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Contribution of Knowledge Management Systems to Organizational Learning

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Abstract

Organizational Learning is regarded as a major factor that leverages the competitive advantage of a company. Nowadays, many enterprises are relying on Knowledge Management systems for various purposes, but the utilization of these systems for enhancing Organizational Learning has not reached its optimum level. In the actual context, the purpose of the research is to determine how Knowledge Management systems foster effective learning at individual, group and organizational level. In order to explore these facets, five interviews have been conducted with representatives of companies that recognize the importance of Information Systems in achieving Organizational Learning. According to our findings, there are several initiatives towards this direction, but lack of time and accessibility to right information undermine the learning processes. As a consequence, appropriate measures should be taken in order to address the aforementioned challenges and to ensure that Organizational Learning becomes a valuable resource that enhances the performance of a company.

Keywords

Knowledge Management, Organizational Learning, five learning cycles, KM systems, wikis, discussion forums, best practices, lessons learned.

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Contents

1.1. Background	7
1.2 Problem area.....	8
1.3 Research purpose.....	9
1.4 Delimitation.....	9
2. Literature review	11
2.1 Knowledge	11
2.2 Organizational Learning.....	12
2.2.1 <i>Defining Organizational Learning</i>	12
2.2.2 <i>Organizational Learning Perspectives</i>	13
2.2.3 <i>Sub processes of Organizational Learning</i>	15
2.2.4 <i>Measuring the effectiveness of Organizational Learning</i>	16
2.3 Relationship between KM and Organizational Learning	17
2.4 Knowledge and Organizational Learning frameworks	18
2.4.1 <i>KM Frameworks</i>	18
2.4.2 <i>Organizational Learning Frameworks</i>	19
2.4.3 <i>Research Model: a culmination of KM and Organizational Learning frameworks</i>	21
2.5 KM Systems	25
2.6 Summary	29
3. Research Methodology	30
3.1 Research approach.....	30
3.2 Data collection methods.....	30
3.3 Techniques for collecting empirical data	31
3.4 Interview guide.....	32
3.5 Data analysis	32
3.6 Scientific quality.....	34
3.7 Research ethics	35
3.8 Reduction bias	36
3.9 Summary	37
4. Empirical findings	38
4.1 Axis Communications.....	38
4.1.1 <i>KM systems used by Axis</i>	38
4.1.2 <i>Usage and impact</i>	40

4.2 Mobile communications company.....	40
4.2.1 <i>KM systems used by the company</i>	41
4.2.2 <i>Usage and Impact</i>	42
4.3 Wireless semiconductor enterprise	42
4.3.1 <i>KM Systems used by the company</i>	43
4.3.2 <i>Usage and Impact</i>	44
4.4 IBM.....	45
4.4.1 <i>KM systems used by IBM</i>	45
4.4.2 <i>Usage and Impact</i>	46
4.5 Handset producer.....	47
4.5.1 <i>KM systems used by the company</i>	47
4.5.2 <i>Usage and impact</i>	48
4.6 Summary	49
5. Data analysis	50
5.1 Overview of the analysis process	50
5.2 Learning at Individual Level	50
5.3 Learning at Individual/group level	52
5.4 Learning at Group Level	53
5.5 Learning at Group/Organization Level	55
5.6 Learning at Organizational Level	56
5.7 Secondary findings	57
5.8 Summary	59
6. Conclusions.....	60
Appendix A.....	63
Appendix B	65
Appendix C.....	70
Appendix D.....	76
Appendix E	81
Appendix F	87
References.....	91

List of figures

Fig. 2.1.KM and organizational processes and outcomes.....	17
Fig. 2.2.Five Learning Cycles Model.....	22
Fig. 3.1.Steps performed during the analysis.....	33

List of tables

Table 2.1.Definitions of Organizational Learning	13
Table 2.2.Comparison of frameworks	20
Table 2.3.Examples of KM Systems mapped to Organizational Learning cycles	29
Table 3.1 Participants to the interviews	31
Table 5.1.Summary of the outcomes of the analysis.....	58

1. Introduction

This chapter starts by presenting the backgrounds of Knowledge Management and of Organizational Learning. Based on the identified issues in the problem area, a research question is formulated. The introductory chapter continues with a description of the delimitations of the current study.

1.1. Background

In the current enterprise environment, Knowledge Management (KM) becomes an essential component that provides multiple facilities to an organization. KM systems are not only providing a repository for storing relevant information, they are also fostering efficient transfer and sharing of knowledge among employees and groups of employees, thus improving the process of Organizational Learning (King, 2009).

KM has strong technical and social components (Rollet, 2003). Even though there is lot of debate regarding which component is more dominant, the emergence of new and innovative technologies determined IT aspects to gain more and more importance in managing knowledge within an organization (McAdam and McCreedy, 1999).

Many companies like Microsoft, Hewlett Packard or Amazon have successful implementations of KM systems that promote virtual communities as adequate environments that allow fast transfer of knowledge. (Abuhamdieh, 2006)

Besides providing information anytime and anyplace, KM Systems are linking together individuals, groups and organizations, thus enabling and reinforcing network structures. They allow managers to actively monitor the performance of individuals and groups within the organization. In addition, these systems empower employees to perform their tasks with more responsibility based on their own expertise and on the information made available through the platform. (Boersma and Kingma, 2006)

KM is closely related to Organizational Learning. More precisely, many people regard Organizational Learning as the goal of KM (King, 2009). By fostering creation, transfer and application of knowledge, KM initiatives contribute to the organization by allowing this knowledge to embed into the organizational processes as a way of ongoing improvement (King, 2009). Organizational Learning has been considered to be an effective developmental initiative

in organizations that have the mission to develop, to sustain and to advance (Law and Gunasekaran, 2009). Stata (1989) claims that an organization's ability to learn faster than its competitors is foreseen as the only sustainable competitive advantage. Contributions of Organizational Learning can be seen through the perspectives of various disciplines. Management science claims of Organizational Learning fosters better information processing through acquisition and dissemination of knowledge and informing; sociology and organizational theory regard Organizational Learning as an incentive to question the nature of learning in organizations; strategic perspective acknowledges the role of Organizational Learning in leveraging competitive advantage and in increasing the strength of adaptability of organizations to changing market circumstances (Easterby-Smith, 1997).

KM systems can provide multiple advantages within a company, but most of the times they do not have a high contribution to effective individual or collective learning. Therefore, a proper understanding of their functioning is required in order to map them accordingly to Organizational Learning processes.

1.2 Problem area

Although KM systems prove to be a valuable resource for managing a variety of internal organizational issues, their utilization in leveraging Organizational Learning has not reached its full potential. Whenever an enterprise lacks or does not have proper implementations of KM systems, it may become the subject of inefficient and inconsistent learning by its members. Organizational units that have potentially synergistic information are many times not aware of its functionality and therefore are unable to route it to proper destinations. (Huber, 1991)

In addition, Huber (1991) claims that excepting repository systems that store "hard" information, the other systems of an enterprise do not perform well in finding whether a certain information item is known to the organization.

Sanchez (2005, p. 4) argues that "most managers of organizations today do not have a clear view of the specific kinds of knowledge that individuals in their organization have." He acknowledges that the main way of discovering known issues within a company is converting tacit knowledge into explicit knowledge. Even though explicit and tangible knowledge have been widely described within the literature, management of tacit knowledge is still not explored enough due to the inherent difficulties encountered in formalization and articulation of this type of knowledge (Vasconcelos et al., 2007).

