A Comprehensive Analysis of Knowledge Management Cycles

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5 October 2016

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Abstract

At present knowledge and its proper management became an essential issue for every organization. In the modern globalized world, organizations cannot survive in a sustainable way without efficient knowledge management. Knowledge management cycle (KMC) is a process of transforming information into knowledge within an organization, which explains how knowledge is captured, processed, and distributed in an organization. For the better performance organizations require a practical and coherent strategy and comprehensive KMC. The aim of this study is to examine the KMCs and how they are playing vital role for the development of organizations.

Keywords: Knowledge, Knowledge management, Meyer and Zack, Bukowitz and Williams, McElroy, Wiig KM cycles.

1 Introduction[1]

Since the 1990s the knowledge management (KM) became an essential issue in every organization due to globalization. Knowledge management cycle (KMC) plays an important role for the development of organizations in a sustainable way. The KMC is the transformation of knowledge information cycle that can be envisaged as rout of information organization. The KMC is a continuous process where information is identified, obtained, refined, shared, used, stored and divested.

Knowledge is built up from data and information as well as prior knowledge. Data refer to raw facts without any processing, organizing or analysis, so they have little meaning and few benefits to managers and decision-makers. Data are uninterpreted materials on which a decision is to be based and depended on facts which may include anything known to be true or exist (KLICON, 1999). Data are bits of content in either text or numerical format (sequences of numbers, letters, pictures, etc.). They are defined as a set of 'discrete, objective facts about events' and have no meaning in themselves (Davenport and Prusak, 1997; Brooking, 1999). Information refers to data that has been processed and shaped to be of more meaning to users. It results from the interpretation of data in a given context. So, a single content of data may produce different information contents if the context is different (KLICON, 1999). On the other hand, knowledge is organized information that changes something or somebody; either by becoming grounds for action, or by making an individual (or an institution) capable of different or more effective action

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(Drucker, 1989; Brooking, 1999). Knowledge is the most useful form of contents for problem solving and decision making since it has more meaning than data and information (Davenport, 1997).

KM can be considered as a systematic process of identifying, creating, capturing, acquiring, storing, sharing, organizing, transferring, sustaining, retrieving, renewing, evaluating and utilizing both explicit and implicit forms of knowledge at individual, group, organizational and community level through harnessing of people, process and technology to enhance organizational performance and create value (American Productivity and Quality Center; Davenport and Prusak, 1997; Alavi and Leidner, 2001; Madhoushi et al., 2010; ICO, 2011; Rašula et al., 2012; World Bank, 2012).

The KMC indicates the ways that organizations handle knowledge at various stages of their life in organizations. It shows us systematically how information is transformed into knowledge via creation and application process. It can be visualized as the route that information follows in order to become transformed into a valuable strategic asset for the organization. It also explains how knowledge is captured, processed, and distributed in an organization. In KMC the organizations need to: i) acquire and capture knowledge, ii) organize and store knowledge, iii) retrieve knowledge as needed, iv) distribute knowledge as needed, and v) maintain currency, relevance, and value of knowledge (Mohapatra et al., 2016).

The KMC indicates to identify existing knowledge (internally or externally), plans what knowledge can be required and acquired, develop the knowledge, distribute the knowledge where needed, foster use of knowledge, control or maintain the quality of knowledge and dispose of knowledge if it is no longer needed (Evans et al., 2014).

In this article we describe KMCs, which encompass the capture, creation, codification, sharing, accessing, application, and reuse of knowledge within and between organizations. Four major approaches to KMCs are: Meyer and Zack (1996), Bukowitz and Williams (2000), McElroy (2003), and Wiig (1993) KMCs. Four KMCs were selected based on their ability to meet the following criteria (Dalkir, 2011):

- They are implemented and validated in real world settings.
- They are comprehensive with respect to the different types of steps found in the KM literature.
- They include detailed descriptions of the KM processes involved in each step.

KMC uses visual representations of (often complicated) processes, removes ambiguity about how to think about managing organizational knowledge, introduces order to the management of organizational knowledge and makes the management of knowledge systematic.

2 Literature Review

Karl M. Wiig (1993) was among the first to address the need for a "coherent and practical framework for KM", which he attempted to create by identifying a set of organizational knowledge processing phases and which was based on the principle that knowledge must be organized, to be useful and valuable (Dalkir, 2011). Kimiz Dalkir (2005) provided integrated life cycle model and P. Heisig (2009) examined on 160 KM frameworks.

Michael H. Meyer and Michael H. Zack focused more on the architecture of information products in the Zack KM life cycle (Meyer and Zack, 1996). They have included information circulated both internally and externally, in electronic or printed form.

