible not to finally delete knowledge, but to mark it as outdated and/or to archive it.

(5) Knowledge application or utilization

Knowledge application or utilization refers to the actual used of knowledge that has been captured or created and put into knowledge management cycle. Organizations use knowledge for three reasons: (a) knowledge can be used for determining organization’s work processes and making strategies for sustainable competitive advantage, (b) knowledge can be used for designing and marketing product, and (c) knowledge plays a critical role of organization’s services quality (Nonaka & Takeuchi, 1995)\textsuperscript{115}. Three mechanisms can integrate knowledge to create organizational capability: (a) directives, (b) organizational routines, and (c) self-contained teams (Alavi & Leidner, 2001)\textsuperscript{116}.

Directives refer to specific set of rules, standards, procedures, and instructions developed through the conversions of the specialist’s tacit knowledge to explicit and integrated knowledge for efficient communication to non-specialist.

Organizational routines refer to the development of task performance and coordination patterns, interaction protocols and process specifications that allow
individuals to apply and integrate their specialized knowledge without the need to articulate and communicate what they know to others.

- Self-contained task teams refer to the creation of teams to attend to tasks where a high degree of uncertainty exists and where group synergy can be exploited. Self-contained task teams involve the task uncertainty and complexity prevents the specification of directives and organizational routines, teams of individuals with prerequisite knowledge and specialty are formed for problem solving. Group problem solving often requires coordination and facilitation of frequent interaction and intense collaboration. Like knowledge structuring, knowledge utilization is also based on information technology. For this reason, if individuals would like to use information effectively, they firstly should be information literacy.

2.3.7 Knowledge management resources

Knowledge management (KM) is a “conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that will improve organizational performance” (O'Dell & Grayson, 1998)\(^\text{117}\). Knowledge management (KM) can be thought as encouraging individuals to communicate their knowledge by creating environments and systems for capturing, organizing, and sharing knowledge throughout the company (Its goal is to identify and leverage collective knowledge in an organization to help the organization compete (Alavi & Leidner, 2001)\(^\text{118}\).

Three effective resources for effective knowledge management practices are people, processes and technologies (Petrides & Nodine, 2003)\(^\text{119}\).

1. People:

According to Alavi & Leidner (2001)\(^\text{120}\), knowledge management has three goals:
(1) make knowledge and its role visible in an organization through maps, database, and communications; (2) develop knowledge intensive culture by encouraging knowledge sharing; (3) build a knowledge infrastructure: a technical system and a web connection
among people by providing space, time, tools, and encouragement. In order to accomplish these goals, the skills, expertise, and experience of people are needed to better gain, retain, and use” (Murphy & Verma 2008). People are necessary for brainpower, innovation, creativity and experiential knowledge to solve problem. People are the human in the context of knowledge management who relay past experience and generate new ideas. People play the central role with identification, gaining, creation, saving, structuring, transferring and utilizing knowledge. People are the most important factor in an organization. If the people are not considered enough in the knowledge management practices, barriers will come up and the success of every knowledge management initiative is in risk (Richter, 2008). Managing knowledge involves two groups of people: leader or manager and knowledge worker.

(1.1) Leader or Manager:

Leader is a person who has influence over other people’s behaviour, attitude and beliefs. He is a person who initiate, direct, support, advice, guide, compromise, coordinate, persuade, encourage and create a change in performance of a group in an efficient way. Successful leaders are able to influence the behaviour, attitudes and beliefs of their followers. In order to establish and maintain the tasks of knowledge management of an organization, leader or manager has to play the important roles as follow:

- Provide the ideally guidelines for collaboration, building mutual trust of employees and ensure the compliance of the guidelines, rules and desired goals.

- Encourage and engage employees in sharing with others what they know, and what they are learning. To make jobs more rewarding and work more effective, working groups of staff from across departments should be persuaded to come together as teams by common need and exchange information. In this process, the teams also build relationships, trust, and expertise and create a shared repertoire of resources, tools, and artifacts that support future learning. “Communities of Practice” (Lave & Wenger, 1991) should be used for managing tacit knowledge within organizations.
Support the skill development of employees to be the core competencies in the organization

Establish the visible short-term as well as the long-term of the actual implementation plan for increasing of organizational capital (i.e. intellectual and financial) and growth and higher utilization of organizational knowledge resources.

Find out the organization’s knowledge management needs, best practices, knowledge uniqueness of organizations and the knowledge management disciplines.

Manage the framework deals with the overall activities that need to be performed in the organization. For this role, the leader or manager needs to carry out the following high-level activities:

- Perform a knowledge-based SWOT analysis of the organization (strengths, weaknesses, opportunities, threats). According to Tiwana (2000) and Zack (1999), using the SWOT analysis to identify the organization’s knowledge gap and help it define its knowledge strategy in the best way to achieve a clear strategy for the work. It is important to identify the knowledge gaps in terms of tacit and explicit knowledge.

- Create a vision for the knowledge management initiative. The vision is the long-term strategy that will drive the knowledge management initiative and provide the scope within which the knowledge management initiative and the organization will grow. The main responsibilities of leader or manager should be to help integrate the four sub-systems of knowledge management effort, namely the organization, the employees, processes and the infrastructure.

- Align the knowledge management initiative with the organizational strategy (Tiwana, 2000; Zack, 1999).

- Manage the organizational culture and manage change(s). The objective of the change is not to change the organizational culture drastically, but to modify the behaviour of people in a way that suits the demands of knowledge management in the organization.

- Manage with a holistic approach (include stakeholders, competitors,
internal environment and external environment). The organization must take in consideration its customers, suppliers, shareholders and competitors to collect and analyze knowledge about them. This will provide the organization with the opportunity to become proactive in meeting customer needs.

- Create and manage organizational learning that will generate innovative knowledge and allow the organization to produce innovative products and processes.

- Focus is on managing employees, their behaviour, their expectations, and their potential to contribute to the success of the knowledge management effort. There should also be an active effort to encourage employees to share and use knowledge in the workplace.

The framework proposes the following activities to achieve this:

- Manage employees as individuals and as part of a team. Organizational learning takes place through individual and team learning. However, management must consider each individual’s opinion and input. This will ensure that employees are more willing to accept change if they feel part of that change.

- Motivate employees to share and use knowledge in the workplace. McDermott and O’Dell (2001)\textsuperscript{128} propose three ways in which sharing knowledge can be made an important factor: Make sharing knowledge a direct part of the business strategy, “Piggyback” sharing of knowledge onto other work initiatives and Share knowledge commonly as part of normal work.

- Encourage learning and innovative thinking in the organization. The easiest way would be to demonstrate how sharing knowledge with other employees and learning from each other can result in improved products and services and time and cost reduction.

- Establish an effective knowledge creation and retention process in the organization. For this role, the leader or manager needs to carry out the following activities:

  - Re-evaluated the working process to enable employees to create, identify, verify, capture, organize, disseminate and use knowledge easily throughout the organization. For this activity to be effective, a continuous feedback from the application of
knowledge must exist in the framework to ensure that the knowledge is maintained and renewed. Therefore, an important aspect of managing knowledge management is the measurement of the impact of knowledge management on the organization. The leader or manager should be responsible for devising suitable metrics to measure how effective the knowledge management effort is to the organization (Duffy, Jooste and Whittaker, 1999).

- Manage the effective infrastructure. It is also important that the infrastructure of the organization should be able to link easily between customers and suppliers, in order to allow a flow of information between the organization and its partner’s information on sharing in the modern organization, codification, distribution and storage of information. The knowledge infrastructure should be promoted for understanding the strategic capabilities or knowledge domain and/or comprehending the requirements for knowledge. The telecommunications infrastructure, including the rise of ICT infrastructure and IT facilities should be provided sufficiently for employees, such as there should be linked up and fully networked within the organization. The use of optic fibers, wired LAN lines, and wireless LAN as well as wi-fi should be in adequate provision. All computers within the organization should be networked and the organization-wide network should be extended to all areas i.e. meeting rooms, and all staff offices. The network facilities should support communication and connection for all employees.

- Formulate the organizational context, such as support and collaboration, learning and development as well as leadership commitment. This can be done as follow:

  - Support and collaboration: This refers to the extent to which people in an organization actively support and assist each other in work related matters. This includes moral support from superiors, peers, subordinates and work groups in performing operational tasks. Support and collaboration is also a measurement of teamwork. Through support and collaboration, ideas are shared and channeled cross-functionally as well as inter-organizationally.

  - Encourage the learning and development: It is important to develop employees for further growth and advancement in career in order to maintain the pool of knowledge within the organization. This will shorten the learning curve of new
employees. With the development of organizational workforce, knowledge that is learned and applied will make knowledge management practices prevail.

- Use motivation and reward: Managers’ commitment, attention, and consistency of purpose are essential in developing the desired behaviours and value systems using motivation and reward. Managers need to provide the necessary resources and create a work setting and a supportive climate to allow subordinates to experiment, explore and try out new work processes and practices. In order for new knowledge generation to take place, leaders or managers must have high-risk tolerance and be prepared to accept failures since every innovative change carries with it the possibility of failure. Management can signal the importance of KM practices by rewarding those who inculcate these in either monetary or non-monetary form as well as reformulate policies that obstruct knowledge management.

(1.2) Knowledge worker: Knowledge workers are the workers whose main capital is knowledge. Knowledge workers play a role in the handling and distribution of information. Knowledge workers spend their time each day searching, and majority of those searches as a pool of intellectual capital - raw material for knowledge. The important roles of knowledge workers are to bring benefits to organizations in a variety of important ways. These include analyzing data to establish relationships, assessing input in order to evaluate complex or conflicting priorities, identifying and understanding trends, making connections understanding cause and effect, ability to brainstorm, thinking broadly (divergent thinking), ability to drill down, creating more focus (convergent thinking), producing a new capability, and creating or modifying a strategy.

The typology of knowledge worker roles suggested by Reinhardt et al. (2011) is "controller, helper, learner, linker, net-worker, organizer, retriever, sharer, solver, and tracker". The details of the typology of knowledge worker roles are shown in the following table.