Sanchez (2005) identifies some other problems that may occur inside an organization. When there is a lack of proper KM techniques, some individuals may feel reluctant in sharing their knowledge expertise. The main reason is that they regard this as a factor that would diminish

their importance within the organization. Problems related to knowledge sharing can be encountered also at higher levels. For instance, Sanchez (2005) mentions the intra-organizational 'not invented here' syndrome, where an organizational unit may not recognize knowledge that was made explicit by another unit.

One method that can be applied in order to reduce the negative outcomes of these problems is proper usage on KM processes (King, 2009). However, the author recognizes that the role of KM in the context of Organizational Learning has not been fully explored.

In this situation, the main research question that arises is:

❖ *How are KM systems contributing to effective Organizational Learning?*

In order to explore all the aspects related to this subject, it is necessary to study in detail all the levels of learning: individual, group and organizational (King, 2009). Therefore, the main research question can be further divided into three sub-questions that focus on each organizational level:

- *How are KM systems contributing to effective learning at individual level?*
- *How are KM systems contributing to effective learning at group level?*
- *How are KM systems contributing to effective learning at organizational level?*

1.3 Research purpose

The study aims to explain the challenges encountered when using KM systems in order to increase the effectiveness of individual and collective learning within an organization. The main contribution of the thesis to Information Systems is provided by the detailed analysis of the way in which KM systems can enhance Organizational Learning. Moreover, inconsistencies when using KM systems for this purpose are addressed and as a result, managers and other employees can be aware of such negative aspects and avoid them in the future.

1.4 Delimitation

The study does not consider internal and technical implementations of KM systems within an enterprise, since this issue is extremely ample and it is outside the scope of the current study. For instance, we do not address what development tools and algorithms have been used to implement the KM systems. Other features like scalability, robustness, speed or security are not discussed since they are not related to the research purpose. As a result, only functional aspects that concern these systems will be taken into account.

In addition, psychological aspects related to individual or group learning process are not discussed in this thesis and will be regarded as an internal aspect when performing our research.

2. Literature review

This chapter describes relevant theories and frameworks related to KM and Organizational Learning. The first part of the chapter focuses on defining and presenting the main characteristics of Knowledge and of Organizational Learning. The relation between these two concepts is clarified by explaining how KM processes are used in order to achieve organizational goals. The chapter continues by evaluating some theoretical models that serve to the research purpose. The evaluation is performed by comparing the characteristics of the frameworks and choosing the model that best fits our study. The final part describes specific KM systems that are widely used within organizations and shows how these systems are related to the selected research model.

2.1 Knowledge

A famous and oft-mentioned axiom is that knowledge is power. However, most of the times, organizations are unable to utilize their knowledge at the full potential (King, 2009). This problem can raise vulnerabilities that might have a negative impact on both organizational learning and organizational performance.

As a result, many organizations have made significant efforts and considerable investments in order to manage knowledge (Crossan and Bapuji, 2003). These efforts are driven by the perception of knowledge being their key strength for competitive sustainability.

Due to the various implications of knowledge in business activities, a proper categorization of concepts is required in order to avoid misinterpretations. Based on previous studies, Bergeron (2003) emphasizes the differences between the core concepts and classify them in the following manner:

- *Data* represents only numerical quantities or attributes that are derived from experiments, observations, calculations etc.
- *Information* consists of data associated to particular explanations, interpretations or other textual material concerning a particular object/process.
- *Metadata* represents additional information regarding the context in which main information is used.

- *Knowledge* is defined as information which is organized and synthesized in order to foster comprehension, awareness and understanding. Knowledge combines both metadata and awareness of the context suitable for applying metadata.
- *Instrumental understanding* is the clear and complete perception of the nature and significance of an issue. It is the internal capability to gain experience by relating specific knowledge to broader themes. Other researchers refer to this concept either as sense making (Sanchez, 2005) or wisdom (Bellinger et. al., 2004).

Knowledge, one of the top concepts in the aforementioned hierarchy, is further classified into two distinct types: *tacit* knowledge and *explicit* knowledge (Nonaka and Konno, 1998). According to the two authors, explicit knowledge can be expressed as words and numbers contained in manuals and specifications. This type of knowledge can be systematically and formally shared between individuals. On the other hand, tacit knowledge, which consists of subjective insights and intuitions, is hard to be formalized due to its personal nature. Nonaka and Konno (1998) identify two dimensions of tacit knowledge: the technical dimension which describes the “know-how” (personal skills and crafts) and the cognitive dimension which encompasses the set of beliefs, values and mental models that are deeply ingrained in individuals and are therefore taken for granted.

Bergeron (2003, p. 8) defines KM as “a deliberate, systematic business optimization strategy that selects, distills, stores, organizes, packages, and communicates information essential to the business of a company in a manner that improves employee performance and corporate competitiveness”. KM helps enterprises in achieving several goals, one of them being Organizational Learning (King, 2009).

2.2 Organizational Learning

Organizational Learning is gaining a lot of importance as it is seen as a facilitator that sustains competitive advantage for an organization (March, 1991). Several organizational outcomes like organizational control and intelligence or exploitation of knowledge and technology can also be achieved through Organizational Learning (Templeton et. al, 2002)

2.2.1 Defining Organizational Learning

In a study conducted by Castaneda and Rios (2007) it is mentioned that the term Organizational Learning was first used by Cyert and March (1963) who mapped learning to an organizational context. Even though Organizational Learning is acquiring a lot of interest, learning in or by an

organization is an issue generating lot of confusion (Jyotibabu et. al, 2010). According to Antonacopoulou (2006), a single perspective is not enough to capture the multiple connections and possibilities created by the entire learning.

Many researchers have defined organizational learning in different ways. Some of the definitions as a representative sample are illustrated in table 2.1.

Table 2.1 Definitions of Organizational Learning

Definition	Relation to research purpose
Organizational Learning is a process in which members of an organization detect errors or anomalies and correct it by restructuring organizational theory of action, embedding the results of their inquiry in organizational maps and images. (Argyris, 1977, p. 116)	Organizational Learning prevents companies from repeating past mistakes.
Organization Learning means the process of improving actions through better knowledge and understanding. (Fiol and Lyles, 1985, p. 803)	Contribution of Knowledge to Organizational Learning
Learning Organizations are organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspirations are set free and where people are continually learning how to learn together. (Senge, 1990, p.3)	Organizational Learning promotes continuous learning of individuals and groups.
Organizational learning is the set of actions (knowledge acquisition, information distribution, information interpretation and organizational memory) within the organization that intentionally and unintentionally influences positive organizational change. (Templeton et. al, 2002, p. 189)	Knowledge acquisition and transfer play an important role in achieving Organizational Learning.

2.2.2 Organizational Learning Perspectives

In an attempt to identify the core aspects of Organizational Learning, several authors have proposed different categorizations of its underlying components which are described further.

- Single Loop Learning and Double Loop Learning

Argyris and Schon (1978) originated two views regarding learning, namely Single-Loop Learning (SLL) and Double-Loop Learning (DLL).

They define single loop learning as “learning that changes strategies of actions or assumptions underlying strategies in ways that leave the values of a theory of action unchanged”, and double-loop learning as “learning that results in a change in the values of theory-in-use, as well as in its strategies and assumptions”(Argyris and Schon, 1996, p. 20).

Single Loop Learning involves putting into effect goals, rules and plans and not trying to question them. On the other hand, Double Loop Learning includes questioning and speculation of established rules. It enables improvisation in terms of reframing a problem which can result into radically different potential solutions. (Kim, 1993)

- “Know-how” and “know-why”

Learning has two meanings: know-how and know-why. Practical knowledge that is gained while doing a task can lead to “know-how” knowledge.(Sanchez, 1997).Repeatable patterns of action impacts how a task can be performed better .

