

Chapter 2

Knowledge Management Cycles

2.1 Introduction

This chapter deals with knowledge management cycle. Any organisation which takes up knowledge management will undergo this process called KM cycle. The KM cycle shows us systematically how information is transformed into knowledge via creation and application process. When an organisation undergoes KM cycle then the following steps happen:

1. Capturing
2. Coding
3. Publishing
4. Sharing
5. Accessing
6. Application

There is no hard rule that only these steps should be there, but we are just trying to give an example. There are variations in different KM cycles so there might be other steps added or subtracted from the above list.

Businesses may follow any KM cycle says Wiig, a KM cycle or an integrated KM cycle or any other. Firstly, here we discuss the different stages in KM cycle and show how exactly this cycle takes place step by step. We also tell about the practical aspects of each step wherever possible. Secondly, KM cycle is explained in terms of transformation from tacit to explicit and then back to tacit. Thirdly, a comparison of pros and cons of different KM cycles is done, and finally, a comparison of where these can be applied is showed.

Traditional methods define business architecture as the relationship between people, process and technology. We agree with this definition as a starting point and add the dimension of strategy (Fig. 2.1).

The shortfall of this model is that it does not cover all the aspects of business so we will not be able to understand the linkages at the next level of detail.

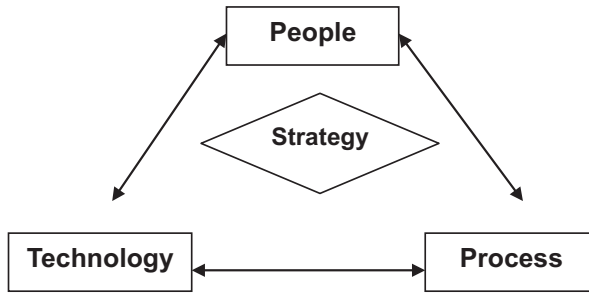


Fig. 2.1 Business architecture

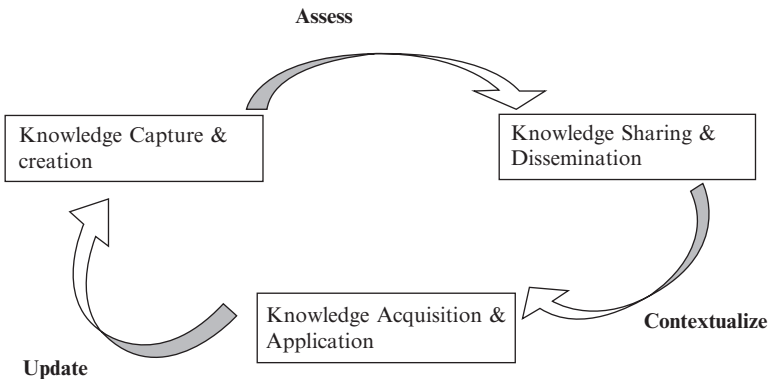


Fig. 2.2 An integrated knowledge management cycle

Process view tells about business process, the organisation chart and the management model.

Technology view models the inter-relational between the various applications, the data and the information flows and various service points.

People view tells about the inter-relational between the positions as defined in the organisation chart, the roles those positions fill and the specific individuals assigned to each position.

But how do we set up such a model?

We show how these stages take place by taking an example of a KM cycle. Figure 2.2 will show how some of the different stages take place in a KM cycle. First knowledge capturing is done and in transition from knowledge capture to knowledge sharing, knowledge content is assessed by other employees in the organisation or some other person outside the organisation. Assessment is done to know about the validity of the knowledge captured. After this the knowledge sharing is encouraged in the organisation. The knowledge is disseminated whenever the need arises in the organisation. After this the knowledge is contextualised. Contextualisation is the process in which the key attributes of the content are identified to match to the needs of the target users. For example, creating a short executive summary for the user so that he can quickly go through the document is contextualisation.

The knowledge is then used by the people in the organisation and then updated. During updating we check whether the knowledge is still useful or is it out of date now. Also, we look for the best practices and lessons learnt during update.

2.2 Different Stages in Knowledge Management Cycles

Capturing: Knowledge capturing refers to the identification and subsequent codification of existing internal knowledge and know-how within the organisation and external knowledge from the environment. This knowledge is usually previously unnoticed.

So what are things that a company should capture—the things that are of top priority and useful in future and not just everything? Focus on certain things only.

And the next question is who will capture those things? The answer lies in bringing in people in the organisation who have good writing skills, i.e. people like knowledge journalists, or who have done editorial work. These people have the knack of writing well and they are better than some Tom Dick or Harry.