**TABLE 2.1**

**TYPOLOGY OF KNOWLEDGE WORKER ROLES**
<table>
<thead>
<tr>
<th>Role</th>
<th>Description</th>
<th>Typical Knowledge Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>People who monitor the organizational performance based on raw information.</td>
<td>Analyze, dissemination, information organization, monitoring</td>
</tr>
<tr>
<td>Helper</td>
<td>People who transfer information to teach others, once they passed a problem.</td>
<td>Authoring, analyze, dissemination, feedback, information search, learning, networking</td>
</tr>
<tr>
<td>Learner</td>
<td>People use information and practices to improve personal skills and competence.</td>
<td>Acquisition, analyze, expert search, information search, learning, service search</td>
</tr>
<tr>
<td>Linker</td>
<td>People who associate and mash up information from different sources to generate new information.</td>
<td>Analyze, dissemination, information search, information organization, networking</td>
</tr>
<tr>
<td>Networker</td>
<td>People who create personal or project related connections with people involved in the same kind of work, to share information and support each other.</td>
<td>Analyze, dissemination, expert search, monitoring, networking, service search</td>
</tr>
<tr>
<td>Organizer</td>
<td>People who are involved in personal or organizational planning of activities, e.g. to-do lists and scheduling.</td>
<td>Analyze, information organization, monitoring, networking</td>
</tr>
<tr>
<td>Retriever</td>
<td>People who search and collect information on a given topic.</td>
<td>Acquisition, analyze, expert search, information search, information organization, monitoring</td>
</tr>
<tr>
<td>Sharer</td>
<td>People who disseminate information in a community.</td>
<td>Authoring, co-authoring, dissemination, networking</td>
</tr>
<tr>
<td>Solver</td>
<td>People who find or provide a way to deal with a problem.</td>
<td>Acquisition, analyze, dissemination, information search, learning, service search</td>
</tr>
<tr>
<td>Tracker</td>
<td>People who monitor and react on</td>
<td>Analyze, information search,</td>
</tr>
</tbody>
</table>
personal and organizational actions that may become problems.

monitoring, networking


Drucker (1973)\textsuperscript{132} and (Mcgee and Prusak, 1993)\textsuperscript{133} suggested seven levels or scales of knowledge work of knowledge worker:

- Knowledge work (e.g. writing, analyzing, advising) is performed by subject-matter specialists in all areas of an organization.
- Knowledge functions (e.g. capturing, organizing, and providing access to knowledge) are performed to support knowledge processes projects.
- Knowledge processes (preserving, sharing, integration) are performed as part of a knowledge management programme. Knowledge processes have evolved in concert with general-purpose technologies, such as the printing press, mail delivery, the telegraph, telephone networks, and the Internet.
- Generation of knowledge (e.g., from science, synthesis, or learning) with its use (e.g. policy analysis, reporting, programme management) as well as facilitating organizational learning and adaptation in a knowledge organization.
- Transfer outputs (content, products, services, and solutions), in the form of knowledge services, to enable external use.
- Knowledge services support other organizational services, yield sector outcomes, and result in benefits for citizens in the context of knowledge markets.
- Formulate social media networks enable knowledge organizations to co-produce knowledge outputs by leveraging their internal capacity with massive social networks.
- Spend effort through technical activity, professional projects, and management programmes, to organize strategy and global-scale networking.

(2) Processes

Knowledge processes refer to the methods and systems for generating,
gathering, analyzing, organizing, disseminating and applying experiences, information and understanding for the benefit of an organization or society (Marchand, Davenport and Dickson, 2000).\(^{134}\)

Gold et al. (2001)\(^{135}\) empirically proved the effective knowledge management was the result of knowledge process and culture. In order to create, sharing, codifying, storage, retrieving, utilizing knowledge, knowledge process and culture in an organization, the effective and efficient process must be considered.

Two important processes can manage knowledge in organization: Knowledge Management System (KMS) and encouragement of organizational culture.

(2.1) Knowledge Management System (KMS)

Knowledge Management System (KMS) is one of the effective processes used in the knowledge management. A Knowledge Management System (KMS) is a computerized system designed to support the creation, storage, and dissemination of information. Such a system contains a central repository of information that is well structured and employs a variety of effective and easy to use search tools that users can use to find answers to questions quickly (Alavi & Leidner, 2001).\(^{136}\)

Gamble, P. R. and J. Blackwell (2001)\(^{137}\) described that Knowledge Management Systems refer to any kind of IT system that stores and retrieves knowledge, improves collaboration, locates knowledge sources, mines repositories for hidden knowledge, captures and uses knowledge, or in some other way enhances the knowledge management process.

Maier, R. (2007)\(^{138}\) stated that Knowledge Management System (KMS) refers to either a technology-based or non-technical interconnected group of functions that have behaviour that enables or facilitates either (or a combination of) the discovery, capture, integration, sharing or delivery of the knowledge required by an organization to meet its objectives. It can comprise a part of a knowledge management initiative or strategy to improve the utility of an organization’s intellectual capital.

One of the greatest challenges of running a contact center is making sure that customers are getting consistent, accurate, and timely information. KMS are
developed to help contact center operators meet this challenge. By having answers to frequently asked questions in a central repository, agents and/or customers can search and retrieve the correct answers quickly and consistently. The concept of "create once, use by many" employed in the knowledge management process greatly increases the operating efficiency of contact centers and reduces overall costs (Alavi & Leidner, 2001). Other tangible benefits include:

- Greater consistency and accuracy of information to customers
- Improved handling and response times
- Increased customer satisfaction
- Reduced contact volume (when implemented as a self-service tool)
- Reduced training time and costs for new agents
- More effective feedback from users on the quality and usefulness of the knowledge.

Most importantly, a KMS can provide comprehensive reporting to help contact center managers to continuously evaluate and manage the quality and effectiveness of the knowledge and productivity of their staff.

Knowledge Management System (KMS) can be implemented in the following manner:

- Deployed as a premised-based solution or as a hosted service provided by an application service provider.
- Deployed for a wide range of knowledge, ranging from simple to the very complex.
- Configured for use by contact center agents as an answer tool and/or as a self-service tool for use by end-customers on a website.
- Support multiple languages and be deployed to support all communications channels (calls, email, web-chat).
- Integrated with other contact center service components, such as Integrated Voice Response (IVR) and Customer Relationship Management (CRM) systems, and other databases to further enhance customer service and increase efficiency.
Steps of using Knowledge Management System (KMS) are as follow: (Alan Frost, 2010)\textsuperscript{140}

**Step 1: KMS organizational fit**
- Start with an internal analysis of the firm.
- Evaluate information/knowledge needs & flows, lines of communication, communities of practice, etc. These findings should form the basis of determining the systems needed to complement them.
- Make a thorough cost-benefit analysis, considering factors like size of firm, number of users, complexity of the system structure, frequency of use, upkeep & updating costs, security issues, training costs (including ensuring acceptance) etc. vs improvements in performance, lower response time, lower costs (relative to the previous systems) etc.
- Evaluate existing work practices and determine how the systems will improve - and not hinder - the status quo.
- One very interesting rule of thumb presented by Botha et al (2008)\textsuperscript{141}, is that "the more tacit the knowledge, the less high-tech the required solution".

**Step 2: KMS acceptance**: Acceptance depends on the following factors: (Liebowitz, 1999)\textsuperscript{142}.
- Involve the users in the design and implementation process when possible
- Involve the user in the evaluation of the system when applicable
- Make it as user friendly and as intuitive as possible
- Support multiple perspectives of the stored knowledge
- Provide adequate technical and managerial support
- Use product champions to promote the new systems throughout the organization.

**Step 3: KMS continued use**: This depends on: (Gamble & Blackwell 2001)\textsuperscript{143}
• Perceived attractiveness factors: This refers to the perceived advantages of knowledge management systems compared to traditional means, or even to other existing systems. The word perceived means that this includes not just the benefits of faster communication, better access to knowledge stores, etc, but also management’s ability to convey these advantages. Apart from implementing a relevant and useful system, this implies that:
  o The benefits are adequately communicated and taught to organizational members.
  o The system is updated and improved as necessary so as to maintain its usefulness.
• Content management issues: In order for the system to remain useful, its content must be kept relevant through updating, revising, filtering, organization, etc.

(2.2) Organizational culture
Organizational culture embodies the norms and beliefs that guide the behaviour of the organizations members and is an important enabler of knowledge management in an organization. Creating and supporting a culture helps to motivate employees to understand the benefits of knowledge management at all levels of the organization and encourages knowledge sharing (Becerra-Fernandez et al, 2004)\(^ {144}\). People and the way they are managed are at the centre of the knowledge-based working process (Ellis, 2005)\(^ {145}\). A culture of support plays a vital role in employee satisfaction and ongoing success of knowledge management strategy.

Desphande and Webster (1989)\(^ {146}\) define organizational culture as the set of shared values that help organizational members understand organizational functioning and thus guide their thinking and behavior. Barney (1986)\(^ {147}\) argued that culture is a complex system of norms and values that is shaped over time and affects the types and variance of organizational processes and behaviours. Organizational culture as a concept is considered to be a key element of managing organizational change and renewal (Pettigrew, 1990)\(^ {148}\). Thus, culture is a sort of glue that bonds the
social structure of an organization together. Hofstede, (1991) called culture the "software of the mind". In the competitive environment the organizations have to change its culture in order to survive otherwise, it may be even counterproductive (Jex, 2003).

Four types of culture are found in organizations i.e. power culture, role culture, support culture and achievement culture (McKenna, 2000). Many scholars and practitioners (e.g. Lopez et al., 2004; Kulkarni, Ravindran & Freeze, 2007), believe that an organizational culture that is supportive and or adaptive can enable the successful implementation of knowledge management practices.

Alavi, Kayworth & Leidner (2006) stated that organizational culture that leads to effective knowledge management should be focus on formalization, trust, learning and collaboration.

- **Formalization**: In work setup formalization refers to rules, procedure and written documentation such as policy manuals and job descriptions (Daft, 2001). Graham and Pizzo (1996) argued that effective knowledge management requires a balance between open and flexible organization system along with formality and discipline to ensure tangible output. The structured and standardized procedures are needed to capture, control and connect knowledge. Although, a general belief that formalization inhibits creativity and innovation and thus knowledge management. However, the empirical evidences do not support the concept, as more innovation and creativity have been found in more formalized setups (Lee & Choi, 2003, Zaman, 2006).