Ruth Bukowitz and Wendi Williams, in *The Knowledge Management Fieldbook*, have produced a guide full of practical advice for managers wishing to implement KM within their organizations. Bukowitz and Williams model discusses a similar guiding principle as Meyer and Zack's (1996) garbage in, garbage out-quality over quantity (Bukowitz and Williams, 2000). They indicated that their model is the learn phase, in which individuals learn from their experiences and organizations create an organizational memory. Their cycle is divided into two dimensions; tactical and strategic.

Mark W. McElroy has developed a model consists of two broad phases; knowledge production and knowledge integration. Knowledge production includes four processes such as, individual and group learning, knowledge claim formulation, information acquisition and knowledge validation. Knowledge integration process deals with the transformation and integration of the produced or acquired knowledge (McElroy, 1999). He also approaches to creating a KM life cycle model which is quite different than the previous models. He refers to the "Complex Adaptive System (CAS) Model" theory which holds that people self organize and continuously fit themselves individually and collectively to ever-changing conditions in their environment. The model starts with a phase called knowledge claim, which immediately requires a validation action, the knowledge claim evaluation (McElroy, 2003).

L. Argote and P. Ingram (2000) and Karl M. Wiig (1993) claim that effective knowledge processing forms the basis of competitive advantage in organizations and is critical to the survival of the firm. Kimiz Dalkir explained that the different phases of KMC are creation, the organization and storage, sharing, access and use (Dalkir, 2005).

3 Methodology of the Study

In this article we have used the secondary data. We take helps from websites, books, previous published articles, theses, conference papers, case studies and various research reports for the preparation of this paper. Here we have tried to describe how individual, group, and organizational knowledge is captured, created, codified, shared, accessed, applied, and reused throughout the KMC.

4 Objective of the Study

The objectives of the study are:

- To discuss five KMCs.
- To compare and contrast major KM life cycle models.
- To describe major challenges and benefits of the KMCs.

5 Various Types of KMCs

Knowledge creation and improvement is a continuous process which has several elements such as, the idea generation, grasping new models and mixing the theories or concepts for new processes (Jashapara, 2004). Here we have discussed four types of KMCs and these are: Meyer and Zack KMC (1996), Bukowitz and Williams KMC (2000), McElroy KMC (1999), and Wiig KMC (1993). In addition we have discussed Kimiz Dalkir's Integrated KMC (Dalkir, 2005).

5.1 The Zack KMC

The Zack KMC is derived by Michael H. Meyer and Michael H. Zack in 1996 from work on the design and development of information products, where they have used the term information to include knowledge content. They have included information circulated both internally and externally, in electronic (i.e., information systems) or printed form (Meyer and Zack, 1996).

In this model, the network between each stage is designed to be logical and standardized. The physical products follow within an organization and can be applied to the management of the knowledge assets. This model proposes that research and development about the design of physical information products can be extended into the intellectual realm to serve as the basis for a KMC. This cycle provides a number of useful analogies, such as the notion of a product platform (the knowledge repository) and the information process platform (the knowledge refinery) to emphasize the notion of value-added processing required in order to leverage the knowledge of an organization. This cycle processes are composed of the technologies, facilities, and processes for manufacturing products and services (Dalkir, 2005). The repository becomes the foundation of the company to create a family and knowledge products. Although the Zack KMC provides information about physical product, it can be easily extended to the knowledge products (Mohapatra et al., 2016).

Meyer and Zack have analyzed the major stages of a knowledge repository and mapped them onto a KMC as (Meyer and Zack, 1996): acquisition, refinement, storage/retrieval, distribution, and presentation (figure 1). They have referred to this cycle as the 'refinery.'

Acquisition of Data or Information: The acquisition phase refers to the gathering of information and acts for the quality control of the data. The source of data should be of high quality, so that the downstream integrity of the life cycle is not compromised. Acquisition deals with issues regarding origin of raw materials such as scope, breadth, depth, credibility, accuracy, timeliness, relevance, cost, control, and exclusivity. These raw data are collected from various sources. Stresses are needed on intensity, precision, scope, cost, significance, management and suitability when data are collected. The guiding principle is the well-known proverb of 'garbage in, garbage out' (Meyer and Zack, 1996).