Know-why knowledge is attributed to the type of learning that involves analyzing a task. This results in the comprehension of why a task is accomplished by certain actions. It is a result of more insightful investigation or inquiry into those actions or tasks (Sanchez, 2005).

- Individual, Group and Organizational Level

Organizational learning is a set of dynamic processes that allow movement of knowledge from individuals to organizations based on organizational information activities (Real et.al, 2006; Ruiz-Marcader et al., 2006). Organizational Learning is described to take place at various levels– individual, group and organizational (King, 2009; Crossan et al, 1999; Sanchez, 2005; Sabherwal and Bacerra-Fernandez, 2003). Moreover there is a consensus that learning takes place at all these three levels (Bappuji and Crossan, 2004).

An organization learns through its individual members (Kim, 1993). Learning fundamentally occurs in the minds of the individuals (Simon, 1991; Sanchez, 2005). Shrivastava (1983) mentions that an organization learns through its individual members, either directly or indirectly. However, the author claims knowledge does not directly magnify into organizational level from an individual. More precisely, the relationships and shared understandings of groups get ingrained at the organizational level (Shrivastava, 1983). The gradual and ultimate impact is at the organizational level information (Hurley and Hult, 1998; Slater and Narver, 1995).

Organizational learning is considered to be analogous to individual learning when an organization is small structured with a small group of people (Applebaum and Reichart, 1998). However, Argyris and Schon (1978) discuss a point of contention by stating that organizational learning is not individual learning and yet organizations learn through their individual members. Kim (1993) emphasizes that there is a clear distinction between individual and organizational learning as an organization grows. Nonaka (1994) highlights that interaction between individuals

is imperative in adding a dimension to organizational knowledge creation. Even though ideas are created in the minds of a single individual, their future evolution is highly dependent on the interaction between several individuals.

2.2.3 Sub processes of Organizational Learning

According to Huber (1991, p. 89), “an entity learns if, through its processing of information, the range of its potential behaviors is changed.[...] An organization learns if any of its units acquires knowledge that it recognizes as potentially useful to the organization”. Huber (1991) has elaborated a model that sees Organizational Learning as a process consisting of four sub processes. They are: knowledge acquisition, information distribution, information interpretation and organizational memory. Acquisition deals with obtaining knowledge, information distribution deals with transfer, interpretation concerns understanding information through many perspectives, while organizational memory relates to the storage of knowledge for future use. This model served as a starting point for many detailed studies of Organizational Learning.

However, Huber (1991) claims that learning does not always contribute to the increase of learner’s efficiency and it does not always determine observable changes in behavior.

Huber (1991) acknowledges the importance of information distribution with respect to both *occurrence* and *breadth* of Organizational Learning. With respect to occurrence, he claims that new information can be obtained by linking together different pieces of information from multiple organizational units. Regarding breadth of organizational learning, the author claims that most enterprises are not aware of their existent knowledge. Therefore, Huber (1991) states that information that is widely distributed in a company (having multiple sources of information) leads to minimization of retrieval efforts and to maximization of learning ability.

After information has been shared through one or multiple communication channels, it can be utilized through several means: elaboration (development of different interpretations), infusion (identification of core issues) or thoroughness (development of multiple understandings by different individuals/groups) (Huber, 1991).

Huber (1991) claims that each time new information becomes available within an organization, its shared interpretation is susceptible to different understandings of the members. In addition, he mentions that there is significant confusion whether a common agreed interpretation or the existence of various interpretations produce more Organizational Learning. He identifies five main factors that affect the extent of shared interpretation of new information:

- 1) the uniformity of prior *cognitive maps* possessed by the organizational units,
- 2) the uniformity of the *framing* of the information as it is communicated,

- 3) the *richness of the media* (ability of obtaining the same understanding of the sender and the receiver) used to convey the information,
- 4) the *information load* on the interpreting units,
- 5) the amount of *unlearning* that might be necessary before a new interpretation could be generated.

2.2.4 Measuring the effectiveness of Organizational Learning

Since the current research aims to understand the contribution of KM to effective Organizational Learning, it is important to comprehend the factors that drive the latter concept. Many measuring tools/surveys have been employed by researchers to measure Organizational Learning and its effects.

Jyothibabu et. al (2010) have developed an integrated scale to measure Organizational Learning. This scale was based on Watkins and Marsick's Dimensions of the Learning Organization Questionnaire (DLOQ) (elaborated by Watkins et. al (1997) and Bontis et. al (2002)). The combination of their study results revealed that there were seven dimensions of learning that affected organizational outcomes:

- Continuous Learning (CL): Organizational effort to facilitate continuous learning opportunities to all of its members.
- Inquiry and Dialogue (DI): Fostering a culture of questioning, feedback and experimentation by an organization.
- Team Learning (TL): Collaborative work promoted by an organization so as to achieve desired tasks.
- Employee Empowerment (EE): The concern for an organization to consider the collective vision of its employees/members about the gap between the current state of affairs and the futuristic vision.
- Embedded System (ES): Presence and efforts to establish systems to capture and share learning.
- System Connection (SC): Connection of an organization to its internal and external environment.
- Strategic Leadership for learning (LL): Involvement from leaders to use learning for changes and leading the organization to new directions.

2.3 Relationship between KM and Organizational Learning

The relationship between KM and Organizational Learning has been thoroughly analyzed by King (2005). The author states that the conceptualization of the aforementioned relation can be viewed from two different perspectives. First of all, King (2005) acknowledges that researchers like Easterby-Smith and Lyles (2003) make a distinction between the two disciplines based on their roles: while Organizational Learning focuses on *process*, KM focuses on *content*.

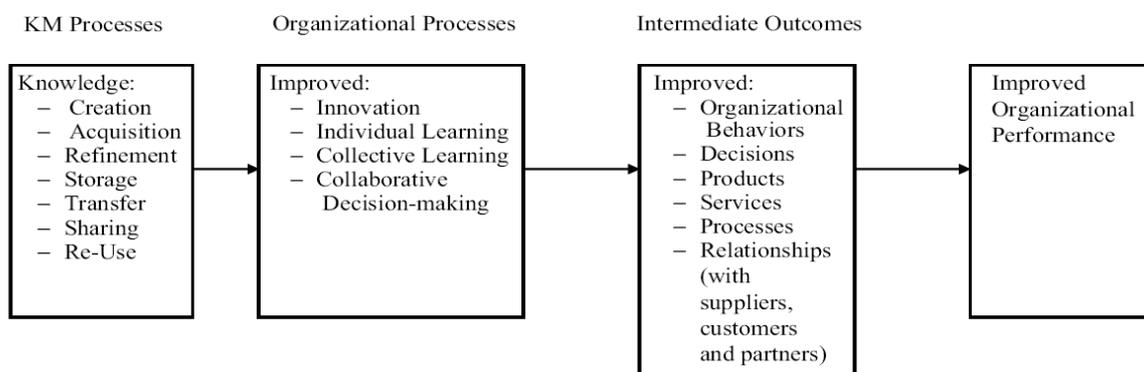


Fig 2.1. KM and organizational processes and outcomes (King, 2009, pp 6)

As it can be noticed from figure 2.1, KM processes involve creation, acquisition, refinement, storage, sharing, transfer and re-use of knowledge. These processes, if applied successfully, have a significant contribution to the enhancement of organizational processes (including innovation, collaborative decision-making, individual and collective learning). In turn, these processes enable enhanced organizational behaviors, better relationships and decision making, which determine a higher quality of products and services. As a result, all these intermediate outcomes lead to improved organizational performance on the long term.