According to Keiser, Beck and Tainio (2001), the formal rules enable organizational learning and knowledge and increase the effectiveness of organizational communication. Rules and directives help sequencing problem solving and decision making, which in turn facilitate knowledge accumulation (Gold et al., 2001). Formalization is also manifested by uncertainty avoidance practices of establishment and enforcement of rules, procedures and regulations (House et al., 2004).

- **Trust**: Trust is the most important explicitly stated value essential for knowledge management. Lopez et al. (2004) stress that an atmosphere of trust and
security is essential to encourage innovation, experimentation and risk taking in order to
develop new knowledge and use existing knowledge. Trust has been defined as an
expectation that arises within a community of regular, honest and cooperative behavior,
based on commonly shared norms, on the part of other members of that community
(Fukuyama, 1996). Trust among people is associated with professional relationships
rather than individual relationships (Wang, Ashleigh & Meyer, 2006). Trust is
considered an important predictor of knowledge creation and interpersonal trust is
empirically found positively linked to knowledge acquisition (Politis, 2003).

- **Learning**: The cultivation of culture that supports and encourages
knowledge acquisition and learning to occur may be more important than any of the
technological advancements. Lee and Choi (2003) defined learning as the degree of
opportunity, variety, satisfaction and encouragement for development in organization.
Tracy et al. (1995) cited social support from supervisors and coworkers, continuous
innovation and competitiveness as key elements of learning.

Organizational learning is synonymous to capacity to innovate and
related to the ability to apply knowledge in organizations (Sinkula, 1994). A learning
process relating to use of conceptual knowledge enhances the employees “knowledge
applicative capability (Tsai & Lee, 2006). A learning culture opens up formal and
informal channels of communication (Bhatt, 2000).

Learning is found to be a predictor of knowledge creation (Lee and Choi,
learning culture to broadening of knowledge base. Strong learning culture of firms is
linked to creation, acquisition, and transfer of knowledge (Murray and Donegan,
2003).

- **Collaboration**: Collaboration is the degree of active support and help
in the organization. Collaboration is defined as human behavior sharing of meaning and
completion of activities with respect to a mutually-shared goal and taking place in a
particular social or work setting (Sonnenwald & Pierce, 2000).

Delong and Fahey (2000) cited interactivity, collaboration, sharing and
teaching, dealing with mistakes, orientation to existing knowledge as the cultural
characteristics, shaping social interaction in the context of knowledge management. Lopez et al., (2004)\textsuperscript{176} empirically identify collaborative culture as a means to leverage knowledge through organizational learning. A culture of collaboration helps in knowledge creation by increasing knowledge exchange.

Collaboration is also found positively linked with knowledge creation (Lee and Choi, 2003)\textsuperscript{177}. Based on the preceding literature review following hypothesis is developed:

H: Formalization, Trust, Learning and Collaboration would have a positive predicting impact on Knowledge Creation.

(3) Technologies

Technology can be defined both material and immaterial, created by the application of mental and physical effort in order to achieve some value. It is the making, usage, and knowledge of tools, machines, techniques, crafts, systems or methods of organization in order to solve a problem or perform a specific function. It can also refer to the collection of such tools, machinery, and procedures. The term can either be applied generally or to specific areas: examples include construction technology and information technology.

Knowledge management is not an application sold in a box or downloaded from the Web. It consists of all the strategies, processes and human interaction. Knowledge management does, however, require a technological spine supported by knowledge retrieval architecture. Knowledge retrieval returns information that is accurate and relevant to the query so it can be immediately applied to the problem.

Implementing knowledge technology and technique solutions can help organizations to initiate collaboration and innovation, facilitate knowledge sharing and increase the organization’s competitive advantage and time to market (Frappalo, 2000)\textsuperscript{178}. In addition to the power of knowledge technology, an organization must have an enterprise-wide infrastructure for sharing explicit and tacit knowledge. Workgroups must be able to rapidly distribute necessary information back and forth to each other over
client/server architecture. Finally, an organization must possess and be able to use its repositories of information containing the collective knowledge of the enterprise. There needs to be a technological solution where employees can access all forms of information. Having the ability to acquire new knowledge is crucial to an organization’s survival.

According to Frappaolo (2000), this is best represented by the ability to search networks outside (such as the Internet) and inside (such as Groupware and Intranet) quickly, safely and accurately, without adding significant time and labour to find the relevant information.

Ruggles, (1997) explained that technology to support knowledge management can be defined as the tools, which enhance and enable knowledge generation, knowledge codification or knowledge transfer. As with many tools, they are designed to ease the burden of work, allow resources to be applied efficiently to the tasks for which they are most suited and promote and enable the knowledge process in order to improve decision-making.

Information and communication technologies (ICT) are essentially enabling mechanisms for the transfer of information, and this permits many ways of acquiring and sharing knowledge. Information technology has had an immense impact on organizational development. For example, it is responsible for the automation of routine tasks and for the coordination of several activities through better communications. In many organizations, it is necessary to take into account their integrated computer systems - and related databases and applications - to analyze and understand there core business processes (Gery, 1995).

Technology enables collecting, defining, storing, indexing and linking data and digital objects in order to process them and to obtain information with sufficient flexibility to render it meaningful. However, the electronic distribution of explicit knowledge electronically plays a significant role in the context of organizational structure and
capabilities. The more the employees share their knowledge and professional experience, the more effectively knowledge can be communicated via electronically mediated channels. Carneiro (2001)\textsuperscript{182} argues that information technology (IT) makes possible concentration and diffusion of knowledge, and permits employees to obtain information more quickly and accurately.

Technology is a powerful enabler of knowledge management goals, but with the onus on humans to conduct knowledge activities. According to Tyndale (2001)\textsuperscript{183} organizations are not exploiting the full potential of the technology they already possess. He argues that organizations need to consider a number of critical design goals when selecting or developing technologies for knowledge management. This suggests that “old tools” as well as “new tools” can be applied in combination in a knowledge management environment.

The technology considerations of a knowledge management initiative include:

(3.1) Need for knowledge management technology

The volume of available data sources has increased exponentially over time, whilst knowledge workers’ capacity to internalize information has remained the same. This brings with it yet another business concept namely attention management, i.e. managing the relevance of information that a knowledge worker encounters. This information overflow emphasizes the need for technology to enable the user to interact with and quickly access only that information which is relevant to his/her specific requirements (Pieterse, 1998)\textsuperscript{184}.

(3.2) Knowledge management technology architecture

The following section identifies a knowledge management technology solution in terms of the conceptual architecture. Pieterse (1998)\textsuperscript{185} identifies the following layers:

- The underlying layer of the knowledge management system includes a knowledge repository as well as unstructured and structured data sources;
- The knowledge retrieval layer entails a search engine that categorizes and indexes all available sources of information;
The collaboration layer enables sharing and communication between employees in connection with the retrieved information;

- The following layer includes intelligent agents that distribute relevant sources to knowledge workers, according to their personal interest, in the right format;
- The administration layer provides the functionality to organize and maintain the usefulness and redundancy of the knowledge sources in the repository;
- The user interface layer provides universal access to any authorized user through his/her required interface or portal.

(3.3) Characteristics of knowledge management technology architecture

According to Morey (2001)\textsuperscript{186} the key characteristics of knowledge management technology architecture in the organization include that the system must:

- Provide complete access for all users.
- Provide for effective navigation and high-speed retrieval.
- Utilize the appropriate mainstream knowledge management technology.
- Be standardized across the organization.
- Provide an open, flexible, easy to use, transparent environment with optimal connectivity between users.
- Be effectively supported and its effective working must be a high priority in the organization.
- Have an organized database with accurate and secure information.
- Be scalable to incorporate a wide range of data types in different physical locations; and
- Contain sufficient “help” functionalities.

(3.4) Current and future technologies

No single technology architecture solution exists to support all the requirements of a knowledge management project. A wide range of technologies can be utilized to support knowledge management. The challenge is to combine a variety of available technologies and products to fit a unique environment. A list of enabling technologies, technologies currently available in the market and technologies to
consider in the future is discussed below.

- **Enabling technologies**
  - Socializing process: Discussion databases, groupware, interactive intranet/web pages, collaboration software, videoconferencing.
  - Externalization process: Knowledge repository, workflow, e-mail, artificial intelligence.
  - Internalisation process: Help line, retrieval ware, distribution ware such as intelligent agents (push technology).
  - Combination process: Document management systems, imaging.

- **Technologies available in marketplace**: The mature technology alternatives that are currently available in the marketplace include:
  - E-mail to facilitate different-time, different-place communications between employees which is an important factor for knowledge exchange.
  - Groupware to support different forms of collaboration between several individuals on the development of new ideas.
  - Internet and intranet to provide powerful information exchange platforms and a repository in support of knowledge management practices.
  - Videoconferencing to allow individuals, although geographically separated to interact through verbal communication.
  - “Yellow pages” to allow individuals and groups to advertise their expertise in support of the development of networks of expertise.
  - Corporate knowledge map to facilitate navigation when searching for special expertise by providing an easy-to-grasp overviews or more detailed of “who knows what” and where it can be found.
  - Corporate memory database to provide a structured repository
retrieval environment for important enterprise knowledge and information.

- Distance learning systems provide opportunities for employees no matter where they are located, to develop their own understanding and knowledge.
- Knowledge-based systems/ artificial intelligence/ expert systems to automate and deploy structured and less complex knowledge so that it is available to practitioners “at their fingertips”
- Knowledge mining to identify complex and valuable information and important trends hidden in databases.
- Intelligent agents to access multiple, large databases automatically to search for, acquire, organize and summaries information on specified topics.
- Search and retrieval engines used for indexing, searching, recalling data with natural language, semantic search and pattern recognition.

 Technologies to consider in future: Other technologies that are becoming available in the market place but that have not yet reached full maturity include:

- Collaborative filtering - the ability of people to hear personal recommendations from parties with the same interest.
- Passive group memory - automatic capturing and indexing of information in meetings and discussions.
- Profile and personalize - customize search and dissemination of information to the personal needs of the employee.