Refinement: Refinement means insert value, reorganization, relabeling and indexing. Refinement is the primary source of value addition. The value addition could be physical (translation of information among various media) or logical form (restructuring, relabeling, indexing, and integrating) which helps in creating more readily usable knowledge objects and which store the contents more flexibly for future use (Meyer and Zack, 1996). Refining standardize (conforming to templates of a best practice or lessons learned as used within that particular organization) the primary data by cleaning up (sanitizing content so as to ensure complete anonymity of sources and key players involved) the irrelevant materials. This phase creates value not only through producing usable information, but also through allowing the information to be stored flexibly, in different formats and on different media. Some of the specific processes in this phase involve the analysis, interpretation, integration, synthesis, and standardization of information (Evans et al., 2014).

Storage/Retrieval: Storage is a vital stage of this cycle because it creates a connection between the first two stages. That is, it forms a bridge between the upstream acquisition and refinement stages that feed the repository and downstream stages of product generation. It can be physical (file folders, printed information) as well as digital (database, KM software) (Meyer and Zack, 1996).

Distribution: Distribution means providing information to users through various media (print, telephone, radio, television, email, fax, and letters) and encompasses not only the medium of delivery but also its timing, frequency, form, language, and so on. The warning of this phase is that medium and content are interrelated. The process delivers the product to the end users (Meyer and Zack, 1996).

Presentation: This is the cumulative effect of each and every stage of the KMC. It addresses the characteristic of establishing the value of information through the context of its use. If it has been able to create value here, it has been able to find the right usage; then the KMC has been successful. If the user have not enough context to be able to make use of the content, then the KM cycle has failed to deliver value to the individual and ultimately to the company. Perspective of this plays an important role in presentation or application stage. The performance of each of the preceding value-added steps is evaluated here. It is the obtained information in the daily operations of group and organization for better future output. The repository and the refinery combined enable the management of valuable knowledge of a firm. In this cycle, there is also an impression of having to continually renew the repository and the refinery in order to avoid elimination (Meyer and Zack, 1996).

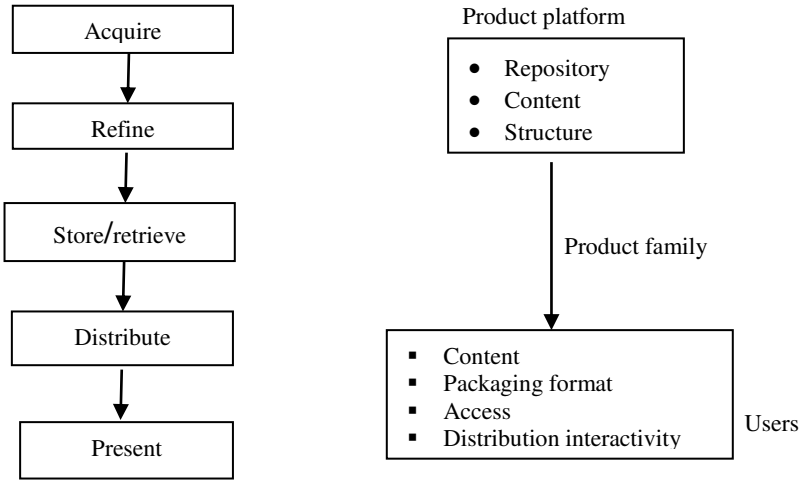

Figure 1: The Meyer and Zack KMC. Source: Meyer and Zack (1996).

The Meyer and Zack KMC is one of the most complete descriptions of the key elements engaged in the KM model. The notion of refinement is a crucial stage in the KMC and one that is often neglected (Meyer and Zack, 1996). It places a greater emphasis on the distribution of knowledge primarily through technological means, rather than simply referring to pooling or aggregating content (Evans et al., 2014). This cycle has failed to deliver value to the individual and ultimately to the organization if the users does not have enough context to be able to make use of the content, unique for each type of the organization (Kim, 2009).

5.2 The Bukowitz and Williams KMC

This model outlines how organizations generate, maintain and deploy a strategically correct stock of knowledge to create value. According to this model, knowledge consists of: repositories,

relationships, technologies, communication infrastructure, functional skill sets, process know-how, environmental responsiveness, organizational intelligence, and external sources. These stages aim on more long-range processes of matching intellectual capital to strategic needs (Bukowitz and Williams, 2000). The seven steps outlined in Bukowitz and Williams KMC are (figure 2): getting knowledge, using knowledge, learning, contributing to knowledge, assessing knowledge, building and sustaining knowledge, and divesting knowledge. Bukowitz and Williams broadly divided the KM processes into tactical and strategic ones. The get, learn, and contribute phases are tactical in nature. They are triggered by market-driven opportunities or demands, and they typically result in day-to-day use of knowledge to respond to these demands. The assess, build/sustain, or divest stages are more strategic, triggered by shifts in the macro-environment. These stages focus on more long-range processes of matching intellectual capital to strategic requirements (Sanghani, 2009; Dalkir, 2011).