How will he capture? It is by consolidating learning outputs and by taking feedback from peers. This is a practical way of knowledge capture in which we use a repository-based modelling tool for knowledge capture. This is nothing but some software where you can store the data in the form of say process diagrams, word document, etc.

Business process modelling tool features a multidimensional object repository that allows us to capture an object once and use it many times. Example of these objects would include things like process diagrams including their steps, the roles involved in executing those steps and the different technology types involved in supporting those process. The Web version of knowledge model was published in a modelling tool. This is what the employee would see when finding out something about their area.

Coding: The translation of valuable knowledge from tacit to explicit form is called codification of knowledge. Anything that allows the organisation knowledge to be communicated independently of its holder comes under the process of coding, for example, a document, a sound or video recording, a picture, a film, etc. These things are nothing but codification of knowledge. In most organisations the coded knowledge only represents just the tip of the iceberg because the tacit knowledge in huge is not coded.

During codification, we represent the knowledge in our minds by building mental models, i.e. by cognitive maps (which is defined below). We document the knowledge in manual and books in this step. Also the knowledge is encoded into knowledge bases.

When knowledge is codified it can now be communicated widely and with a less cost than what we had before codification.

Codification of knowledge can be achieved in many ways. Some are given below:

1. *Knowledge taxonomies*: It is a process by which the knowledge is partitioned and a relationship is defined between the partitioned knowledge. After this a classification is done. By this process we can understand the body of the knowledge better. An example of taxonomy is shown in Fig. 2.3.
2. *Cognitive maps*: A knowledge map or cognitive map is a representation of the mental model of someone's knowledge, and this provides a good way of codifying knowledge. A mental model is nothing but a symbolic representation of some knowledge in the real world. Cognitive map is a very useful way to codify the captured knowledge because it captures the complex relationships (see Fig. 2.4).
3. *Decision trees*: It is another good method to codify explicit knowledge. It is typically in the form of a flowchart. It has alternate parts which indicate the impact of different decisions. An example of this is shown in Fig. 2.5.

A few tools for doing knowledge creation and codification are:

1. For content creation:
 - (a) Templates
 - (b) Data mining
 - (c) Blogs
2. For content management:
 - (a) Metadata tagging
 - (b) Archiving
 - (c) Classification

Publishing: Knowledge is only useful if it is delivered to the right person, at the right time, in the right place. Knowledge publishing is defined as the process that allows getting knowledge to those people who need it in a form that they can use it. Different users may require the knowledge presented in a different way.

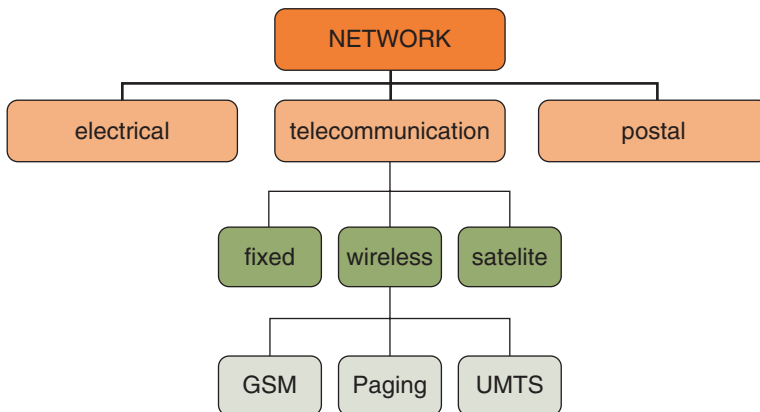


Fig. 2.3 An example of taxonomy (source: <http://www.trainmor-knowmore.eu/>)

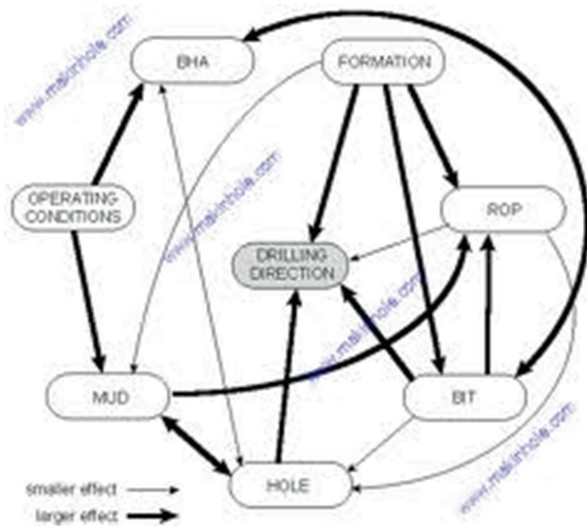


Fig. 2.4 Cognitive map to show the complexity of drilling (source: <http://www.makinhole.com/>)