It can be said that technology is a vital and necessary contributor to the effectiveness of the organization. The most effective technologies within a knowledge management framework should be broadly accessible to target user groups and promote the tracking and exchange of useful information across departments, or even
across institutions (Petrides & Nodine, 2003). Technological tools for knowledge management have been developed to provide for the capture and transfer of knowledge. With the advent of the internet, e-learning, web conferencing, collaborative software, content management systems, e-mail lists, wikis, blogs, and other technologies have become the enablers or facilitators of knowledge management practices in organization.

2.3.8 Knowledge management in education

The use of knowledge management in education is an approach that can inform a wide range of practices within an educational organization. For educational institutions, however, the full promise of knowledge management lies in its opportunities for improving students’ learning outcomes. One of the goals of knowledge management in education is to advance and improve student learning by creating quality knowledge. This goal will become increasingly important as schools come under pressure for increased accountability from external and internal sources (Petrides & Nodine, 2003). The ultimate benefit of this, of course, is to students, educators, and the education community as a whole.

Educational institutions are under tremendous pressure for increased accountability from external and internal sources. External pressures raised by stakeholders like teaching staffs, government agencies, and parents for measurable improvements in educational institutions are mounting and demand for information about student learning outcomes is escalating. Internally, educational institutions are asking themselves difficult questions about accountability. In this climate of external and internal demands for accountability and improvements of student learning outcomes, schools, as organizations committed to educational missions, must ensure students are learning by acquiring knowledge in the most efficient and effective way. Schools must also have the ability to demonstrate enhancement of student learning and development. Thus, schools may find it beneficial to adopt knowledge management programmes to improve the schools’ performances and outcomes.
Consider an individual teacher who possesses knowledge on how to improve student learning outcomes. If the institution relies on only this expert individual to conduct ongoing exercises in improving student learning outcomes, it can hamper the flexibility and responsiveness of the organization. The challenge is to convert the knowledge that currently resides in this individual and make it widely and easily available to any educator. Thus, knowledge management can lead to improving in sharing knowledge - both explicit and tacit - and subsequently benefit the organization as a whole. Knowledge management in education can be thought of as a framework or an approach that enables people within an organization to develop a set of practices systematically to collect information and share what they know (e.g. skills, experiences, beliefs, values, ideas, etc.), leading to action that improves services and outcomes (Petrides & Nodine, 2003).

Knowledge management can be built and integrated into the structures and processes of educational institutions to improve their performances. Knowledge management can benefit educational institutions in at least five areas: research, curriculum development, student and alumni services, administration, strategic planning, and traditional classroom enhancement (DeDiana & Aroyo, 1998, Kidwell et al., 2000).

Kidwell et al. argued that knowledge management has several application areas in the curriculum development process. They are curriculum design and revision efforts, knowledge of teaching and learning (with technology), pedagogy and assessment techniques, student evaluations, etc. Some of the benefits identified are to enhance the quality of curriculum, improve responsiveness to student evaluations, leverage the best practices, improve teaching and learning, and monitor outcomes. Furthermore, Petrides & Nodine (2003) stated several implementation areas where knowledge management practices are useful in schools. One of the areas is enabling educators to create and represent quality knowledge for students to advance and improve their learning.

Learning is a process by which students take in information and translate it into knowledge or skills. It has been defined as the process of acquiring knowledge, attitudes, or skills from study, instruction, or experience (Miller & Findlay, 1996).
Learning outcomes are statements of what is expected that a student will be able to DO as a result of a learning activity. According to Barr et al. (2001), learning outcomes are statements of the knowledge, skills, and abilities the individual student possesses and can demonstrate upon completion of a learning experience or sequence of learning experiences (e.g., course, program, and degree). The learning activity follows the educator’s materials on the e-learning environment or students listening to a lecture based on them, but it could also be a laboratory class, even an entire study programme. Learning outcomes help instructors to be more precise in telling students what is expected of them. A learning audit is necessary to measure the cognitive and behavioural changes as well as tangible improvements that results from the learning process of students (Garvin, 1993). The primary emphasis on knowledge for pedagogical purposes may be for increasing students’ learning, which requires a feedback loop in which institutional performance is evaluated, corrective measures are taken, and improvements are made in the knowledge base and practices.

One of the tasks in this complex process of teaching and learning is to code knowledge and to disseminate this knowledge to students in classrooms. The students can learn by acquiring the requisite knowledge using knowledge management system where knowledge or information concerning student learning and outcomes can be collected and shared amongst the teaching staff. The knowledge gained by the teaching staff allows them to make appropriate decisions to ensure that their courses, topics, instructional materials, presentations, assignments, assessments, etc. are updated to improve the student learning outcomes.

2.3.9 Advantages and Barriers of knowledge management

Advantages: Knowledge management is "a tool by which knowledge communities are built, maintained, and operated, and the payoff is profit in the knowledge business" (Botkin, 1999). Knowledge management process helps organizations to find, select, organize, disseminate, and transfer important information and expertise necessary for activities such as problem solving, dynamic learning, strategic planning, and decision-making. The closer knowledge management links to knowledge communities, the more benefits can be realized.

It can be summarized that knowledge management can enable organizations to
improve efficiency, operate more intelligently on the markets, enhance the continuity and profitability of the organization, improve individual and group competencies, make professionals learn more efficiently, provide a foundation for making better decisions, improve communication between knowledge-workers and make the company focus on critical organizational knowledge.

The challenges of knowledge management lie in making information productive, in handling the uncertainty of knowledge in a globalize world and in coming to terms with the growing importance of consumers and their individual needs. In the knowledge-based-economy, organizations increasingly have to deal with such matters as: an increasing complexity of products and processes; a growing reservoir of relevant knowledge; increasing competition in an economy with shorter product life cycles, in which learning processes have to be quicker; and the fact that companies will increasingly have the work done by a flexible workforce e.g. outsourcing, which makes holding on to knowledge and transferring knowledge all the more difficult (Beijerse, 1997).

According to Beijerse (1997), knowledge management can enable organizations to face the complexities accompanying the emergence of the knowledge-based economy. By managing the knowledge environment organizations can improve efficiency; operate more intelligently on the markets; enhance the continuity of the organization; enhance the profitability of the organization; improve the relevant individual and group competencies; make professionals learn more efficiently and effectively; provide a better foundation for making decisions e.g. new knowledge and technology; improve communication between knowledge workers; and make the company focus on the core business and on critical company knowledge.

**Barriers** : According to Bonfield (1999) four areas can be identified as potential organizational barriers when implementing a knowledge management initiative, namely, cultural, technological, economic, and marketplace barriers.

- **Cultural barriers**: Bonfield (1999) argues that three-quarters of knowledge management initiatives fail because of cultural issues. People tend to focus on their own targets and see their department as separate from - and in competition with
- others. In such a culture, it is a sign of weakness to ask another department for advice. Cultural concerns are addressed by demonstrating that while knowledge sharing sometimes takes quite a lot of time, lack of collaboration takes even more time.

- Technological barriers: People need access to and have to be able to use and feel comfortable with technologies for knowledge sharing. Demonstrating that each single unit has a great deal more to gain by accessing all other units’ information can alleviate technological concerns.

- Economic barriers: People reason that if knowledge provides the organization’s source of competitive advantage, then it also provides the individual’s competitive advantage in the organization. The latter is true if people are willing to share the knowledge that earns them the position they hold, and their hope of financial reward. Bonfield (1999) stated that economic barriers can largely be addressed by linking a reward system to collaboration. Leaders or managers can be rewarded as a team, with bonuses dependent on the achievement of group as well as individuals goals.

- Marketplace barriers: Knowledge sharing has to be relevant to the work. The team must understand the source of competitive advantage and the critical knowledge needed to deliver that advantage. Marketplace barriers are addressed by giving every employee a mission to transform the perception that “information is power” into one that “information-sharing is power”.

2.4 REVIEW OF THE PAST STUDIES

2.4.1 Introduction

The review of literature is an important part in the research study, as it links between the research proposed and the past studies. It tells the reader about aspects that have been already established or concluded by other authors, and also gives a chance for the reader to appreciate the evidence that has already been collected by previous research, and thus projects the current research work in the proper perspective.

2.4.2 Importance of review of the past studies
Review of the past studies is an important aspect of any research both for planning the work as well as to show its relevance and significance. It provides the background and justification for the research undertaken. According to Bourner, T. (1996)\textsuperscript{202} there is good reasons for spending time and effort on a review of the literature before embarking on a research project. These reasons include:

(1) To identify gaps in the literature, information and ideas that may be relevant to research project, methods that could be relevant to research project, and seminal works in researcher’s area.

(2) To avoid reinventing the wheel (at the very least this will save time and it can stop from making the same mistakes as others)

(3) To carry on from where others have already reached (reviewing the field allows the researcher to build on the platform of existing knowledge and ideas)

(4) To increase the breadth of knowledge of researcher’s subject area

(5) To provide the intellectual context for researcher’s work, enabling researcher to position the project relative to other work

(6) To put the work into perspective

(7) To demonstrate that the researcher can access previous work in an area

As far as the literature review process goes, ultimately the goal for the researcher is to complete their review in the allocated time and to ensure they can maintain currency in their field of study for the duration of their research.

Leedy & Ormrod. (2005)\textsuperscript{203} mentioned two critical considerations stem about the review of past studies:

(1) Research must enhance the current understanding of a phenomenon, or contribute to enhance the body of knowledge.

(2) Research must communicate what was discovered in the new study. Knowing the current status of the body of knowledge in the given research field is an essential first step for any research project.

An effective literature review accomplishes this step by:
(1) Helping the researcher to understand the existing body of knowledge including where excess research exists and where new research is needed.

(2) Providing a solid theoretical foundation for the proposed study

(3) Substantiating the presence of the research problem

(4) Justifying the proposed study as one that contributes something new to the body of knowledge.

(5) Framing the valid research methodologies, approach, goals, and research questions for the proposed study.

Kumar, V. (2009) states that a large part of review of literature actually needs to be done even before the research project is formalized. This is essential to make sure that the researches are not repeating the work that someone has already done earlier. Sometimes, if the research has already been undertaken earlier, then it provides an option of modifying the work by adding a new perspective or altering some of the methods of research to obtain a perspective that will be different from earlier works and thus more valuable.