Get stage: It is the first stage, and it consists of seeking out information required in order to make decisions, solve problems, or innovate. At present the challenge is not so much in finding information. Dealing in effectively with the enormous volume of information that can be obtained is also a great challenge. The resultant *information overload* has created a critical need to sift through the vast volume of content, identify the knowledge of value, and then to manage this knowledge effectively and efficiently. When KM diverges from information management (IM) is that *getting* of content encompasses not only traditional explicit content (a physical or electronic document) but also tacit knowledge (Dalkir, 2005). The key activities of this model are to organize knowledge content, maintain timeliness, completeness as well as train users in the new knowledge repository technologies in the organization (Jenny, 2014).

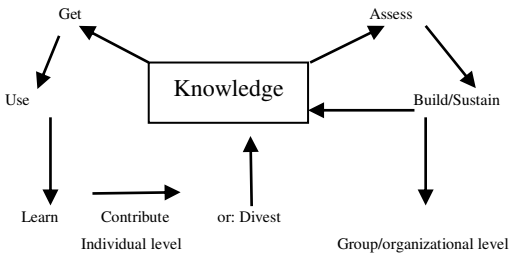

Figure 2: The Bukowitz and Williams KMC. Source: Bukowitz and Williams (2000).

Use stage: It deals with how to combine information in new and interesting ways in order to advance organizational innovation. The focus is primarily on individuals and then on groups. Bukowitz and Williams have discussed a number of techniques to promote serendipity and out-of-the-box thinking or creativity enhancing techniques (Bukowitz and Williams, 2000). It focuses on creation of an organizational memory base for making organizational learning possible through the best practices and lessons learned (Kim, 2009).

Learn stage: It refers to the formal process of learning from experiences as a means of creating competitive advantage. An organizational memory is created and then organizational learning becomes possible from both successes (best practices) and failures (lessons learned). Organizational learning is important because it represents the transition step between the application of ideas and the generation of new ones. This needs to be reflected without it, the knowledge will be of no real significance for further use (Dalkir, 2005; Mohapatra et al., 2016).

Contribute stage: It deals with getting employees to post what they have learned to the repository. So that individual knowledge can be made visible and available into the whole organization, where and when appropriate, and individuals can avoid mistakes. A good system must place to maintain the results of organizational learning and rewards for contribution should also be introduced (Dalkir, 2011). In this stage, employees are motivated to post what they have learned into knowledge base. The main goal is to link the individual learning and knowledge to the organizational memory (Jenny, 2014).

Assess stage: It deals more with the group and organizational level. It is done for intellectual capital. Assessment means the review of present intellectual or corporeal assets (information, knowledge) against the future needs of individuals, groups and organizations (Bukowitz and Williams, 2000). It is the process of continuous evaluation of intellectual capital the organization holds (Jenny, 2014). The organization must also develop metrics to demonstrate that it is growing its knowledge base and making profit from its investments in intellectual capital. It includes identifying new forms of capital such as human capital, customer capital, organizational capital (knowledge bases, business processes, technology infrastructure, values, norms, and culture), and intellectual capital (the relationship between human, customer, and organizational capital) (Dalkir, 2005).

Build/sustain step: It ensures that the organization's future intellectual capital will keep the organization viable and competitive by employing resources. We have to build the new intellectual or corporeal assets if current intellectual assets will not fulfill the future needs and if current intellectual assets will fulfill the future needs then sustain them. For this, resources must be allocated to the growth and maintenance of knowledge, and they should be channeled in such a way as to create new knowledge and reinforce existing knowledge (Dalkir, 2005). The employees should be able to use the existing knowledge base and apply the same within the organization. On a different level, the organization should have the right knowledge at the right time to be the winning hand in a competitive world (Jenny, 2014). At the tactical level, the inability to locate and apply knowledge to meet an existing need results in a lost opportunity (Dalkir, 2011).

Divest step: It is the final step of Bukowitz and Williams KMC. This is a let go stage wherein if the organization can better use their intellectual capital externally, it should have means for it. Similarly the cost or benefit of holding and divesting the information is considered (Mohapatra et al., 2016). The organization should divest assets if they are no longer creating value. Some knowledge may be more valuable if it is transferred outside the organization and organizations need to examine their intellectual capital in terms of the resources required to maintain it and whether these resources would be better spent elsewhere (Bukowitz and Williams, 2000).