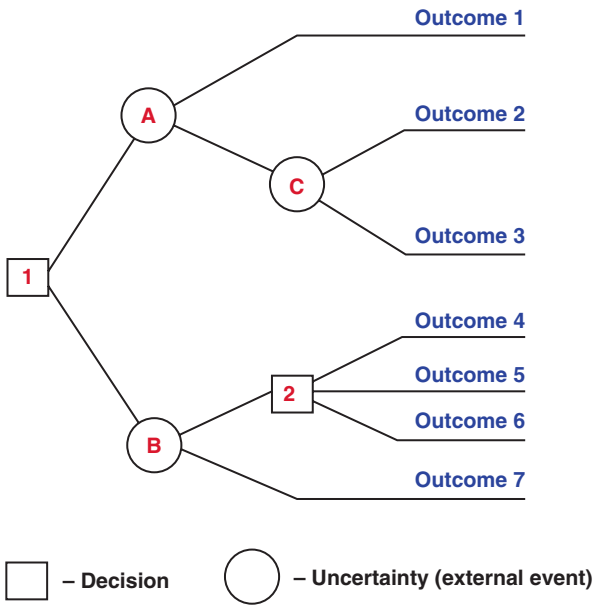


Fig. 2.5 An example of a decision tree (source: <http://www.time-management-guide.com/>)

Sharing: Once the knowledge is captured and codified in an organisation, it needs to be shared. The parties should be convinced that change in mentality is necessary for both the parties (the parties being the employee and the company). The employees should be told that sharing their knowledge would never affect their position

rather it would earn a lot of respect and fame for him from his peers. Some tools for sharing are:

1. *Groupware and collaboration:* Groupware is nothing but a set of software that helps workgroups who are connected to each other by a network (e.g. LAN) to organise their activities and share knowledge. Groupware supports file distribution, electronic newsletters, etc.
2. *Wikis:* It is a Web-based software that allows open editing. This allows multiple users to edit and create content and is a good method of knowledge sharing, similar to Wikipedia perhaps in working. There is a word-like screen in which you can add your knowledge, and you need not even know programming or HTML commands for this.
3. *Networking technologies:* These consist of knowledge repositories, knowledge portals, Web-based shared workspaces, intranets, extranets, etc. Figure 2.2 which was shown above is an example of knowledge repositories in networking technologies. In this knowledge repository, knowledge is collected, summarised and integrated across sources.

Some methods by which employee would willingly share their knowledge are:

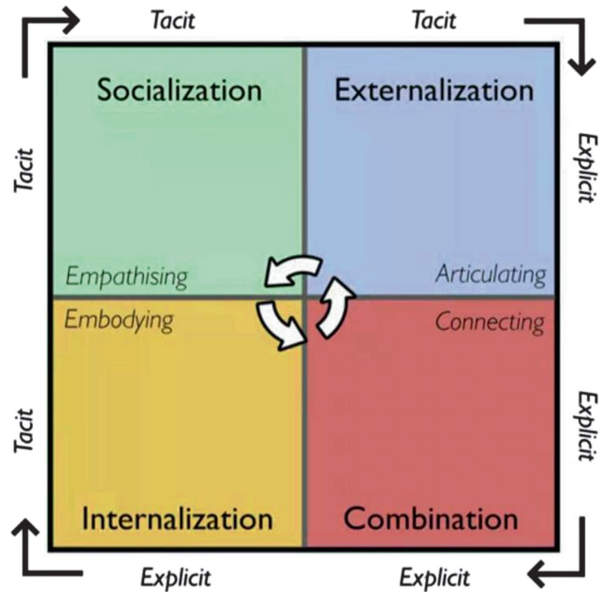
1. Make whatever they share more visible.
2. Make sharing a performance goal. This can be an effective strategy to entice the employee into sharing their knowledge.
3. Monitoring is really hard so rely on performance management, goals and objectives rather than monitoring. This also shows the trust that you have in your employee, and this also builds trust in the organisation which will even further boost employees to share their knowledge.
4. Make sharing easy.
5. Change your physical space a bit in the organisation to allow more collaboration. It might lead to forming more communities of practices (CoPs) which may help the organisation in sharing more knowledge.