A good researcher usually goes through a lot more literature than is actually incorporated in the paper. This is because different literature may have differing relevance for the current project and all of it may not worth reporting in the end, but in the initial phase, when the researcher is looking for all aspects of an issue that could be relevant one would like to extensively explore the literature and see if any relevant findings are already available. Some of the literature reviewed is directly relevant and hence used as a preface to explain the background of work. Then other reports may be relevant from the point of view of the project as they provide some clues to the puzzle by suggesting a hypothesis, which may be the subject matter of your research project.

It can be summarized that review of literature is very important part of one's research. It is necessary to show the available evidence to solve the problem adequately and thus the risk of duplication can also be avoided. It provides ideas, theories, explanations or hypotheses valuable in formulating the problem. It also suggests methods of research appropriate to the problem, to locate comparative data
useful in the interpretation of results and to contribute to the general scholarship of the researcher. Review of literature is also important to highlight difference in opinions, contradictory findings or evidence, and the different explanations given for their conclusions and differences by different authors.

2.4.3 Abstracts of the past studies related to knowledge management practices

This chapter presents twelve past researches related to knowledge management practices which were already done in Thailand and in different countries as follow:


Objective of the study : The objectives of this study were as follow:

(1) To find out the knowledge management practices in academic libraries with regards to the partnership with others

(2) To find out the knowledge management practices in academic libraries with regards to the policies and strategies, knowledge capturing and acquisition, and knowledge sharing

(3) To find out the knowledge management practices in academic libraries with regards to the leadership in leading knowledge management activities

(4) To find out the knowledge management practices in academic libraries with regards to the possible reasons to apply knowledge management practices

(5) To find out the knowledge management practices in academic libraries with regards to the skills needed for knowledge management

(6) To find out the knowledge management practices in academic libraries with regards to the motivation to implement knowledge management practices

Tool used in the study : The instrument used in the study were the questionnaire, interviews and observations about Knowledge Management Practices in Academic Libraries.

Sample of the study : 23 personnel in the University of Natal Pietermaritzburg Libraries (10 academic librarians and 13 deputy University librarian)
were selected to be the sample of the study. Initial contact was made with each of the potential interviewees and each interview lasted for about 25-30 minutes.

**Technique of analysis of data**: Data for the current study were analyzed using descriptive statistics (i.e. mean and standard deviation) while the interview data were analyzed qualitatively.

**Major findings**: It was found from the study that:

(1) **Partnerships with other libraries**: The study was interested to find out if the library does collaborate with other libraries. Overall, 73.90% respondents said the library had used partnerships with other libraries to acquire knowledge. Leveraging and sharing knowledge is a key component of partnerships or collaborations.

(2) **Knowledge sharing**: The study also wanted to find out if staff was systematically sharing their know-how, expertise and experiences through various mechanisms. Respondents indicated that they shared knowledge informally within the library (87.00%), preparing written documentation such as newsletters (82.60%), and in collaborative work by teams (52.20%). The study also wanted to find out the level of knowledge sharing in the library. It was also found that overall, 47.80% of the participants said that knowledge sharing in the library was on average, 21.70% mentioned that it was good, 17.40% said it was poor and 13.00% indicated that it was unsatisfactory. It can be argued that though the library does share knowledge to some extent, however, there is little systematic sharing of knowledge taking place among the academic library staff. More emphasis should be placed on formalizing knowledge sharing activities.

(3) **Policies and strategies**: Respondents (60.90%) indicated that the library had no written knowledge management policy and strategy and 39.10% respondents said they were not aware of any knowledge management policies or strategies in place. The results indicate that knowledge management is not seen as an integral part of the library’s mission and objectives. In addition, the results indicate that there is a lack of awareness of knowledge management in the library. In most cases academic libraries do not systematically or formally harness and manage their knowledge management activities.
(4) Leadership: With regard to who takes part in leading knowledge management activities, the results indicate neither the University Librarian (78.30%) nor the library staff (56.50%) is involved in knowledge management activities. With the follow-up interviews conducted, the library staff indicated that if the library has to implement knowledge management, they need the support of management and that the University Librarian should play a leadership role in knowledge management activities.

(5) Knowledge capturing and acquisition: The study was interested to find out if the library had captured and acquired the knowledge of its internal staff. Overall, 87.00% of respondents indicated that there was no capturing and acquisition of knowledge of internal staff. The results show that the library has not recognized the capacity of its staff. Capturing and acquiring knowledge is crucial to the success and development of a knowledge-based organization. With the follow up interviews conducted, participants indicated that there was a high staff turnover. The participants mentioned that the know-how and expertise of the retired and resigned staff has not been captured elsewhere.

(6) Possible reasons to apply knowledge management practices: This question was find out the possible reasons to apply knowledge management practices in the library. Respondents (69.6%) found that promoting the sharing or transferring of knowledge with users such as lecturers and students was critical. It is because the role of academic libraries is to provide and disseminate information to its users. In addition, respondents (56.50%) indicated that it is important to identify and protect strategic knowledge present in the library.

(7) Skills needed for knowledge management: The study was to find out the skills that academic librarians need in order to better serve the needs of the users. The results show that academic librarians are in need of skills and competencies that could help them engage in knowledge management activities. It is indicated in the literature that the success of academic libraries depends on the capabilities and skills of its staff to better serve the needs of the university community more efficiently and effectively. Academic librarians need to constantly update their skills and competencies.
Motivation to implement knowledge management practices: The study wanted to find out what could motivate the library to implement knowledge management practices. Participants indicated the following:

- The difficulty in capturing staff’s undocumented knowledge;
- Loss of key personnel and their knowledge;
- To contribute to knowledge creation of knowledge to the parent university;
- To increase knowledge sharing and
- To increase staff productivity.

It was found that there were various reasons into which organizations embark on knowledge management activities. In the case of the University of Natal, Pietermaritzburg Libraries the problem lies with lack of capturing the knowledge of staff. Knowledge capturing is an important process that enables individual knowledge to be reusable in the whole organization. The library should establish ways in which knowledge could be captured.

In conclusion, it was clearly seen that the environment in which academic libraries operate is changing. It is both faced with challenges and opportunities. Academic libraries need to respond to these challenges in order to better serve the needs of the entire academic community. One way of doing that is engaging in knowledge management activities, that is, creating, capturing, sharing and utilizing knowledge to achieve the library goals. Knowledge management is a viable means in which academic libraries could improve their services and become more responsive to the needs of users in the university. People gain knowledge from their experiences and their peers’ expertise. Academic libraries need to recognize the knowledge its staff and create an environment in which their knowledge can be valued and shared.

STUDY 2: A Study of Knowledge Management in Architectural Practice: A Socio-Technical Perspective (Isobel Chong, 2006)

Objective of the study: The objective of the study is to explore and understand how knowledge is managed in the firm. Specifically, (1) to understand the implication of KM in project-based environment; (2) to understand KM in multi-profession
environment; (3) to explore the challenges of KM of the firm; and (4) to explore social relationships in the management of knowledge.

**Tool used in the study:** This research was the qualitative research approach. The research design is an interpretive single-case study. The qualitative interviews used for data collection method was semi-structured. This was focused conversations with persons who are involved in the situation.

Seven interviews were conducted at Charities Aid Foundation’s London office. Informants from different positions were interviewed: two directors of the firm, a project director and a project co-coordinator and three architects. One of the directors is the director of strategic marketing, formerly the chairman of the practice. The other director is the chairman of the Professional Focus Knowledge Management Group set up for the KM initiatives of confirmatory factor analysis (CFA). CAF is a multi-profession (architecture, engineering, design) firm; however, the research is conducted with the focus on the architecture profession alone. Each interview lasted approximately one and a half hours. Following the principles of qualitative interviews, interview questions were prepared and used as a guide. Informants were asked around similar topics, however, the interviews were conducted with the awareness that different positions could provide in-depth insights on different issues. Care was taken not to control or direct the interviews too much. The interviews were tape-recorded to allow full concentration on interviews itself. Simple notes were also taken during interviews.

After interpreting the interview data, further open-ended questions were asked via email on specific issues to gain deeper understanding, as well as verifying certain information. Some information was obtained through their Internet site as well as published corporate literature.

**Sample of the study:** There were seven persons used to be the sample of the study (two directors of the firm, a project director and a project co-coordinator and three architects).

**Technique of analysis of data:** A qualitative approach was used to analyze the data. A socio-technical model of KM (Pan and Scarbrough, 1998) was adopted for analyzing the interview data.
Major findings: This study has set out to explore knowledge management in architectural practice by drawing upon a case study of a multi-national and multi-profession architecture firm in its London office settings. The firm is in an early stage of a process to improve its KM practice, thus offered some interesting findings on knowledge management in project-based environment. Research findings were analyzed using the socio-technical model of Pan and Scarbrough (1998)\textsuperscript{208}. The firm has applied workplace design to their new office with the aim to encourage knowledge sharing and communications, which was considered by the firm as successful. This finding implies that social environment can be cultivated to improve social relationships and knowledge sharing among people; and the use of technology should not replace social activity.

The research findings suggest that the firm has three main types of knowledge that need to be managed in order to improve continuously: first type is specialist sector knowledge; second type is profession (technical) knowledge; and third type is confirmatory factor analysis (CFA) specific process knowledge. Technology is used mainly to manage explicit knowledge such as the third type. Because of the tacit nature, the firm has great difficulties managing the first and second types of knowledge, which are held within employees who work on many different projects. This reliance on employees as repositories for the firm’s cumulative sector and profession knowledge has proved to be problematic to the firm. The findings suggest the firm has two inter-related problems. Firstly, the firm suffers great loss of knowledge; valuable project knowledge, experience and lessons learned just “disappear” as soon as project teams disband. Secondly, they have problems knowing who knows what within the firm, because they don’t have adequate means to find out who has what experience or knowledge, consequently they have difficulties accessing their own knowledge which leads to reinventing the wheels.