The Bukowitz and Williams KMC introduces two new critical phases: i) the learning of knowledge content, and ii) the decision as to whether to maintain this knowledge or divest the organization of this knowledge content. This KMC is more comprehensive than the Meyer and Zack KMC, because the notion of both tacit and explicit knowledge has been incorporated here (Dalkir, 2011).

5.3 The McElroy KMC

Mark W. McElroy describes a knowledge life cycle that consists of the two broad processes; knowledge production and knowledge integration, with a series of feedback loops to organizational memory, beliefs, and claims and the business-processing environment (figure 3).

Knowledge production includes four processes; i) individual and group learning, ii) knowledge claim formulation, iii) information acquisition, and iv) knowledge validation (McElroy, 1999). Knowledge integration is the process by which an organization introduces new knowledge claims to its operating environment and retires old ones. It includes all knowledge transmission such as, teaching, knowledge sharing and other social activities that either communicate an understanding of previously produced organizational knowledge to knowledge workers or integrate newly minted knowledge (Dalkir, 2011).

McElroy stressed that organizational knowledge is held both subjectively in the minds of individuals and groups, and objectively in explicit forms (McElroy, 1999). McElroy KMC examines existing knowledge and then identifies gaps in current knowledge, allowing for an iterative process in which organizational needs are cataloged and solutions to meet knowledge gaps (Firestone and McElroy, 2003).

Matches strengthen the existing knowledge, leading to its reuse, whereas mismatches lead to adjustments in business processing behavior via single-loop learning (Argyris and Schon, 1978). Successive failures from mismatches will lead to doubt and ultimately rejection of existing knowledge, which will in turn trigger knowledge processing to produce and integrate new knowledge, this time via double-loop learning (Argyris and Schon, 1978).

In this cycle the key processes are (McElroy, 1999): i) individual and group learning ii) knowledge claim formulation, iii) information acquisition, iv) codified knowledge claim, and v) knowledge claim evaluation.

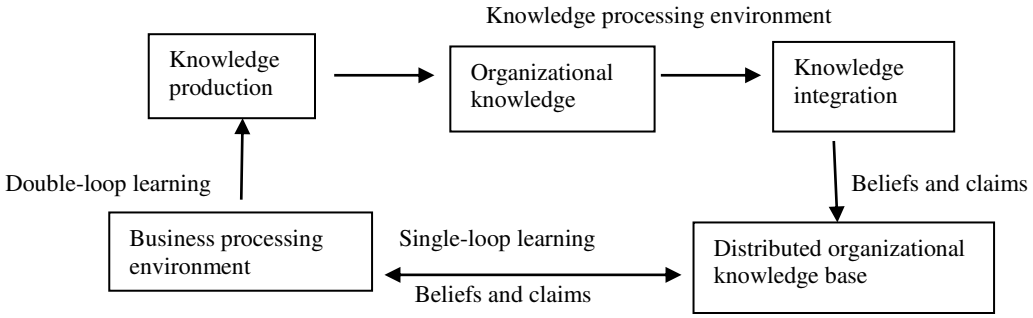

Figure 3: McElroy KMC. Source: McElroy (1999).

One of the great strengths of the McElroy cycle is the clear description of how knowledge is evaluated and a conscious decision is made as to whether or not it will be integrated into the organizational memory. In this cycle, the validation of knowledge is a step that clearly distinguishes KM from document management. It does more than address the storage and subsequent management of documents or knowledge that has been warehoused 'as is'. It focuses on processes to identify knowledge content that is of value to the organization and its employees (Dalkir, 2011).

McElroy KMC is different from other KM models in that it details expected outcomes from knowledge production and integration, such as improved organizational knowledge and expansion of the organizational knowledge base. It is often criticized for its focus on KM activities without providing guidance on how to implement a KM system in an organization (Wong and Aspinwall, 2002).

5.4 The Wiig KMC

Karl M. Wiig is one of the pioneers in the field of KM and was among the first to publish a series of texts that assembled management relevant concepts. His KMC addresses how knowledge is built and used as individuals or as organizations. The model is highly favored in KM, because it addresses the organization as a whole and includes business areas that are commonly found in most organizations. He proposes that the foundation of KM is comprised of the way knowledge is created, used in problem solving and decision making, and manifested cognitively as well as in culture, technology and procedures (Wiig, 1997b).