In order to fully employ KM processes, it is mandatory to differentiate between transfer and sharing. While the former concept relates to focused communication from a sender to a known receiver, the latter implies dissemination of knowledge (through a repository) to a target which is not known in advance (King, 2009).

In addition, there is another way to conceptualize the connection between KM and Organizational Learning. This particular interpretation implies regarding Organizational Learning as the goal of KM:

“By motivating the creation, dissemination and application of knowledge, KM initiatives pay off by helping the organization embed knowledge into organizational processes so that it can continuously improve its practices and behaviors and pursue the achievement of its goals. From this perspective, organizational learning

is one of the important ways in which the organization can sustainably improve its utilization of knowledge.” (King, 2009, p. 5)

To summarize, both points of view emphasize the strong link between KM and Organizational Learning. Consequently, we can conclude that one factor plays an essential role in achieving the other factor. As a result, enterprises can significantly improve their organizational processes by enabling and monitoring several knowledge-related processes.

However, it is argued that most processes that contribute to the success of KM have social nature. Rollet (2003, p. 19) states that “the first and most general lesson learned is that knowledge is always primarily about people”.

An example of social process that supports the above statement is the Communities of Practice whose importance has been acknowledged by King (2009) and Coakes and Clarkes (2006). They define Communities of Practice as groups of people who share the same interests, experiences and best practices. These groups encourage mutual learning between members either on face-to-face or on virtual basis. Even though such people have a high involvement in the management of knowledge processes, their contribution can be made more efficient by the aid of Information Technology (Baroni, Araujo, 2006; King, 2009).

2.4 Knowledge and Organizational Learning frameworks

There are various frameworks proposed for KM and Organizational Learning. After the 1990s, there has been an exponential growth of the number publications related to Organizational Learning (Crossan and Guatto, 1996). Similarly, KM is an emerging field. McCreedy and McAdam (1999) state there is a paucity of distinctive classifications of KM models.

Therefore, it is imperative to find a suitable theoretical model that combines principles of both KM and Organizational Learning and which reflects clearly the connection between these two concepts.

2.4.1 KM Frameworks

With respect to KM and especially to the combination of tacit and explicit knowledge, Nonaka and Konno (1988) have elaborated the SECI model which captures four distinct conversion patterns namely: Socialization, Externalization, Combination and Internalization.

Socialization involves transfer of tacit knowledge between several individuals. *Externalization* requires expressing tacit knowledge in an adequate way in order to increase comprehension of other individuals. At this stage, individuals become members of a group by sharing their

knowledge. *Combination* consists of structuring explicit knowledge into more complex sets. This stage of knowledge conversion can be divided into three processes: capturing and integrating new explicit knowledge, disseminating explicit knowledge and processing explicit knowledge (in order to increase its usability). The last pattern, *Internalization* entails the conversion of explicit knowledge into tacit knowledge. Nonaka and Konno (1998) emphasize two premises that must be met for internalization process: having explicit knowledge embodied in action and practice and using simulations and experiments to trigger learning by doing.

Even though the SECI model has been widely acknowledged within relevant literature, it presents some empirical shortcomings that have been questioned by Gourlay (2003). He states that researchers like Becerra-Fernandez and Sabherwal (2001), Poell and van der Krogt (2003) showed that each of the SECI components is strictly dependent on the type of work task. Moreover, they argue that SECI model is specific only to Japanese organizational cultures (where tacit knowledge is predominant) and its linearity is often criticized.

Furthermore, McAdam and McCreedy (1999) conducted a critical review of KM Models starting with the SECI Model and moving further to Hedlund's and Nonaka's KM model (1993), Boisot's knowledge category model (1987), Intellectual Capital model of KM model (Chase, 1997) and Demerest KM Model (1997). They conclude with a modified version of Demerest's KM Model as it signifies a balance between scientific and socially constructed knowledge. This model depicts a recursive movement of knowledge from its construction to embodiment of knowledge through social interchange, to knowledge dissemination and finally to knowledge use, especially its economic applicability for the organization.

2.4.2 Organizational Learning Frameworks

Bapuji and Crossan (2003) have performed a review of the literature regarding Organizational Learning that was between 1990 and 2002. Even though they did not come up with a model that best captures all viewpoints, they addressed certain concerns centered on Organizational Learning. More exactly, they have discussed about the following aspects:

- the need for an increase in empirical research in Organizational Learning,
- learning to be able to be acknowledged beyond the realms of experiential learning,
- shifting more attention to learning processes
- the need for a movement towards accumulation, synthesis and integration.

Furthermore, Crossan et. al (1999) have performed a comparative analysis of different phenomenological domains applicable to Organizational Learning frameworks that address the paucity of strategic renewal in Organizational Learning. As it can be noticed from table 2.2, most of the Organizational Learning frameworks are inconsistent.

First of all, most of them do not identify the phenomenon of interest, which is in this case strategic renewal (Crossan et. al, 1999). Secondly, the models do not address all the levels of Organizational Learning (some of the frameworks omit organizational level, while other frameworks omit both group and organizational levels). Moreover, the links between these levels are not covered (an exception is the model elaborated by Nonaka and Takeuchi (1995) which explains briefly the link between individuals and groups).

Regarding processes that link levels, Crossan et. al (1999) identify three types of shortcomings in the analyzed models: some frameworks are not considering this aspect at all, some others focus mainly on individuals and groups, while other models do not include process/level perspectives.

The cognition/action link is described by all the frameworks. However, Crossan et. al (1999) point out that the model elaborated by Nonaka and Takeuchi (1995) is centered on knowledge, and does not describe Organizational Learning issues.

Table 2.2 Comparison of frameworks (based on the evaluation performed by Crossan et. al, 1999, pp 523, modified)

Source	Strategic Renewal Tension	Multilevel Framework	One level affects the others	Process Linking Levels	Cognition/ Action Link
March & Olsen (1975)	Not considered	No group level	Not considered	Not considered	Yes
Daft & Weick (1984)	Not considered	Not considered	Not considered	Processes are described, but not a levels perspective	Learning is a change in behavior
Senge (1990)	Not considered	No organizational level	Not considered	Processes focus on individual and group- not a levels-related model	Yes
Huber (1991)	Not considered	Yes	Not considered	Processes within level but no model or processes to link levels	Cognition affects behaviors
March (1991)	Yes	No group level	Not considered	Not considered	Yes
Watkins & Marsick (1993)	Not considered	Yes	Not considered	Six action imperatives of the learning organization	Consistent with Senge's perspective
Nonaka & Takeuchi (1995)	Not considered	Recognized, but not a substantial part of the model	Some discussion of the link between individual and group	Focuses on processes that link individual and group – weak on link between group and organization	Knowledge focus
Sanchez (2005)	Yes, through emergence and embedding loops	Yes	Yes	Strong emphasis on individual-group and group-organization links. Focuses on two processes that are linking the learning cycles: emergence and embedding	Yes

Crossan et. al (1999) claim that there should be a balance of exploitation and exploration in Organizational Learning. As a result, the authors elaborate the 4I framework which reflects learning that occurs through the sub-processes of Intuiting, Interpreting, Integrating and Institutionalizing in a multi-level context i.e. individual, group and organizational.

- *Intuiting* is a preconscious recognition of a pattern or possibilities and is strongly an individual learning aspect.
- *Interpreting* occurs when an individual insight is further fortified not only through an internal conversation but also with an interpretive process with others. This is also related to individual learning.
- *Integrating* is based on two basic tenets i.e. shared understanding and coordinated actions. The interpreting process merges into the integrating process. Repeated actions of certain routines are significant of this process. This is related to group learning.
- *Institutionalizing* is an organizational level process where coordinated actions occur through a shared understanding resulting because of dialogue and joint actions. Repeated actions (Integrating) from which effective and formal rules and procedures are filtered as embedded routines.