We should also consider customer feedback as this may help in finding the solutions of some problems and also in influencing future design.

When such practices are followed, employees would indeed share knowledge, and when we give them incentive for their hard work, they give more positive results.

Accessing: Once the knowledge sources are identified, they are then collated into background references for a repository and in order to facilitate access and retrieval for all the people in the organisation. Organisations use focus group to arrive at a consensus as to how best this can be achieved. Since this knowledge is shared with knowledgeable people, the process of accessing will address difficult problems, and we get a second opinion from the experts about this knowledge which has been coded and shared. One can access and retrieve knowledge directly from repository as well, e.g. using a system of knowledge base to obtain an advice on how to read a knowledge document or how to do something in order to arrive at a decision.

Fig. 2.6 Framework to show how knowledge conversion happens in KM cycle (source: Nonaka and Takeuchi)



Application: Knowledge application refers to the actual use of knowledge which has been created and captured and put into the KM cycle. When capturing, coding, sharing, etc. are done, then we are still in the third quadrant of Nonaka and Takeuchi model as shown in Fig. 2.6. To complete the knowledge spiral, we must do internalisation of knowledge and this happens in application part of KM cycle.

Knowledge has a short shelf life sometimes, so we should use it as quickly in the organisation as possible because that thing which you have shared may become outdated and something better might have come in the market so using it quickly is not such a bad option.

This step in KM cycle is the most important one because if this step is not accomplished successfully then all of the KM efforts will be in vain. Remember that KM can succeed if knowledge is used.

One of the ways by which knowledge application is done at individual level is by task analysis and modelling. Task analysis is the process of describing a task by breaking it down into its primary components. It is done by task decomposition. For example, a process of polishing your shoes is described below:

1. Wipe off the dust off the shoes by using a cloth or a brush.
2. Apply the polish on one shoe and then leave it aside for the shoe to absorb the polish.
3. Take the second shoe and apply polish on it and leave this aside.
4. Now take a brush and rub it on the first shoe vigorously for a couple of minutes.
5. Repeat step 4 for the second shoe.
6. You are ready now to wear the shoes.

Using a repository based modelling tool for knowledge capture

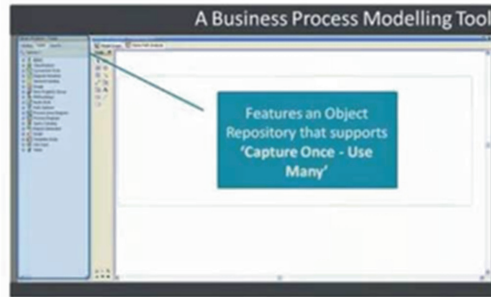


Fig. 2.7 How knowledge capture is done by software (source: Synoptic Consulting Sydney)

Knowledge application at group level is done in the following ways:

1. *Knowledge Reuse*: It involves recall, recognition and applying the knowledge. There are three major roles required for knowledge reuse: knowledge producer (the one who produced the knowledge or documented it), knowledge intermediary (the one who prepares the knowledge by indexing, standardizing, categorization, mapping, publishing etc.) and knowledge reuser (the one who understands, retrieves and applies it).
2. *Knowledge Repositories*: An example of this is already shown in Fig. 2.7. Knowledge repository is nothing but a place to store and retrieve the knowledge. It can contain a mix of tacit and explicit knowledge. They are usually intranets or portals. They serve to preserve, manage and build up the organisational memory.

The tools for knowledge application are:

1. *Adaptive Technologies*: These technologies are used to better target the content to a specific knowledge worker or to a group of knowledge workers who share a common work need. If a worker wants that his content should be in a particular language or a particular format, then he gets that in these technologies.
2. *Intelligent Filtering Tools*: The name itself suggests what they are used for. These tools can help in addressing the challenge of information overload by just selecting relevant content and delivering this in a just-in-time and just-enough format as required by the user.