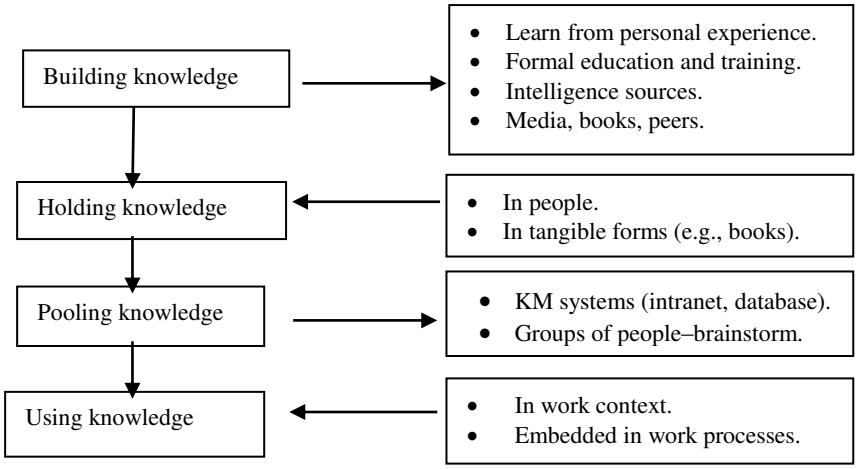

Figure 4: Major steps in the Wiig KMC. Source: Dalkir (2005).

Wiig's KMC focuses on the three conditions that need to be presented for an organization to run its business successfully as: i) it must have a business (products/services) and customers, ii) it must have resources (people, capital, and facilities), and iii) it must have the ability to act. The third point is emphasized in the Wiig KMC (Wiig, 1993).

Wiig identifies the major purpose of KM as an effort "*To make the enterprise intelligent-acting by facilitating the creation, commutation, deployment and use of quality knowledge*." He proposed an organizational KMC of four consecutive stages as shown in figure 4 (Wiig, 1993): i) building, ii) holding, iii) pooling, and iv) using knowledge. This cycle can be presented in linearly, but some activities within these stages can be performed simultaneously or in reverse (Podgórski, 2010). The cycle focuses on identifying and relating the functions and activities that we engage in to make products and services as knowledge workers (Dalkir, 2005).

Building knowledge: It consists of obtaining, analyzing, reconstructing, synthesizing, organizing, codifying and modeling knowledge. It starts with its acquisition through a variety of means, such as, personal experience (experiential learning), formal education or training, and sources such as, books, peers, etc. Knowledge building phases are conducting market research, competitive intelligence studies, synthesizing lessons learned, or documenting frequently asked questions (FAQs) in order to post them on a website. At an organizational level, knowledge

acquisition can be done by hiring people or through research and development projects (Evans et al., 2014).

Obtaining knowledge indicates the activities of i) R&D projects, individual innovations, experimentation, reason with existing knowledge, hiring new people, ii) import knowledge from outside sources, and iii) observation of the real world (site/field visits, etc.). Analyze knowledge indicates; i) extract potential knowledge from obtained material, ii) abstract extracted materials, iii) identify patterns extracted, iv) explain relations between knowledge fragments, and v) verify that extracted materials kept their original meetings. Knowledge is organized for specific uses and according to an established organizational framework such as, standards and categories. Reconstruct and synthesize knowledge is to i) generalize analyzed material to obtain broader principles, ii) generate hypotheses to explain observations, iii) establish conformance between new and existing knowledge, and iv) update the total knowledge pool by incorporating the new knowledge. Codify and model knowledge indicates i) how we represent knowledge in our minds, ii) how we assemble the knowledge into a coherent model, iii) how we document the knowledge in books and manuals, and iv) how we encode it in order to post it to a knowledge repository (Wiig, 1993). At this point knowledge is acquired and built from various sources. Experts and advisers, training courses, procedures and instructions, research, books, media, inspections and observations are needed for the building of organizational knowledge (Podgórski, 2010).

Holding knowledge: This type is the remembering, accumulating and embedding knowledge in storehouse as documents which are gained as research reports, practical tips, case studies, etc. Remembering is the individual has retained the item of knowledge. Accumulating is the creating a computer-resident knowledge base and encoding knowledge so it can be stored in organizational memory. Embedding is the ensuring knowledge and is a part of business procedures. Archiving is the systematically retiring outdated, false, irrelevant knowledge from the active repository. Archiving typically involves storing the content in another, less costly or less bulky medium for less frequent future retrieval (Wiig, 1997a). This type includes holding tacit knowledge that can be found in company members' minds and which can be extracted in the form of practical tips and case studies, etc. (Podgórski, 2010). Examples of holding knowledge are intellectual property, patents, knowledge documented in the form of research reports, technical papers, or tacit knowledge, which remains in the minds of individuals but which may be elicited and embedded in the knowledge base or repository (Dalkir, 2005).