This study also pointed out a misconception; the firm attributed the loss of knowledge to “not record adequately” which assumes that the problem could be resolved by codifying tacit knowledge within individuals. The study suggests that technology may be used to manage tacit knowledge but the focus should shift from codification to utilizing technology as a facilitator that helps in initiating and sustaining social interaction (Stenmark, 2000-2001)\textsuperscript{209}. The current system and the new KMS the
firm envisages do not address the two fundamental problems. The study suggests that they require a system that could facilitate a social network as an effective means to connect people for knowledge sharing. The system should be self-maintaining and keeps dynamic records of employees’ experience, expertise and interest. It needs to be integrated into the work process, requires minimum supervision and manual updates in order to be effective. The study suggests that Stenmark’s prototype recommender system (Stenmark, 1999 and Stenmark, 2000-2001) has implications for CAF and other AEC firms. By dynamically maintaining and matching users’ profile, the system enables users to locate colleagues, and provides intelligent recommendations. The aim of the system is to utilize IT to exploit tacit knowledge without making it explicit.

The study also highlighted that resolving the problem of high staff-turnover has great significance to knowledge management practice since the employees are the repositories of the firm’s most vital knowledge (Leonard and Sensiper, 1998; Nonaka and Takeuchi, 1995). By employing technology designed to facilitate the social networks and greater staff retention, the problem of managing tacit knowledge could be addressed.


Objective of the study : The objective of this study is to examine structural relationships among the capabilities, processes, and performance of knowledge management, and suggest strategic directions for the successful implementation of knowledge management.

Tool used in the study : The questionnaires was used to the tool of this study. It consisted of 35 items about capabilities, processes, and performance of knowledge management. Items about knowledge management capabilities consisted of organization members’ T-shaped skills (five items), centralization of organizational structure (five items), learning organization (five items), and IT support (five items).

Knowledge management processes consisted of generating knowledge, accessing knowledge, facilitating knowledge, representing knowledge, embedding knowledge, using knowledge, transferring knowledge, and measuring knowledge assets (eight items).
Sample of the study: Samples were restricted to the companies that adopted knowledge management or held similar process innovation campaigns. In this study, the researcher conducted a questionnaire-based survey. Questionnaires were sent to the task force team in charge of knowledge management (or process innovation campaigns) of 74 companies in Korea that had been introduced to knowledge management practices. In addition, the researcher sent multiple questionnaires to each company to promote response. After conducting an extensive survey to 74 companies, 215 questionnaires returned from 68 companies. All were used in our statistical analysis.

Technique of analysis of data: In order to fulfill the objectives of this research, the researcher conducted an extensive survey on knowledge management adopting Korean firms in diverse industries and verify the causal relationships between core constructs of value chain through confirmatory factor analysis (CFA) and structural equation analysis (SEA).

Major findings: It was found from the study that there exists statistically significant relationships among knowledge management capabilities, processes, and performance. The empirical results of this study also support the well-known strategic hypothesis of the balanced scorecard (BSC).

It was also found that knowledge management strategies can be described along two dimensions to reflect knowledge derive an organization’s competitiveness. Through the analysis of theory and empirical testing, this study strongly supports the notion that companies may possess a predisposition for successful knowledge management through the improvement of key capabilities and processes. The results imply that organizational structure (decentralization), learning organizational culture, and IT support from a definitional basis for the theoretical framework positively impacts key aspects of knowledge processes (or knowledge management activities). The results also imply that process activation of generating, accessing, facilitating, representing, embedding, usage, transferring knowledge, and measuring knowledge assets form an operational perspective for the framework of knowledge combination and exchange that underlies the theory of knowledge integration is positively related to organizational performance (customer and financial perspectives). Together, these results suggest that theories of knowledge capabilities provide a rich resource for developing empirically
based studies and that capabilities can provide a useful benchmark for managing knowledge management within the company.

Although the study presents strong evidence regarding the relationships among capabilities, processes, and performance of knowledge management, the results should be considered in light of its inherent limitations. First, this study presents a cross-sectional research that does not consider time-lag effects. A longitudinal study to investigate the dynamic features of knowledge management would provide further robust results. Second, it focuses on relatively large and profitable firms. The results may differ in small or venture firms. Finally, the results are limited to Korean firms. The generalization from a Korean setting to other countries may be questionable.

STUDY 4 : Knowledge Management Practices: Role of Organizational Culture (Saeed Tahir, Tayyab Basit, Ahmad Mushtaq, and Chanudhry Anwar, 2010)\textsuperscript{215}

Objectives of the study: The objective of this study was to investigate the predicting role of culture attributes (Collaboration, Formalization, Trust and Learning) with reference to knowledge management practices (Knowledge Creation).

Tool used in the study: The Organizational Culture Scale (OCS) and Knowledge Management Practices Scale (KMPS) were used to be the sample of the study.

Organizational culture scale (OCS) by Tayyab (2008)\textsuperscript{216} measured the four attributes of organizational culture. The OCS in current study consists of 13-items; 4 for Collaboration, 3 each for Learning, Trust and Formalization. The scale was rated on 7-point Likert-type scale, with 7 indicating “Strongly Agree” to 1 indicating “Strongly Disagree”. The test for alpha reliability was 0.86 for the current instrument. The Knowledge Management Process Scale was adapted to measure knowledge management process by Lee et al. (2005)\textsuperscript{217}. This version consisted of 29-items questionnaire that measure the five dimensions of Knowledge Management Processes, however in the present study 5 items measuring the Knowledge Creation was used. The items were rated on a 7 point Likert’s type scale, ranging from (1) Strongly Disagree to (7) Strongly Agree. The internal consistency reliability estimates for the knowledge creation dimension of KMPS was 0.78.
Sample of the study: Based on purposive sampling design, 1500 managers from 50 organizations in 7 different sectors including Banking, Software, Telecom, Post, Transport, Petroleum and Food was contacted. However, 813 of these participants provided complete data and were included for the study with the response rate of 54.2%. Thus, the final sample included 17% participants from senior management level, whereas 44% and 27% from middle and lower levels respectively.

Technique of analysis of data: Multiple regression and ANOVA were used for analysis of data. Regarding to procedure, participants were approached individually during office hours in their respective organizations with the help of concerned administration. In case of field locations, e-mails and post mail were also used to approach participants through their organizations. Participants were briefed about the purpose of study and confidentiality was assured to the participants, sufficient time given to complete the questionnaires and collections were made when intimated.

Major findings: It was found from the study that in order to verify the direct/predicting effect of organizational culture attributes (Trust, Collaboration, Learning and Formalization) on knowledge creation process, multiple regression was computed. The regression results partially support the hypothesis, as significant contribution to the knowledge creation is made by trust, collaboration and formalization, while, learning has not shown significant impact. Furthermore, ANOVA showed significant difference with reference to levels of managerial positions and knowledge management process. Study limitation, future research and implications are discussed.

STUDY 5: Factors Influencing Knowledge Management Practices Among Multimedia Super Corridor (MSC) Organization (Yap, L.S.; Rosmaini Tasmin; Muhamad Saufi Che Result, and Norazin Hashim: 2010)

Objective of the study: The objective of this research was to gauge the level of knowledge management practices in MSC status organizations. It was also to identify the relationship between demographic elements and knowledge management factors that can influence the implementation of knowledge management practices in those organizations.
Tool used in the study: The instrument used in this research was the Likert scale which distributed randomly to the employees of MSC status companies in Kuantan. The scale was be divided into two parts. The first part of the scale was the personal information of the respondents. The second part of the scale was the scale which measures the knowledge management practices in MSC status organization.

Sample of the study: This research will be conducted in Pahang, more specifically in the area of Kuantan. Research was conducted in MSC status organizations in Kuantan. The population of this study was the employees in Multimedia Super Corridor (MSC) Status organizations. The sample of this study was the employees in the Multimedia Super Corridor (MSC) Status Companies in Kuantan. While the target respondents in this research were knowledge-based workers and academic staffs. In this research, the total number population was 340 people and the size sample was 180 people.

The sample of this research was carried out on organizations which were registered under the category of MSC-status organizations. The sampling method in this research is non-probability sampling. The purposive sampling technique was chosen for the study. Purposive sampling is a sampling which is a group of respondents will be choose have same characteristic and enable answer research question and meet the objective.

Technique of analysis of data: Statistics used for data analysis were the descriptive analysis and one way ANOVA. 180 sets of the scales have been distributed to employees and knowledge-based worker in Cosmopoint College, OPEN University, UMP, and IKIP College. The total set of questionnaires that have been collected is 121 sets which is equivalent to 67.2%, while, 59 sets of the scale cannot be collected. The subsequent section reports the basic findings of the research in terms of demographics of respondents. It consists of respondents’ age, gender, designation, number of years working in current firms, overall working experience, and familiarity with knowledge management.

Major findings: It was found from the study that knowledge management practices in MSC status organizations are at medium level. There are significant
differences in knowledge management practices with respect to age of respondents and job designation.

It can be concluded that sufficient attention should be given to culture, information technology, organization structure and people to achieve success in knowledge management practices. The current knowledge management level among MSC status organization in Kuantan was in the medium range and the most important factor ranked was information technology. It was shown that there was the relationship between some demography factors and knowledge management factors which was represented by the relationship between job designation with culture and information technology and the relationship between age and organization structure. To have successful knowledge management in an organization, one must see it as a total. Although information technology plays an important role in knowledge sharing in an organization, without proper attention paid to culture, organization structure and people, knowledge sharing in an organization cannot be successfully implemented. Thus, information technology, culture, organization structure and people should always be taken into considerations.

STUDY 6: Knowledge Management in Projects – A Study of Small Consulting Firms (Custav Pilsmo, 2010)\textsuperscript{219}

**Objectives of the study:** The objectives of this study were to describe and compare how small knowledge intensive consulting-firms work with knowledge management related processes. The study was to find out the knowledge acquired in projects being captured, spread and reused within the consulting firm.

**Tool used in the study:** In order to answer the research question, tool for gathering primary data were prepared. The primary data, which is the data that is collected by the researcher in order to meet a specific objective of the study was gathered by performing interviews as well as a literature study was made.

In order to get a good picture of the situation at the different firms, both a manager and consultant was chosen at the different firms. At the interviews, there was a discussion about how they are working with knowledge management both on a visionary as well as practical way. Using interviews and dialogues it was possible to get the perspective from the management about what the organizations think about knowledge
management, how their visions are developed and how they transform it into practice. In the interviews with the employees information about their perspective of how the vision and the strategies are transformed into practice was studied. Also, information about if the employees perceive the culture and routines to be promoting or obstructing knowledge management procedures was given.