2.4.3 Research Model: a culmination of KM and Organizational Learning frameworks

We consider that the model that should be selected for this study should best reflect the most important aspects of both KM and Organizational Learning. Sanchez's Five Learning Cycles Model (fig. 2.2) has been chosen as our research model for performing this study. The main reasons for choosing this model are detailed below:

- The discussion of the model acknowledges the tacit and explicit knowledge distinction through the 'personal knowledge' and 'organizational knowledge' dimensions. As opposed to the Five Learning Cycles model, SECI model is purely descriptive and does not provide sufficient support for analyzing organizational learning and competence.
- The model addresses Organizational Learning as the culmination of multi-level sub-processes: individual, group and organizational.
- We consider that as opposed to 4I framework, this model has a 'top down' and 'bottom up' approach within each sub process and the overall framework in terms of emergence and embedding of knowledge. This acknowledges double loop learning perspective of Organizational Learning and also a recursive aspect of KM as addressed by the version of Demerest's KM model that has been modified by McAdam and McCreedy (1999).
- This model goes a step further and embodies the link between each cycle in terms of individual/group cycle and group/individual cycle. While Crossan et al. (1999) discuss about a 'spill over' of sub-processes that may occur between the three levels (individual, group and organizational) and describe the link between the learning processes be a

“natural blend”, Sanchez’s Five Learning Cycles Model clearly integrates the three levels with the additional individual/group and group/organizational cycles.

- “The array of the learning cycles in the model does not represent an ascending order of hierarchy, with the ideas of the individual worker at the bottom and a CEO at the top. (Sanchez, 2005)”. The impediments faced in acceptance of the ideas of an individual worker or a CEO at the organizational level are considered to be the same in the model, thus this model provides a more holistic approach for the all the members of an organization.

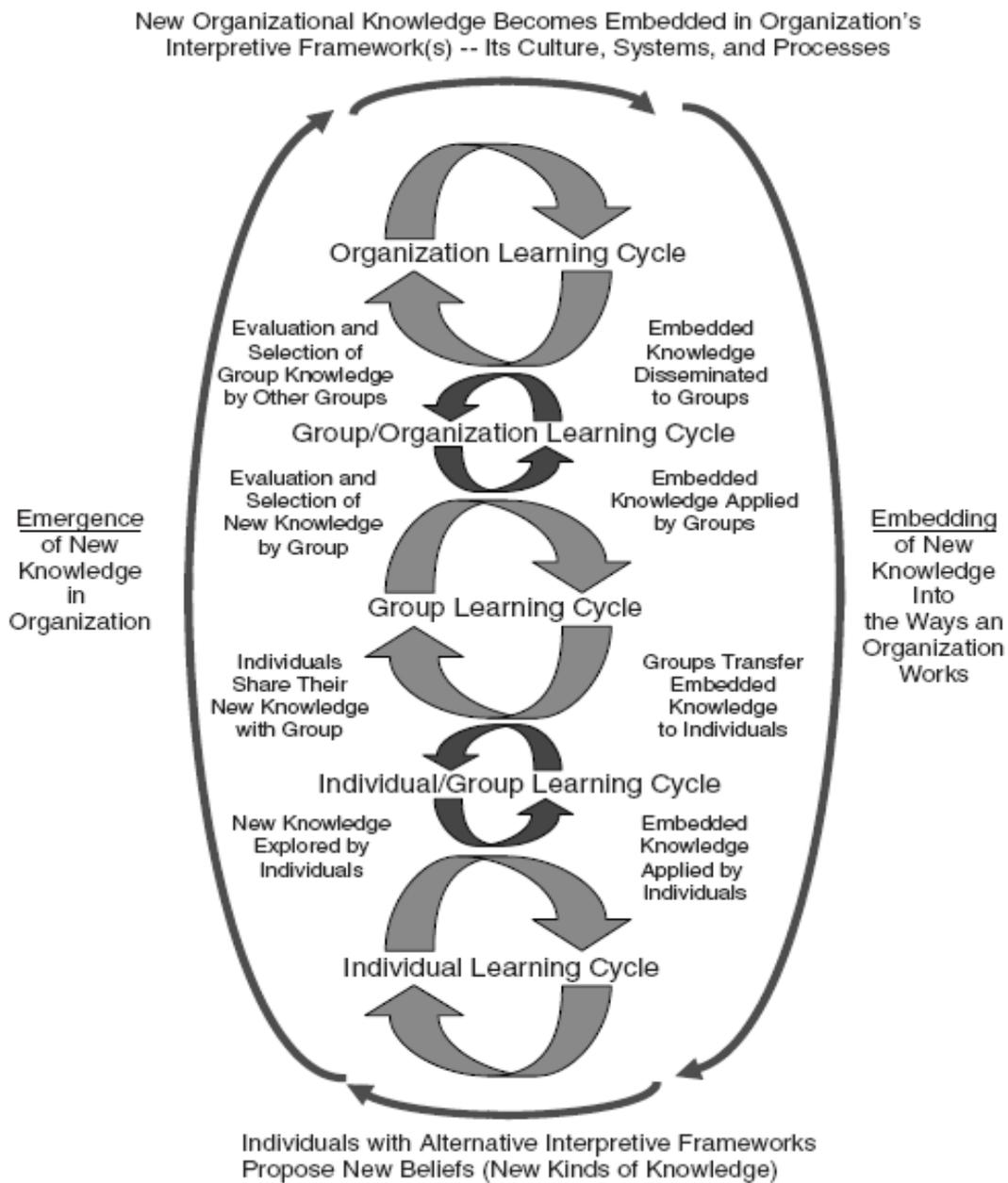


Fig. 2.2. Five Learning Cycles Model (Sanchez, 2005, p. 27)

The Five Learning Cycles Model consists of five levels of learning that are described as follows:

- Individual Learning Cycle

The premise for learning originates at the individual level. An individual's capacity to interpret information and gain knowledge depends on the individual's interpretive frameworks and personal sense making processes. However, an important aspect is to extract tacit knowledge from individuals in order to allow further dissemination of information to various cycles. This aspect helps in propagating Organizational Learning. (Sanchez, 2005)

- Individual – Group Learning Cycle

The individual/group cycle considers the interaction between an individual and his/her team members or the network of peers. This cycle encompasses the intermediate process of sharing both the individual's knowledge and learning with peers within a group. At this stage an individual's knowledge is validated by the group before it is accepted as a coherent and coordinated action. Therefore, the thin demarcation between an individual's personal sense making process and sharing of his/her knowledge between peers is accounted for. (Sanchez, 2005)

- Group Learning Cycle

This form of learning takes place when individuals in a group perform their tasks in a coordinated fashion and share the same set of core beliefs (Sanchez, 2005). This cycle also involves learning capabilities to improve a group's current routines for performing its tasks. (Sanchez, 2005)

- Group-Organization Learning Cycle

This cycle represents the formation of knowledge by a group that can be further used to communicate with other groups in the organization. The group/organization cycle is significant as the basis of *know-how* knowledge (learning how to do a task by repeatable actions) and *know-why* knowledge (analyzing the task further to understand why a certain task can be accomplished through coordinated actions) which give rise to *know-what* knowledge (new tasks that can be performed with current or new capabilities). A group communicates either of these types of knowledge to other groups in order to achieve organizational assets to put these ideas into action at the organizational level. (Sanchez, 2005)

- Organization Learning Cycle

This learning cycle involves collaboration of all the groups within an organization. Interaction between various groups leads to an exchange of group knowledge. Thereafter group knowledge that is accepted as valid is extracted and appropriate action is taken to allow the influence of this knowledge to the organizational processes. (Sanchez, 2005)

Emergence and *embedding* of knowledge in the framework represent the upward and downward movement of knowledge respectively in an organization thus forming an organization's knowledge processing loop.