Pooling knowledge: It relates to the collective or group level of the organization and refers to coordinating, assembling, and accessing and retrieving of knowledge. It indicates knowledge coordination that primarily relies on setting a knowledge resource network structure which is responsible for making certain resources available. Coordinating is formed collaborative teams to work with particular content to create a 'who knows how to do what' network. Assembling is the gather knowledge sources into a background library or repository to make later access/retrieval easier (Dalkir, 2005). Knowledge can also be pooled through social interactions, such as apprenticeships, brainstorming sessions, and consulting with coworkers (Evans et al., 2014). Access and retrieval can get knowledge from the repository or through consultation with knowledgeable people about difficult problems, obtaining a second opinion from an expert, or discussing a difficult case with a peer. Collection of information about locating knowledge in documents, databases, expert networks is needed from all employees. So that, knowledge is acquired and built from various sources such as, experts and advisers, training courses, procedures and instructions, research, books, media, inspections and observations (Wiig, 1993

1997b). Organizations can pool knowledge in various ways. The employee who does not have the necessary knowledge and know-how to solve a particular problem can contact others in the organization who have solved similar problems either by obtaining the information from the organizational knowledge repository or by finding an expert through the expertise locator network and contacting that person directly (Dalkir, 2005).

Using knowledge: It is ways of using practical knowledge such as, routine tasks, production and services mostly in any kind of decision-making within an organization at various management levels. There are innumerable ways to apply knowledge (Wiig, 1997a). Knowledge can be used in the work context to describe various scenarios and determine the scope of the problem at hand, either as encapsulated knowledge or as knowledge that is applied to successfully complete the task. Additionally, knowledge is used to support the synthesis and evaluation of potential alternatives, make a decision as to what to do, and finally to implement a solution by executing the appropriate tasks (Evans et al., 2014). Routine tasks typically use compiled knowledge that we use almost unconsciously or automatically. To make standard products, use the expert network to find out who is knowledgeable about a particular area. The services include using knowledge for identifying problems and their potential consequences, choosing knowledge suitable for solving these problems, searching for alternative solutions, assessing the advantages and disadvantages of those solutions, and planning and implementing selected solutions (Podgórski, 2010).

Wiig (1999a) discussed about two cycles as; a) Institutional Knowledge Evolution Cycle and b) Personal Knowledge Evolution Cycle. They can help organizations to structure their activities and priorities. The Institutional Knowledge Evolution Cycle considers five stages as follows (Wiig, 1999b):

Knowledge development: Knowledge is developed through learning, innovation, creativity, and importation from outside.

Knowledge acquisition: Knowledge is captured and retained for use and further treatment.

Knowledge refinement: Knowledge is organized, transformed, or included in written material, knowledge bases, and so on to make it available to be useful.

Knowledge distribution and deployment: Knowledge is distributed to Points-of-Action through education, training programs, automated knowledge-based systems, expert networks, to name a few; to people, practices, embedded in technology and procedures, etc.

Knowledge leveraging: Knowledge is applied or otherwise leveraged. By using knowledge, it becomes the basis for further learning and innovation as explained by other mechanisms.

The Personal Knowledge Evolution Cycle also has five stages that depict how knowledge, as it becomes better established in an individual's mind, migrates from barely perceived notions to be better understood and useful. The five stages of this cycle are as follows (Wiig, 1999b):

Tacit subliminal knowledge: This knowledge is mostly non-conscious and is not well understood. It is often the first glimpse we have of a new concept.

Idealistic vision and paradigm knowledge: Part of this knowledge is well known to us and explicit and we work consciously with it. Much of it such as, our visions and mental models is not well known, it is tacit and only accessible by non-consciously.

Systematic schema and reference methodology knowledge: Our knowledge of underlying systems, general principles, and problem-solving strategies is, to a large extent, explicit and mostly well known to us.

Pragmatic decision-making and factual knowledge: Decision-making knowledge is practical and mostly explicit. It supports everyday work and decisions, is well known, and is used consciously.

Automatic routine working knowledge: We know this knowledge so well that we have automated it. Most has become tacit and we use it to perform tasks automatically, without conscious reasoning.

A major advantage of the Wiig approach to the KMC is the clear and detailed description of how organizational memory is put into use in order to generate value for individuals, groups, and the organization itself. The ways in which knowledge can be applied and used are linked to decision making sequences and individual characteristics. Wiig also emphasizes the role of knowledge and skill, the business use of that knowledge, constraints that may prevent that knowledge from being fully used, opportunities and alternatives to manage that knowledge, and the expected value added to the organization (Dalkir, 2005). In brief, the strength of the Wiig KMC is that it has a clear description of how organizational memory is put into use to generate value for individuals, groups, and the organization.