2.3 KM Cycle Transformation From Tacit to Explicit and Back to Tacit

Explicit knowledge is that which can be expressed in language, can be easily articulated, can be understood, can be codified and can be recorded, whereas tacit knowledge is one which cannot be expressed in language; it is unseen knowledge. It cannot be easily codified. Tacit knowledge is habits, assumptions, skills, etc. Explicit knowledge said to be only the tip of the iceberg. Our aim should always be to convert tacit knowledge to explicit knowledge. Nonaka and Takeuchi say that tacit and explicit are part of a four-part process. Some people said earlier that converting tacit knowledge to explicit knowledge is impossible. But Fig. 2.6 shows how KM cycle undergoes the knowledge conversion process in an organisation. The four modes of knowledge conversion are:

Socialisation: The word socialisation itself speaks a lot. It is nothing but sharing knowledge through social interactions. It happens when tacit knowledge is converted to tacit knowledge. Here take an example of a person X who is having 20 years of work experience in an organisation. When this person meets a fresher Y during a coffee meeting at the canteen and gives the tacit knowledge that he has to this newcomer, then this is known as socialisation. Here knowledge is created long back in the mind of X, and this knowledge is still not written down when Y is capturing it in his brain.

Advantage:

This is the easiest form of transferring knowledge.

Disadvantage:

1. The knowledge still remains tacit and our aim should always be to make it explicit.
2. Honda does brainstorming camps for solving difficult problems. This is one of the examples of socialisation.
3. It is very time-consuming and difficult to use this mode.

Socialisation happens through:

1. Interaction.
2. Teamwork and a culture of sharing one's experiences.
3. Informal communication.
4. If in an organisation, workplace has open space without any physical barriers, then a lot of tacit to tacit to transformation happens.
5. Other examples being corridor meetings, apprenticeship, mentoring models, knowledge days, knowledge camps, etc.

Externalisation: It happens when tacit knowledge is converted to explicit knowledge. When knowledge is in written form, then we can read it, and if we read information it makes it understandable and interpretable. In this mode, individuals will be able to understand things. In this mode, the previously tacit knowledge can be

written down, recorded, taped, etc., and for this we need intermediaries such as knowledge journalists.

Externalisation is done through:

1. Writing notes
2. Brainstorming
3. Encouraging a learning environment

Combination: It happens when explicit knowledge is converted to explicit knowledge. In this process no new knowledge is created, but the knowledge is organised into broader concept systems. Knowledge is logically ordered to make it more meaningful. Here categorising, sorting, reconfiguring, adding and updating content are done. These systems can include:

1. Databases
2. Books

A working example is formal education and training.

Internalisation: It happens when explicit knowledge is converted to tacit knowledge. The understanding of explicit knowledge is internalisation. It transforms to tacit and becomes part of an individual's basic information. In a nutshell, it is nothing but learning by doing. Examples of internalisation are:

1. By practising and repeating
2. By experience and expertise

This creates know-how. For example if you learn to ride a bike, you never forget it throughout your lifetime.

The advantage of SECI (socialisation, externalisation, combination, internalisation) model is quite simple and proves that tacit knowledge can be converted to explicit knowledge in an organisation.

Disadvantages of SECI model:

1. Based on the Japanese companies, where employees often have 'jobs for life'
2. Heavier reliance on tacit knowledge in this model

So we can come to a conclusion that SECI model shows that tacit knowledge can be converted to explicit. It is a framework for managing KM processes. These processes are:

1. Socialisation—verbal explanation
2. Externalisation—physical demonstration
3. Combination—reading the manual
4. Internalisation—embodying knowledge

2.4 Types of Knowledge Management Cycle

There are four types of knowledge management cycle. They are:

1. Zack KM cycle (1996)
2. Bukowitz and Williams KM cycle (2003)
3. McElroy KM cycle (1999)
4. Wiig KM cycle (1993)

In the different KM cycles, the term used differs but the real difference is not much.

2.4.1 Zack KM Cycle

The physical products follow within an organisation and can be applied to the management of the knowledge assets. Although the Zack KM cycle provides information about physical product, it can be easily extended to the knowledge products.

It is composed of the technologies, facilities and processes for manufacturing products and services. Their approach provided a number of good analogies like the notion of a product platform (the knowledge repository) and the information process platform (the knowledge refinery). The repository becomes the foundation of the company to create a family and knowledge products. The KM cycle basically means creating higher-value products from the existing sets of knowledge. In Zack's approach, the interfaces between each stage are designed to be seamless and standardised.