Sanchez (2005) states that emergence occurs when new knowledge from an individual level moves further to the group level as it is evaluated and selected (or rejected) and thereafter when knowledge moves further from the group level and is evaluated and selected (or rejected) by the organization.

Furthermore, once new knowledge is accepted by the organization at a large extent and is embedded in the organizations processes, culture and systems, it follows a 'downward' movement to its inherent groups and individuals (Sanchez, 2005). This allows the groups and the individuals to exploit the knowledge further in their daily activities.

The emergence and embedding parts of the learning cycle in the framework feed each other. Once new knowledge is embedded in the system, individuals and/or groups can exploit the new knowledge and test their own set frameworks of understanding how to test or challenge the set of beliefs of the organization. This can trigger emergence of new knowledge that follows the upward fashion of learning.

In order to study the effectiveness of Organizational Learning using our research model, we have adopted the seven dimensions of learning enablers by Watkins et. al (1997), as discussed under measuring the effectiveness of organizational learning (sub-section 2.2.4). They propose Continuous Learning and Inquire and Dialogue as Individual Level enablers; Team Learning as Group Level Enablers; while Embedded Systems, System Connection, Strategic Leadership for Learning and Employee Empowerment are regarded as enablers of Organizational Level learning.

As may be noticed, all the aforementioned enablers are mapped only on three learning levels. However, the current research model is based on a theoretical framework that includes two more additional levels: individual/group and group/organization. As a result, appropriate changes have been made in order to map the enablers to the theoretical model. Therefore, we regard Embedded Systems as an enabler for all the levels of organizational learning with more emphasis on Group-Organization and Organization level learning.

Since the current study does not cover the aspects of the management's role we do not consider Strategic Leadership for learning.

Another important enabler, Employee Empowerment, is seen from the individual perspective. The main reason is that our study investigates the way in which individuals are engaged in using KM systems.

Furthermore, Inquiry and Dialogue are seen as enablers at the individual/ group and at group level as the Five Learning Cycles model reflects the movement of individual knowledge to an intermediary group and then to the group level through a process of interaction and feedback.

System Connection and Embedded Systems are regarded as enablers of group/ organization level. The current research does not focus on the ability of systems to connect an enterprise to its external environment; instead, it tries to analyze how relevant group artifacts (like documented Best Practices and Lessons Learned) are becoming organizational standards.

2.5 KM Systems

King (2009) considers KM systems as an extension of computer based communication and information systems (CIS) that supports knowledge processes. Besides providing the core functionalities of regular CIS, KM systems include repositories that contain lessons learned, directories and networks designed to facilitate communication between knowledge experts and other employees.

Baroni and Araujo (2006) analyzed different implementations of KM concepts by various software providers. Their research resulted in classification of KM software into ten distinct categories:

- Intranet systems
- Content Management Systems
- Groupware
- Workflow
- Artificial Intelligence (AI) systems
- Business Intelligence (BI)
- Knowledge Map Systems
- Innovation Support Tools
- Competitive Intelligence Tools
- Knowledge Portals

Intranets are defined as “private computing networks, internal to an organization, allowing access only to private users” (Curry, Stancich, 2000). The access, which is performed through Web browsers, is restricted to people outside the company. According to the two authors, intranets are linking employees, divisions and companies and are constantly reinforcing the existent network structures. Utilization of intranets is also discussed by Baroni and Araujo (2006), who identify another important usage scenario: gathering and systematizing knowledge that is dispersed between several departments within an organization. As a consequence, we can conclude that intranets have a significant role in individual/group, group/organization and organization learning cycles.

Curry and Stancich (2000) emphasize that one of the main benefits of using intranets is providing a centralized and automated mechanism for managers to monitor the activities and performance of employees. Another advantage pointed out by the researchers is that intranets provide more information to the organization members, thus increasing their awareness and empowering them to act with more responsibility.

The main aim of *Content Management Systems* (CMS) is to provide a repository for enterprise documents and organizing them in a better way (Baroni, Araujo, 2006). As mentioned by the authors, CMS software is used for cataloging, editing metadata, versioning, searching and indexing. Since CMS help in structuring information from various enterprise departments, they have a major contribution to group/organization learning cycle.

The term *groupware* is used to refer to flexible structures that can adapt easily to internal and external changes. Factors like globalization and the emergence of new technologies fostered the creation of this kind of groups (Baroni, Araujo, 2006). Communities of practice serve as a basis for forming groups of individuals that have similar expertise; moreover, these individuals do not have to be in close physical proximity in order to share and transfer knowledge. According to Baroni and Araujo (2006), asynchronous methods (e-mails), synchronous methods (live chat) and community-focused tools (e-groups) are used for achieving the outcome of remote communication between dispersed groups or group members. In other words, groupware provides technological support for individual/group, group and group/organization learning cycles.

Workflow systems offer support for monitoring business processes. These systems control the flow of information between individuals, hence establishing the sequence of tasks that have to be performed. When integrated with CMS and groupware, workflows provide a smooth document flow between different workers and sustain them in execution of processes (Baroni, Araujo, 2006).

Workflows ensure that each employee has access to the right information on the right time and consequently maintains the right parameters for the individual learning cycle.

Another way of enhancing the individual learning cycle is by the aid of *Artificial Intelligence* (AI). Examples of AI tools include neural networks, expert systems and case based reasoning systems. Baroni and Araujo (2006) point out that these systems use advanced algorithms based on pattern-matching and statistical instruments in order to discover the most relevant information which needs to be retrieved by a user.

Baroni and Araujo (2000) describe *Business Intelligence* (BI) as a collection of tools used for manipulating large amounts of operational data and to extract business information from them. BI consists of two main components: front-end systems (online analytical processing, data mining, query and reporting) and back-end systems (database management systems, data warehouses). According to the two researchers, BI improves reconfiguration and structuring of existent information and can be used additionally for creating new information as well.

Knowledge maps (also known as expertise locators) are used for identifying existent competencies within an organization and to match them accordingly to suitable tasks. More precisely, knowledge maps help human resource specialists in finding the people who have the necessary “know-what”, “know-how” or “know-why” for solving a certain type of problem (Baroni, Araujo, 2006).

Since knowledge maps contribute in finding the right people within a group, they provide consistent technological support for individual/group learning cycle.

Innovation support tools provide technological means for monitoring new ideas (design modifications, new patents or development of new products). These systems consist of technical databases, graphical simulation features and combinatory tools that foster storage and retrieval of innovative information (Baroni, Araujo, 2006).

As a result, innovation support tools enhance both individual/group and group/organization learning cycles by providing the necessary information with respect to innovations.

Besides structuring information, *Competitive intelligence tools* also contribute to sense making, hence providing organizations a better understanding that enables them to make better decisions (Baroni, Araujo, 2006).

Based on the previous finding, we can conclude that competitive intelligence tools play an essential role in case of organizational learning cycle.

Knowledge portals represent a fundamental artifact that contributes to the support of all five learning cycles of an organization.

Woods et. al. (2006, p. 116) define the portal as a resource “used to collect content from many different sources, resulting in a virtual collection available through a single point of access”. The described heterogeneity of information available through portals is also pointed out by Baroni and Araujo (2006).