The interviews for this thesis can best be described as semi-structured consisting of different categories (themes) with appropriate questions. When following a semi-structure for the interviews, the respondents can form their answers in their own words. This differs from a structured interview that has a standard format and fixed response categories. The interviewer does not need to follow the order of the questions nor does he have to ask all of them. The biggest benefit from using a semi-structure is the freedom for the interviewer; if a question rises during the interview he is free to ask this newly founded question. An interview-guide with an explanation of the purpose of the study was sent to the respondents before the performed interview, in order for the respondents to prepare. All interviews were performed in person at the different firms. The interviews lasted between 35-60 minutes and were all recorded.

Sample of the study: As this thesis was the qualitative research, the literature-study and search for relevant data was made. It mainly involved books from the local university-library and articles from databases such as Business Source Elite and Academic Search Elite. The main part of literature was found mainly searching on the keywords: knowledge management, knowledge sharing, knowledge, organizational learning and intellectual capital. By reading other essays and thesis's within the, sources were found by looking at others references.

During the process of selecting which organizations that was going to be involved in the study a mail was sent to approximately fifth-teen companies located on the east-coast of southern Sweden due to practical reasons. Three of these organizations responded and wanted to be a part of this study. The first contact was established with the CEO’s or the head of the offices at the respective firm. To chose the respondents, the CEO or head of office was consulted in order to contact consultant that later was interviewed.
Technique of analysis of data: In the analysis the empirical findings are connected to appropriate theories in order to gain an understanding and finding patterns from the respondents’ answers. This study was done by making a primary analysis of the results in order to gain an understanding of the case studies, one-by-one and to be able to see all the results as a unit before continuing. In this thesis it is done by summarizing the interviews as stories divided into appropriate categories (or themes in order to follow the structure of the interview-guides). The next step in the analysis was to search for patterns amongst all the case-studies done in the survey. One of the methods to do this was to list the similarities and the differences in order to increase the chances of finding details and maybe even making up new categories if necessary. The analysis-chapter of this study continues to follow the methods stated by Eisenhardt (1989) and the similarities and differences listed are following the same structure as the interviews.

After the secondary comparative analysis is done hypotheses and conclusions are formed, based on the patterns and processes discovered and compared to the existing literature read within the subject.

Major findings: It was found from the study that the studied companies are capturing the knowledge from projects by saving all the outcomes and deliveries from every project and stored either in an archive or as know-how in the mind of the participants. In some of the companies surveys’ are made in order to receive feedback from larger projects, even though the results might not be further reflected upon. Acquired knowledge is spread within the organization mainly by informal meetings, working tightly together, observing and imitating and mentorship (which can all be categorized as socialization). Knowledge was also spread through internalization (learning-by-doing) when working in teams. The reuse of old knowledge from previous projects or know-how was done to a limited amount by either studying the outcome from projects or by asking people that have earlier been involved in similar projects.

It can be concluded that by answering the following question the purpose of the thesis attained: “How is the knowledge acquired in projects being captured, spread and reused within the consulting firm?”
The study has shown that there was a lack of fixed routines for capturing; spreading and reusing acquired knowledge from projects within the studied small consulting firms. The companies studied do have procedures that can be categorized under knowledge management even though they have not got any explicit strategies of how to work with knowledge management in projects. Hence they do not work actively with knowledge management in projects. Instead focus within the firms’ was on increasing and spreading competence and issues concerning the personnel.

A conclusion based on the findings of this study was that the context in which the knowledge was created was the most important and crucial factor for knowledge management. The larger a company grows, the more important the fixed routines and the administration seem to be, based on the studied organizations.

**STUDY 7**: The Evaluation of Organizational Knowledge Management: A Case Study of Office of Disease Prevention and Control” (Yatinee Buranakasemehal, 2010)

**Objectives of the study**: This research was to evaluate the knowledge management in organization (Office of Disease Prevention and Control).

**Tools used in the study**: The personal check list, the knowledge management evaluation questionnaire in the form of CIPP model and the interview questions about problem and suggestions were used to be the tools for data collection of this study.

**Sample of the study**: Two groups of sample in the Office of Disease Prevention and Control were used in the study. The first group of sample consisted of 28 persons who operate the job done on knowledge management whereas the second groups of sample consisted of 117 persons who operate the job done on academic approach.

**Technique of analysis of data**: The descriptive statistics, such as frequency, percentage (%), mean (\(\bar{X}\)), standard deviation (S.D.) were used for analysis of data.

**Major findings**: It was found from the study as follow:

(1) The knowledge management of Office of Disease Prevention and Control were on medium level.
According to the interview questions on problem and suggestions, it was found that the knowledge workers were lack of general knowledge about knowledge management process and knowledge management system. There was lack of knowledge management manual to operate accordingly. The knowledge workers did not have sufficient time for knowledge sharing and transferring and well as knowledge storing. The Office of Disease Prevention and Control should formulate the policies and strategies for sustaining development of knowledge management practices.

STUDY 8: Knowledge Management in Community: A Case Study of Ecotourism Management by Participation of Community (Tanyaporn Wanichrittha, 2011)

Objectives of the study: The objective of this study was to develop pattern of ecotourism knowledge management and to study the procedure of knowledge management in the community of Samut-Songkhram province, Thailand.

Tool used in the study: As this study was the qualitative research, the tool for gathering data was prepared. The data was collected from books and various documents and interviews. The Participatory Action Research (PAR) was used to be the project model of this study.

Sample of the study: The sample of this study was 44 local people in the community of Samut-Songkhram province, Thailand. 13 people came from Muang district, 3 people came from Amphawa district, and 28 people came from Bang Khontee district.

Technique of analysis of data: The content analysis was used for analysis of data.

Major findings: It was found from the study that the important components of knowledge management in Participatory Action Research (PAR) model of Samut-Songkhram community were the people and knowledge management practices. People were the vital key for knowledge management practices i.e. knowledge identification, knowledge creation and acquisition, knowledge transferring and sharing, knowledge storing and knowledge utilization.

STUDY 9: The Study of Knowledge Management Status in Schools under Office of the Basic
Objectives of the study: The objectives of this study were to explore general status of schooling knowledge management, problems and also to find out how to handle these problems of knowledge management in schools under Office of the Basic Education Commission around the west province of Thailand i.e. Kanchanaburi, Nakhonprathom, Petchburi, Ratchaburi, and Suphanburi.

Tool used in the study: The questionnaire was used to be the tool of the study. It divided into three major parts: (1) General information of the respondents, (2) General status of knowledge management consisted of the components of knowledge management process, and (3) problems, suggestions of knowledge management implementation.

Sample of the study: The sample of this study was the knowledge workers working for schooling knowledge management. They were selected by quota sampling random from 350 schools under the Office of the Basic Education Commission around the west province of Thailand, using the.

Technique of analysis of data: The quantitative research was conducted for this study. Mean and Standard Deviation were used for analysis of data.

Major findings: It was found from the study that the knowledge management practices in the west province of Thailand at a whole were at moderate level. The knowledge management practices in each aspect i.e. knowledge identification and knowledge utilization were found at high level whereas the aspect of knowledge storage and knowledge sharing were found at moderate level.

The results of the study was also shown that five main issues i.e. people, process, organization, learning organization, and technologies did affected on the knowledge management practices.

The suggestions were presented as follow:

- The organization should support for sufficient budgets for sustaining and developing of the knowledge management practices.
The knowledge management practices should be developed in order to enhance the people to utilize the appropriate knowledge in school, society and for their daily life. People in the organization should be encouraged to be the knowledge workers. Learning organization should be implemented both in and out of schools. Furthermore, school administrators should facilitate and promote knowledge management in schools as well.

STUDY 10: Knowledge Management Process and Academic Performance in Iraqi HEIs: An Empirical Investigation (Ammar, A. Ali Zwain; Lim Kong Teong; and Siti Norezam Othman, 2012)

Objectives of the study: examines the relationship between the processes of Knowledge Management (KM) and educational organization outcome in respect to academic performance.

Tool used in the study: In order to measure the processes of Knowledge Management (KM) and educational organization outcome in respect to academic performance, the researchers adopted the items of instrument from relevant literature. The instrument was pre-tested and reviewed by four academicians (heads of departments). The participants were involved to evaluate the questionnaire in terms of readability, accuracy, and brevity of the instrument. There were four part of knowledge management i.e. knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application.

The academic leadership as respondents were requested to focus on questions related to degree or extent of practices KM processes and academic performance in their organizations with items followed a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree. In this study, the indicators for academic performance of HEIs context are: academic status (CPA), undergraduates’ wastage rate, classes of degrees, graduation rates, and overall academic achievements (Johnes, 1996; Lee & Buckthorpe, 2008; Miller, 2007). Respondents are required to answer the questions regarding their organizations perceived performance over the past three years in order to reduce the influence of temporary fluctuations in those AP indicators.
In order to assess the validity and reliability index of the instrument measures, the instrument was subjected to the construct validity and reliability tests. The construct validity was evaluated by factor analysis. Meanwhile, the reliability was evaluated by the coefficient of Cronbach’s alpha with acceptable value of 0.70 and above (Hair, Black, Babin, & Anderson, 2010).

Sample of the study: The study is based on a survey design and time horizon was cross-sectional. Since the objective of this study is to measure the actual level of each of the KM processes on academic performance in Iraqi HEIs, academic leadership (dean or dean assistant) which was knowledgeable about organizational practices considered appropriate subject. The survey was carried out in 64 colleges, which offered the undergraduate programmes. The colleges are selected randomly from four public universities in Iraq. The final number of participants for this study was 41 colleges. The sample size comprised about 63 percent of the total population.

Technique of analysis of data: Pearson’s correlation and regression analyses were used for analysis of data.

Major findings: The results of the study were as follows:

(1) All processes of KM are positively and significantly related with academic performance. Most of KM processes shows strong correlation with academic performance. It means that all the KM processes are highly associated with academic performance.