Mayer and Wack analysed their major development stages of the knowledge repository and mapped following stages on to a KM cycle:

1. Acquisition
2. Refinement
3. Storage
4. Distribution
5. Presentation (Fig. 2.8)

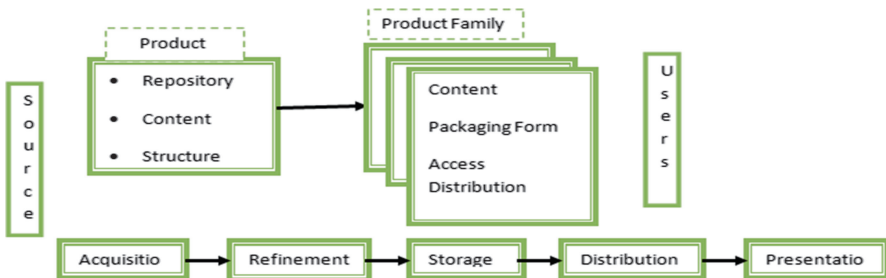


Figure 2.8 Zack KM cycle

Meyer and Zack KM cycle stages	Significance
Acquisition	<ul style="list-style-type: none"> • Quality control of the data • The data is measured on parameters like depth, relevance, credibility, cost, control and exclusivity
Refinement	<ul style="list-style-type: none"> • Primary source of value addition to the primary data • The value addition could be physical or logical • It also means to standardise the primary data by cleaning up the irrelevant materials
Storage	<ul style="list-style-type: none"> • It forms a bridge between the upstream acquisition and refinement stages that feed the repository and product generation • It could be physical or digital
Distribution	<ul style="list-style-type: none"> • The process to deliver the product to the end users • It encompasses not only delivery channel but also its timing, frequency, form and language
Presentation	<ul style="list-style-type: none"> • This is the cumulative effect of each and every stage of the KM cycle • If it has been able to create value here, it has been able to find the right usage; then the KM cycle has been successful

2.4.2 The Bukowitz and Williams KM Cycle

It describes a knowledge management framework which helps the organisation to take strategically correct steps for the creation of knowledge in the organisation.

In this framework, knowledge consists of knowledge repositories, relationships, information technologies, communication networks and organisational intelligence (Fig. 2.9).

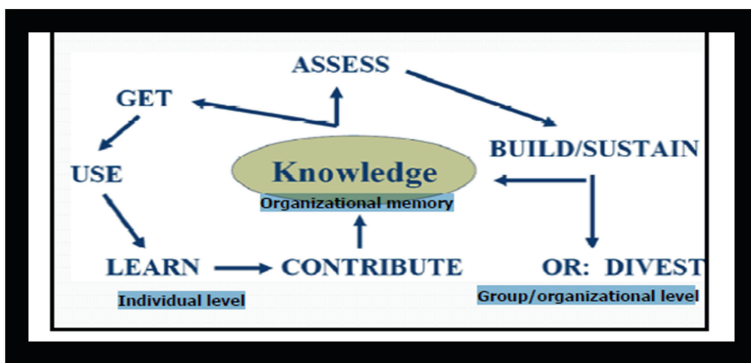


Fig. 2.9 Bukowitz and William KM cycle

Bukowitz and William KM cycle stages	Significance
Get	<ul style="list-style-type: none"> • This is the first stage that consists of seeking out information needed to make decisions and solve problems • The main problem is obtaining tacit knowledge
Use	<ul style="list-style-type: none"> • This includes fostering the info obtained for dealing new problems in the organisation or for innovation
Learn	<ul style="list-style-type: none"> • The use of knowledge can result in failure or success. This needs to be reflected • Without it the knowledge will be of no real significance for further use
Contribute	<ul style="list-style-type: none"> • The employers post what they have learnt to the communal knowledge base
Assess	<ul style="list-style-type: none"> • It is done for intellectual capital • The present capacity is measured with future needs
Build	<ul style="list-style-type: none"> • It ensures that the future competitiveness of the organisation is maintained and sustained
Divest	<ul style="list-style-type: none"> • This is a let go stage wherein if the organisation can better use their intellectual capital externally, it should have means for it • Similarly the cost/benefit of holding and divesting the info is considered

Strengths: Introduction of two new critical phases:

1. Knowledge content and the decision as to whether to maintain or divest this knowledge
2. Consider both tacit and explicit knowledge (more comprehensive than the Meyer and Zack cycle)

2.4.3 The McElroy KM Cycle

The McElroy emphasises that the organisational knowledge remains in the minds of the individuals and groups and objectively in the explicit terms. He describes the KM cycle that consists of the processes of knowledge production and knowledge integration, with a series of feedback loops to organisational memory, beliefs, claims and business process environment (Fig. 2.10).

Definition of single-loop learning and double-loop learning:

In *single-loop learning*, individuals, groups or organisations modify their actions according to the difference between expected and obtained outcomes.