An additional feature of portals is metadata management:

Tags and values can be directly replicated from source documents or harmonized within the virtual collection by mapping them to a centralized schema. In addition, a portal may permit the addition of metadata based on characteristics of the source system or based on the decisions made by the group about how ontology terms will be attached to documents. (Woods et. al., 2006, p. 116)

Other important advantages of using portals are highlighted by Woods et. al. (2006): easy publishing of distributed content based on intellectual properties of specific groups, customization for creating rich knowledge-sharing environments, embedded support for addition of personalized content.

Personalization is another feature discussed by Baroni and Araujo (2006), who mention that knowledge portals enable users to organize their content based on several criteria like interests, tasks, specific communities.

Knowledge portals are currently evolving into more complex systems that have the main aim of increasing awareness within the members of an organization (Baroni, Araujo, 2006; Woods et. al., 2006).

In addition to the aforementioned systems described by Baroni and Araujo (2006), another important tool for creating knowledge is the *wiki*. According to Gonzales-Reinhart (2005), wiki pages foster conversational KM, which is a method for creating organizational knowledge within a virtual environment. Wiki is defined as a “script driven website that allows a visitor to edit the content of the page” (Gonzales-Reinhart, 2005, p. 6). Users of wikis can gather information or add their own contribution to existent content. Gonzales-Reinhart (2005) mentions that wikis are characterized by an “open” principle, allowing users to freely add, edit or delete information. In addition, the author emphasizes that wikis are an example of social software solutions that enable individuals to benefit from their involvement in a group. Therefore, we can conclude that wikis have a significant role in improving individual/ group learning.

Table 2.3 presents all the previously described KM software systems in relation to the five Learning Cycles. In addition, relevant examples (suggested by Baroni and Araujo (2006) and Gonzales-Reinhart (2005)) are added in order to illustrate each KM software solution.

Table 2.3 Examples of KM Systems mapped to Organizational Learning cycles (Baroni, Araujo, 2006)

KM System	Supported Learning Cycle(s)	Example
Workflows (Baroni, Araujo, 2006)	individual	ARIS toolset
Artificial Intelligence based systems (Baroni, Araujo, 2006)	individual	CA-Neugents
Innovation Support tools (Baroni, Araujo, 2006)	individual/group group/organization	Goldfire innovator
Knowledge Maps (Baroni, Araujo, 2006)	individual/ group	Lotus Discovery Server
Groupware (Baroni, Araujo, 2006)	individual/group group	Lotus Family (Notes, Sametime) MS Suite (Outlook, Messenger)
Intranets (Baroni, Araujo, 2006)	individual/group group/organization organization	Apache HTTP Server
Content Management Systems (Baroni, Araujo, 2006)	group/ organization	File Net Excalibur RetrievalWare
Competitive Intelligence tools (Baroni, Araujo, 2006)	organization	Knowledge Works Vigipro
Wikis (Gonzales-Reinhart, 2005)	individual/group	-

2.6 Summary

This chapter presented theoretical concepts related to KM, Organizational Learning and the relation between them. Relevant frameworks (SECI model, 4I framework, Five Learning Cycles) have been thoroughly described. The Five Learning Cycles model has been chosen as the most suitable framework for performing the study. Its selection was grounded on a detailed analysis of the advantages and disadvantages of the other models. The last part of this section illustrated examples of different KM software systems that contribute to the enhancement of Organizational Learning.

3. Research Methodology

This section outlines the main research approach that was used for gathering empirical data. It goes on with a presentation of data collection methods and it also provides detailed descriptions of the interview guide and of the analysis process. Other important research aspects like quality, ethics and bias are discussed in the remainder of this chapter.

3.1 Research approach

Creswell (2007) identifies the premises necessary for performing qualitative research: when a problem requires in-depth exploration, when complex understanding of an issue is needed or when quantitative methods do not provide sufficient information. Due to the fact that the role of KM in context of effective Organizational Learning has not been fully explored (King, 2009), qualitative research was chosen for performing the study. In addition, there is still lot of confusion regarding the characteristics of KM and of Organizational Learning; therefore, qualitative approach is used to clarify the distinction between the two concepts.

Qualitative research is used in order to analyze the contribution of KM to effective learning within real-life organizational contexts (Creswell, 2007). In other words, this research enables exploring the actual environment in which company members are employing knowledge-related assets to leverage the Organizational Learning processes.

3.2 Data collection methods

Creswell (2007) defines data collection as a series of interrelated activities that aim at gathering good information to answer emergent research questions. Data collection is a complex process consisting of the following steps: finding the appropriate people and places to study, gaining access, establishing rapport with the participants, deciding on a strategy for purposeful sampling, determining strategies for data collection and for storage of information (Creswell, 2007). As suggested by Yin (2009), there are various techniques when collecting data for a qualitative study: archival records, documents, direct observations, participant observations and interviews.

Semi structured research interviews were selected in order to conduct the study. Kvale and Brinkmann (2009) emphasize that semi structured interviews aim at understanding themes of the lived everyday world from the subject's own perspective. As opposed to structured research interviews, this type of interview is more flexible, allowing the participants to express their opinions and insights regarding a certain aspect in an open way, without being constrained by pre-defined sequences of questions.

For this particular study, 5 interviews were conducted in order to gain a deep understanding of the impact of KM on Organizational Learning processes. The interviewees were representatives of companies like Axis Communications, a mobile communications company, a wireless semiconductor enterprise, IBM and a handset producer. All the selected companies are using different KM software systems on a regular basis in order to enhance transfer and sharing of knowledge between employees. All the interviews were face-to-face interviews. Furthermore, all the interviews were conducted in English. The location of each interview was at the company of the participant. The duration of each interview was approximately 45 minutes. The interviewees were persons having a wide experience in using KM software systems within their organizations. Therefore, they were aware of all the aspects related to the usage of knowledge sharing platforms and to their impact on Organizational Learning. The interviewees had different positions within their companies and this helped us to gain an understanding of the usage of KM systems from different perspectives, as illustrated in table 3.1.

Table 3.1 Participants to the interviews

Interviewee	Position
1	Global Intranet Editor at Axis Communications
2	Application Architect for a mobile communications company
3	Senior Engineer in R&D division of a wireless semiconductor enterprise
4 and 5	Transition Managers at IBM
6	Information Architect for a handset producer

3.3 Techniques for collecting empirical data

Before proceeding with the interviews, introductory e-mails (describing the subject of the current study and the relevant questions) have been sent to the participants. All the interviewees described their experiences regarding the role of KM systems in achieving better Organizational Learning. Several descriptions of features and usage scenarios were supported by concrete examples. In addition, the interviewees expressed their thoughts with respect to the future evolution of these systems.

The interviews have been recorded on an audio device after the permission was granted from the interviewees. All the interviews have been transcribed using a specialized software package. The main advantage of using specialized software is that it enables easy adjustment of the speed of the conversations, thus facilitating the transcription process. The resulted written transcripts became a useful resource in the process of data analysis and increased significantly the understanding of the subject (Kvale and Brinkmann, 2009).

3.4 Interview guide

As previously mentioned, semi structured research interviews will be conducted in order to collect relevant data. Kvale (2009) points out the importance of interview guides that contain the purpose of the study and a description of the corresponding questions.

The research question is reflected on the interview questions that aim at gaining a detailed perspective on how KM is contributing to effective Organizational Learning. The interview starts with more general questions that focus on the broad context in which KM systems and Organizational Learning are perceived by organization members. Later on, as the interview progresses, the questions become narrower, focusing on detailed aspects regarding KM features reflected on each of the five Organizational Learning cycles.