5.5 Dalkir's Integrated KMC

Review of the various approaches to KMC help distill an integrated model with three major stages as follows (Dalkir, 2011):

- Knowledge capture and/or creation.
- Knowledge sharing and dissemination.
- Knowledge acquisition and application.

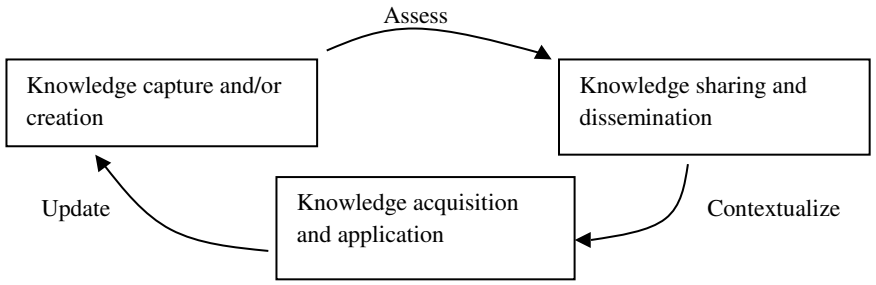

Figure 5: Integrated KMC. Source: Dalkir (2005).

In the transition from knowledge capture/creation to knowledge sharing and dissemination, knowledge content is assessed. Knowledge is then contextualized in order to be acquisition and application, and then to update the first one (figure 5). Knowledge capture indicates to the identification and then codification of existing internal knowledge and know-how within the organization and/or external knowledge from the environment, and knowledge creation is the development of new knowledge and know-how; innovations that did not have a previous existence within the organization. Contextualize involves maintaining a connection between the knowledge and those knowledgeable about that content. Contextualization succeeds to when the new content is firmly and precisely embedded in the business processes of the enterprise (Dalkir, 2011). Comparison of KMC is given in table 1.

In the Bukowitz and Williams (2000) KMC there are phases that are similar, if not identical both in the Meyer and Zack (1996) and Wiig (1993) KMCs (table 1). For example, *get* is similar to *build* and *acquire*; *assess* is similar to *refine*; *build/sustain* is similar to *hold* and *storage/retrieval*; and *contribute* is similar to *use/apply* and *distribution*.

Table 1: Integrated KMC. Source: Dalkir (2011).

Meyer and Zack (1996)	Bukowitz and Williams (2000)	Wiig (1993)	McElroy (1999)	Integrated
Acquisition	Get	Creation	Individual and group learning	Create/capture
Refinement	Use	Sourcing	Knowledge claim validation	Create/capture
Store/ retrieve	Learn	Compilation	Information acquisition	Create/capture
Distribution	Contribute	Transformation	Knowledge validation	Create/capture and contextualize
Presentation	Assess	Dissemination	Knowledge integration	Share, disseminated and asses
	Build/ sustain	Application		Acquisition and application
	Divest	Value realization		Update

6. Benefits of KMC

At the present globalized world knowledge is an essential element. Organizations cannot develop sustainably without it, because it is offering lots of benefits in the professional world. The benefits of KMC are competitive edge, improvement in the business processes, increase in the communication, and saves money and time of organization which enhances the overall productivity. KMC processes knowledge for individuals, groups and the organization to learn, to remember what is learned and to leverage the collective expertise in order to develop the organizations more efficiently and more effectively (Evans et al., 2014).

Some benefits of KMC are as follows (Alavi and Leidner, 1999; Dalkir, 2005):

- Supports new technologies easily and capture new knowledge for future use.
- Improves staff engagement and communication.
- Reduces IT costs without having to compromise quality service to internal and external customers.
- Link people to people by setting up collaborative methods.
- Improving innovation through wider and borderless collaboration.

- Due to the existing knowledge base, the employees can quickly find all the information they need.

The uses of KMC are: visual representations of processes, removes ambiguity about how to think about managing organizational knowledge, introduces order to the management of organizational knowledge, and makes the KM systematic.

7. Conclusion

In this study we have discussed different stages in every KMC. Knowledge sharing and appropriate applying of knowledge among employees in organization is essential for the effectiveness and completeness of KMC. Organizations should use different KMCs by considering their capacity for the development of their organizations. When they face difficulties, they have to overcome these using KMC as a strategic tool.

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