In *double-loop learning*, the entities (individuals, groups or organisation) question the values, assumptions and policies that led to the actions in the first place; if they are able to view and modify those, then second-order or double-loop learning has taken.

Fig. 2.10 Knowledge processing in McElroy cycle

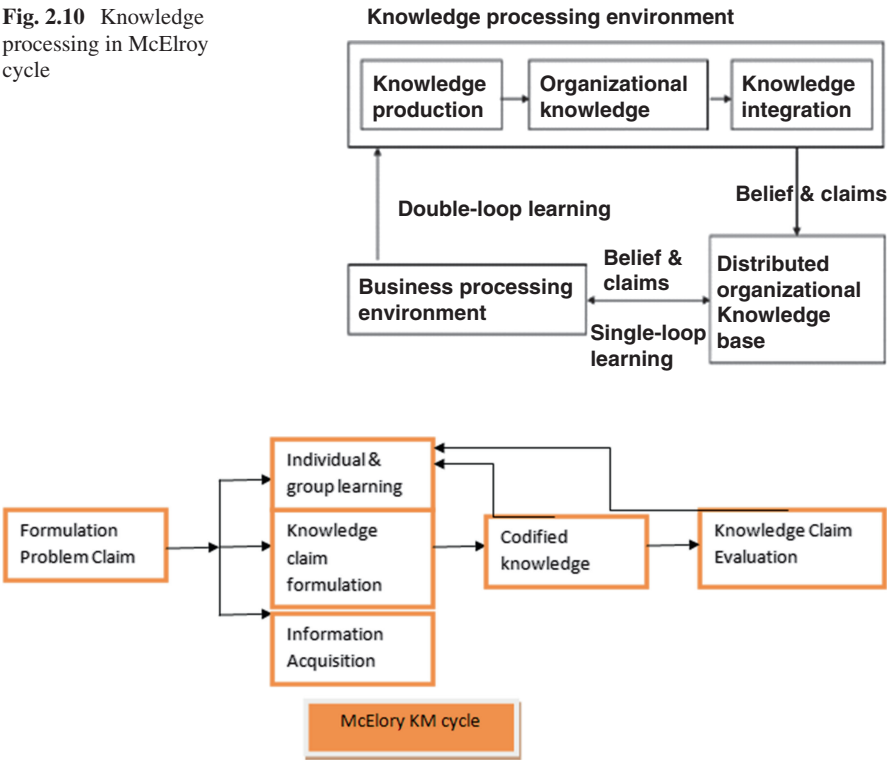


Fig. 2.11 McElroy KM cycle

The following diagram depicts the main stages of the McElroy KM cycle (Fig. 2.11):

McElroy KM cycle stages	Significance
Formulation problem claim	<ul style="list-style-type: none">• An attempt to learn and detect the specific gap in the knowledge asset
Individual and group learning	<ul style="list-style-type: none">• It is the validation of the collected knowledge by the organisation
Knowledge claim validation	<ul style="list-style-type: none">• Involves codification at an organisational level based on individual and group innovations
Information acquisition	<ul style="list-style-type: none">• The process by which an organisation acquires knowledge claims or information produced by others, usually external to the organisation (competitive intelligence)
Knowledge claim evaluation	<ul style="list-style-type: none">• The process by which knowledge claims are evaluated to determine their validity and value. The knowledge is of greater significance than the present knowledge

2.4.4 Wiig KM Cycle

Wiig basically focuses on the three conditions necessary for the organisation business conduction:

- 1. It must have business and customers.
- 2. It must have resources to satisfy the need of customers.
- 3. It must have the ability to act.

The third point has been emphasised in the Wiig KM cycle. Wiig emphasised on the smarter execution for achieving better productivity by applying proper knowledge (Figs. 2.12 and 2.13).

Significance:
This model provides a ‘clear and detailed description of how organisational memory is put to use in order to generate value for individuals, groups and the organisation itself’.