(2) In this study, academic performance acts as the dependent variable and KM with the five processes: knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application as the independent variables. From the results of the analysis, it can be seen that there was strongly relationships between knowledge identification, knowledge acquisition, knowledge storage, knowledge sharing, and knowledge application. Only two variables had a significant and positive effect on academic performance. They are knowledge sharing and knowledge application. It can be concluded that knowledge sharing has the greatest effect on academic performance followed by knowledge application.
(3) There are several techniques that researchers can utilize to reduce the effect of multi-collinearity. In this study, the Principal Component Analysis (PCA) was employed to handle multi-collinearity as suggested by Hair et al. (2010)\textsuperscript{229}. The results of PCA indicated that the first principal component of KM processes explained 63.50 percent of the total variance of the KM processes. KM variables were analyzed collectively; principal component scores of KM variables were retrieved (Agus, 2000\textsuperscript{230}; Lim et al., 2004)\textsuperscript{231}. A simple linear regression analysis was later carried out between academic performance and the first saved of principal component scores of KM processes.

(4) The results of simple regression analysis indicate that KM variables (collectively) have a significant relationship with academic performance variable. Regression coefficient of the regression model is statistically positive and significant at $\alpha = 0.05$. Thus, based on $\beta$ value, the researchers conclude that KM processes have a significant and positive effect on academic performance. In short, data analysis results provide sufficient evidence to support all five alternative hypotheses.

In conclusion, this study explored the relationship between KM processes and academic performance. Results have shown that the KM processes had a significant effect on academic performance; educational organizations, therefore, need to find solutions on how to improve these processes in order to improve academic performance among educational partners (students and educators).

The findings indicate that HEIs should emphasize greater attention to the key processes of KM namely: knowledge identification; knowledge acquisition; knowledge storage; knowledge sharing; and knowledge application. To other researchers, future studies should attempt to identify the effect of critical success factors (CSFs) of KM implementation that may produce such differences. The theoretical model used in this study can also be tested by conducting cross-country studies. In addition, this study would help the researchers to identify important variables of KM processes for educational organizations in developing countries, especially in the study of KM in Iraq.

This study covers only 41 colleges within four public universities in Iraq. More variations of results could be obtained through a wider coverage of respondents.
Otherwise, a comparison between public universities and private universities could provide additional insights. For future study in line of this research, the researchers believe that the analysis pertaining to the effect of KM processes on other performance indicators (such as non-students related academic achievement) along with students’ related academic achievement is essential.

**STUDY 11: Utilization of Technologies in Knowledge Management of Secondary Schools**

(Witthaya Srimahawong, 2012)

**Objectives of the study:** The objective of this study was to investigate the utilization of technologies in knowledge management in secondary schools of the Northern part of Thailand.

**Tool used in the study:** The research instruments of the study were the documentary study form, observation form, interview form, brainstorming guideline, and questionnaire.

**Sample of the study:** 120 teachers, 600 students and 600 parents in secondary schools of the Northern part of Thailand were selected by stratified random sampling to be the sample of the study.

**Technique of analysis of data:** The descriptive analysis i.e. percentage (%), mean (X), standard deviation (S.D.) and the content analysis were applied for analysis of data.

**Major findings:** The results of the study were as follows:

1. The technologies were not properly utilized by teachers, students, and parents in the knowledge management process.
2. Teacher did not use technologies in learning process and students as well as parents were not encouraged to involve in the process of knowledge sharing and knowledge utilization.
3. In suggestions for development of the utilization of technologies in knowledge management process in secondary schools were as follow:
School leader should conduct a workshop for establishment of the knowledge management policies and strategies, using technologies as the knowledge management resources.

School leader should encourage the school staff to create the learning multimedia, such as e-book and computer assisted instruction (CAI).

School leader should arrange the seminar for knowledge sharing and transferring regarding the utilization of technologies in knowledge management.

(4) According to the students’ opinions pertaining to the knowledge utilization, it was found that students interested in using media technology. In addition, they also prefer to involve in seeking knowledge from the internet. The students who obtained the higher mean score on the utilization of technologies in knowledge management also obtained the higher mean scores on learning achievement.

STUDY 12: Knowledge Management Model for Developing Coaching & Empowering Competency of Directors of the President’s Office (Nalinee Tanasanti, 2012)

Objectives of the study: The objective of this study was to investigate the production and implementation of a knowledge management model for the development of the managerial competency of directors in the President’s Office at Ubon Ratchathani University. “Coaching & Empowering” is one of ten managerial competencies recognized by the Thai government as beneficial for managerial development.

Tool used in the study: The researcher employed qualitative research methodology and the tool, such as unstructured interviews, focus groups, and content analysis were used in the study.

Sample of the study: 30 participants, including administrative directors, administrative staff, and stakeholders from outside the university were used to be the sample of the study.

Technique of analysis of data: The content analysis was applied for analysis of data.

Major findings: It was found from the study that the research identified eight main factors to develop managerial competencies i.e. collaboration, objectives, action, checking, holism, innovation, networking, and resultant goals. Focusing on these
factors, the researcher designed a model that combined organizational systems and processes to promote the managerial competency of directors to coach and empower staff. It is anticipated that the development of such a managerial competency lead to a culture of knowledge-sharing by staff can be established networking in the President’s Office for a supportive learning organization.

2.4.4 Review of the past researches

From the abstract of the twelve past researches, it can be seen that two past researches aimed to find out the knowledge management practices in academic library and academic performance whereas the other one research studied about the knowledge management in Architectural practices. Some researches investigate the predicting role of culture attributes (collaboration, formalization, trust and learning) with reference to knowledge management practices whereas some researches aimed to identify the factors influencing knowledge management practices and knowledge management model. Seven researches investigate and evaluate the utilization of knowledge management in organizations, companies, and communities, whereas the other five researches studied the knowledge management practice in educational institutions.

Two researches were the qualitative research whereas the other five researches were the quantitative research, and five researched were the qualitative mixed with quantitative. For qualitative research, interviews (semi-structure), focused conversations, observations, brainstorming, literature and various document studies were used to identify knowledge management. For quantitative research, Likert scale and questionnaire were used to measure knowledge management i.e. • Questionnaire which measures knowledge management practices in academic libraries, • Questionnaire which measures capabilities or skills and policies/Strategies, • Questionnaire which measures educational organizational outcomes, • Organizational Culture Scale (OCS) and • Knowledge Management Practices Scale (KMPS)

From twelve past researches, knowledge management was analyzed for their relationship with some variables i.e. capabilities or skills, policies/strategies,
students’ academic achievement, educational organizational outcomes, motivation, and Multi-Media technologies. Pearson’s Product Moment Correlation Coefficient and Multiple Regressions were employed for the analysis of data.

The knowledge management process in the past researches was divided into various aspects i.e. knowledge identification, knowledge sharing, knowledge acquisition, knowledge storage, and knowledge application.

2.5 Uniqueness of the present study

After the review of twelve past researches related to knowledge management, it can be seen the uniqueness of the present study as follow:

(1) The present investigation aims to prove the affect of knowledge management resources on the knowledge management practices. Mean (\( \bar{X} \)), standard deviation (S.D.) and ANOVA were used to test the significant between mean scores of knowledge management practices rated by primary school teachers belonging to different levels of knowledge management resources. Therefore, this research is a unique research or only one research which indicates the difference between mean scores of knowledge management practices rated by primary school teachers belonging to different levels of knowledge management resources.

(2) Knowledge management practices in the present study were analyzed in order to find out the relation with the knowledge management resources i.e. people (leaders and knowledge workers), process (knowledge management system and organizational culture), and technologies. Knowledge management practices were used to be the dependent variables whereas knowledge management resources were used to be the independent variables. Knowledge management resources were considered to be the source or supply which benefit the knowledge management practices. Benefit of knowledge management resources utilization of this study include three aspects i.e. people (leaders and knowledge workers), process (knowledge management system and organizational culture), and technologies.

Six processes of knowledge management i.e. knowledge identification, knowledge creation and acquisition, knowledge codification, knowledge transfer or sharing, knowledge storage and retrieval, and knowledge application or utilization were
used as the aspects of knowledge management practices. This is also a uniqueness of the present research which is not appeared in any research.

(3) Two scales were used in this study. One was the knowledge management practices scale whereas the other one was the knowledge management resources scale. These two scales were constructed and standardized by the researcher and test for the item analysis (i.e. validity, discrimination, reliability).

Construct validity was used for establishment of validity of the scale. Item-Test Correlation was applied to the data obtained from 100 primary school teachers. The Pearson Product Moment was calculated for the $r_{xy}$ value from the total scores and the score of each item. t-test (independent) was used to test the discrimination index whereas test-retest method was used to prove the reliability of the scale.

After viewing the tools used in past and present research, one can says that the tools used in present research are unique tools which are not appearing in any research. These two tools are the first construction and standardization. It cannot be seen these two tools in the market before.

(4) Sample of the past research was the secondary school personnel, university staff, company’s member but the sample of the present research was the primary school teachers in South Thailand. This is also the uniqueness of the present research.

2.6 SUMMARY

The second chapter discussed about knowledge management practice and knowledge management resources. Knowledge management practices refer to the knowledge management process which comprises a range of practice used by organizations to identify, create, codify, transfer or share, storage and retrieve, and apply or utilize.

In the present study, knowledge management practices refer to the scores obtained from the scale which measures the knowledge management practices rated by primary school teachers. Knowledge management practices divided into six process i.e. knowledge identification, knowledge creation and acquisition, knowledge codification, knowledge transfer or sharing, knowledge storage and retrieval, and knowledge application or utilization.
Knowledge management resources are the sources for enhancing the knowledge management practices. In this study, knowledge management resources refer to three sources i.e. people (leader and knowledge worker), process (knowledge management system and organizational culture) and technologies.

Knowledge management practices were used to be the dependent variables whereas Knowledge management resources were used to be the independent variables of the study.

Twelve past studies were reviewed in order to gain the information and ideas that relevant to the knowledge management practices and knowledge management resources, methods, tools, sample, technique of analysis of data and seminal works in researcher’s area; and make sure that the present research is not repeating the work that someone has already done earlier. After viewing the past researches, it can be seen that the present research studies is a unique research or only one research which determine the level of knowledge management practices in relation to certain variables i.e. knowledge management resources. The study also test the difference between mean scores of knowledge management practices rated by primary school teachers belonging to different levels of knowledge management resources which was considered to be the independent variables of the study.

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