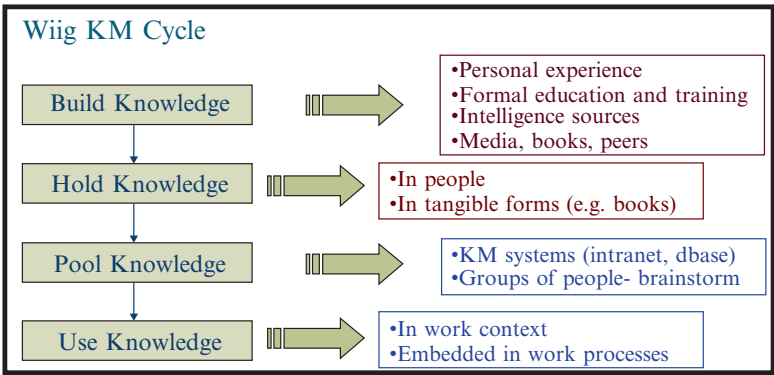


Fig. 2.12 Wiig KM cycle

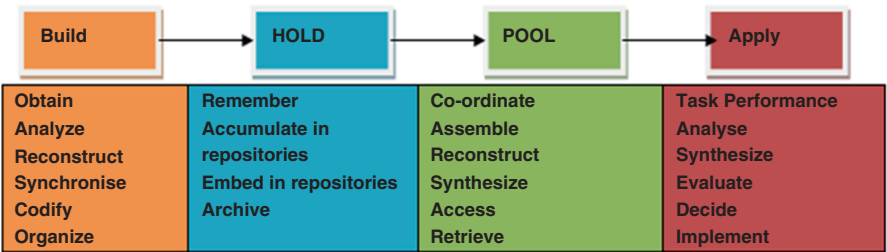


Fig. 2.13 Summary of Wiig KM cycle

2.5 Knowledge Management: Perspective of Small and Big Organisations

2.5.1 Small Organisations

It is easier for the smaller organisations to emulate individual knowledge management cycle since the number of employees is less and the level of interaction is high. But nevertheless they need to inculcate the habit of KM right from the beginning to ensure that the knowledge does not get lost in the day-to-day operations of the organisation. There could be resource constraints in the earlier days of functioning of an organisation, yet the background of KM could be managed. But the incentives to inculcate KM should be clear in the minds of the managers. The result of not capturing knowledge in the earlier days of an organisation could result in loss of competition and incurring extra cost to obtain the knowledge. The smaller organisations are flexible enough to tap the changes so in a way they are at an advantageous position in comparison to bigger organisation.

2.5.2 Large Organisations

As the organisation grows, it becomes difficult to emulate KM cycle of an individual. A lot of stakeholders raise queries and the need to share information rises. The dissemination of the knowledge becomes difficult due to time and space crunch. But the bigger organisations have the resources available, and with the advent of modern technology, it is possible for larger organisation to implement KM in their organisation. More than anything, these large organisations need to consider a shift in their culture, if it is not tuned to the implementation of the KM. They need to set their priorities to implement KM since its need can be latent, and by the time it could become urgent, it would be late and there could be serious loss of competition.

2.6 Challenges for Implementing Knowledge Management Cycle

- *Challenge 1:* Moving people from information-driven process to knowledge-driven process—Most people don't have the time, energy and incentives to invest in the creation and dissemination of the knowledge. Unless the benefits are not obvious, it is difficult to get the work done. In creating KM cycle, the managers face similar issues where he has to signify the importance of KM to the employees.
- *Challenge 2:* The capturing of tacit knowledge—No process is full proof, and the capturing of tacit knowledge remains a major challenge for any KM cycle.

- *Challenge 3:* To delink technology and KM—The use of technology has created myth among the organisations that KM is meant for big organisations which can spend on the technology. But technology unavoidable part of any modern Knowledge Management practice.
- *Challenge 4:* To create trust for free flow of information—The cultural issues of the organisation affects the type of KM cycle that can be implemented. In a close organisation the implementation of KM would be difficult and will the need necessary changes in the culture.
- *Challenge 5:* The implementation of KM cycle will change not only with the change in the organisations but also due to the changes within the organisation itself.

2.7 Summary

This chapter discusses different stages in knowledge management cycles. Each KM cycle has stages such as capturing the knowledge, codifying the captured knowledge (this will help in easy retrieval later on), getting it reviewed and then publishing it. However, in the knowledge economy, the effectiveness of KM cycles is measured by the degree to which the knowledge is shared among employees. Hence, without sharing and applying these knowledge to business practices, the KM cycle can never be completed. In the modern times, these knowledge are ‘pushed’ to potential business users. From tacit to explicit, the change in type of knowledge is important for business to be productive. This change is obtained by following a systematic and scientific way of adopting a KM cycle.

There are different KM cycles that have been proposed by different experts. However, an organisation needs to adopt different stages to suit its requirements. In the process of adopting these KM cycles, there will be hurdles that the organisation will have to overcome. A successful learning organisation will be able to overcome these challenges and use knowledge as a strategic tool.

Designing Knowledge Management-Enabled Business
Strategies

A Top-Down Approach

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