As proposed by Kvale and Brinkmann (2009), the interview questions are as brief and simple as possible. The specific questions are elaborated in a gradual manner: the first ones are concerning learning at individual level; the intermediate questions are concerning knowledge transfer and sharing at group level, while the last questions are related to the learning process at top organizational level. As a result, all the interview questions have been grouped into distinct categories, as illustrated in Appendix A.

Having this gradual classification enables a thorough investigation of existent gaps and a detailed analysis of the way these gaps are propagating at higher levels.

3.5 Data analysis

After successfully transcribing the interviews, the collected data must be further analyzed. Kvale and Brinkmann (2009) highlight the importance of thinking about analysis even before collecting the actual data. They describe two categories of interview analysis: analysis focused on meaning and analysis focused on language.

For this particular study, data is analyzed by focusing primarily on its meaning. One of the main guidelines provided by Kvale and Brinkmann (2009) is to code the meaning by attaching one or more keywords to a segment for later identification of a statement. As a result, various statements (concerning roles of KM systems in achieving each learning cycle) have been labeled according to their corresponding learning levels: individual, individual/group, group, group/organization and organization. This approach has also facilitated easier grouping of similar statements (which have been made by different informants) in the later phases of the analysis.

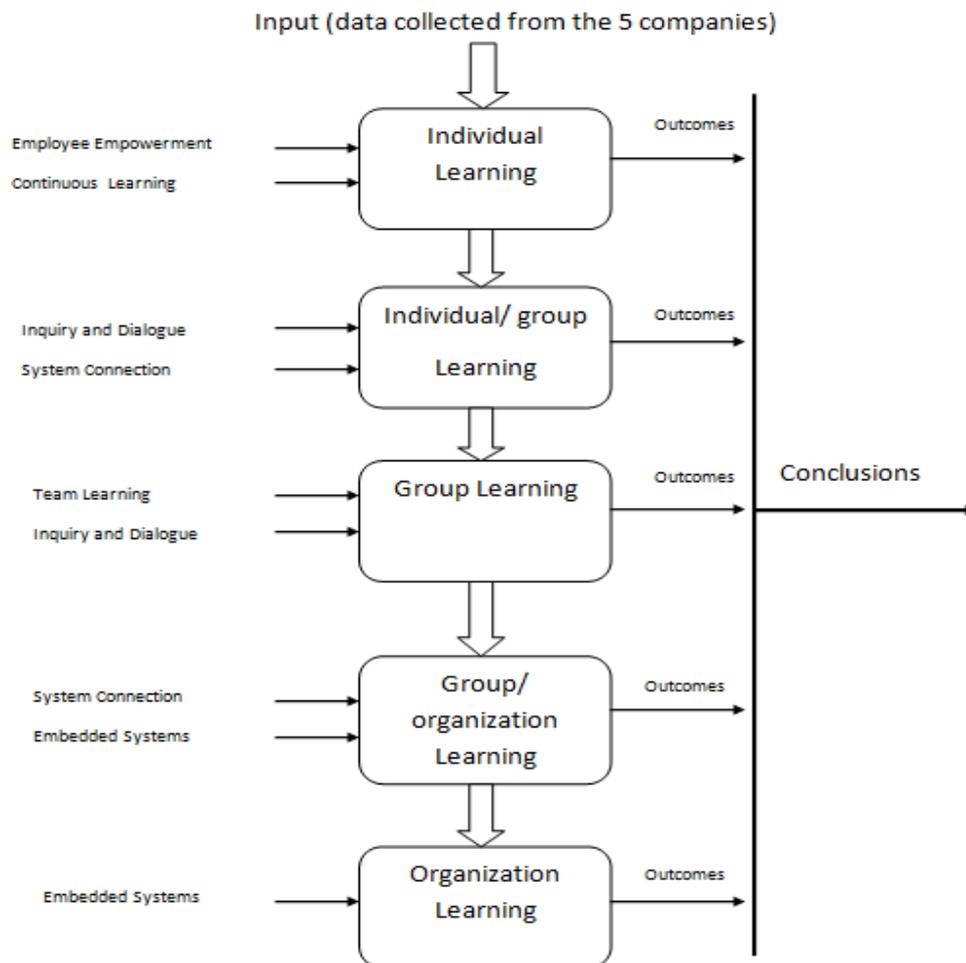


Fig. 3.1 Steps performed during the analysis

Figure 3.1 shows how the Five Learning Cycles model was applied in order to analyze the collected empirical data. All the empirical findings from the five companies have been categorized according to the learning cycles. For each such cycle, its corresponding dimensions were mapped on the collected data (describing particular features and usage scenarios of KM systems within all participant companies). This approach enabled an easy comparison of the

effectiveness of these tools in achieving Organizational Learning. To add, it allowed identification of existent gaps that are encountered at a given level and how these gaps were propagating to higher levels.

The analysis performed for each cycle provided relevant outcomes that have been compared and discussed. Finally, appropriate conclusions have been elaborated based on the interpretations of these outcomes. The conclusions will be further detailed in Chapter 6.

An essential issue specific to data analysis is meaning condensation, which implies compression of longer statements into briefer ones, identification of meaning units and reformulation in such a way that the key idea is preserved (Kvale, Brinkmann, 2009). Due to the fact that participants were describing personal experiences, they tended to use long explanations that make the analysis process much harder. Hence, it was mandatory to make such statements more compact without losing their core concepts.

Another important aspect of the analysis process is meaning interpretation. According to Kvale and Brinkmann (2009), meaning interpretation requires the interpreter to go beyond gathered information in order to work out structures and relations that are not evident at first sight. In our study, it is necessary to clarify the meanings of ambiguous statements and to make connections between relevant themes. Therefore, we have asked the participants to clarify some ambiguous statements when we have sent them our transcriptions.

3.6 Scientific quality

Seale (1999) argues that quality is an elusive concept that cannot be specified in advance by certain models and that quality should be achieved through extensive learning and practice.

By taking into consideration previous researches, Seale (1999) describes three main interpretive criteria for quality:

1. Credibility (often referred to as internal validity) implies that the truth of the empirical results corresponds to the research purpose and to the research questions (Seale, 1999; Norris, 1997). The credibility of this study was sustained by a technique recommended by Seale (1999): member validation. Member validation consists of presenting the results of research to the participants in order to check the trustworthiness of the findings. All the transcripts have been sent to the interviewees for approval and for verifying if there were some inconsistencies in their statements.

Besides member validation, another technique used for increasing the quality of research is triangulation (Seale, 1999). A methodological triangulation or a multiple operationalism method can be envisaged whereby several methods of research can be used to cancel out the biases of

any one method. However, since the research implied collecting data from people having relevant expertise in KM systems, use of quantitative methods (like surveys) was not considered adequate due to the reduced number of highly-specialized persons that have a broad overview of the system.

2. *Transferability* (or external validity) refers to the generalizability of the research results (Seale, 1999). In order to ensure the external validity of the study, the perceptions of people having different roles within several companies have been taken into consideration to gain a general perspective regarding use of KM systems within an organization.

3. *Reliability and objectivity* ensure confirmability of a research report through an audit trail which requires documentation of data, methods and decisions made during and at the end of a project.

Reliability of the research was enhanced in the following ways suggested by Creswell (2007): using high-quality recording devices, having a proper transcription of the interviews and performing accurate coding.

Another significant aspect is the *generalizability* of the findings. The thesis focuses mainly on the usage of KM systems within IT organizations which are recognized for investing a lot of effort in ensuring that their internal platforms are meeting high demands. The analysis of findings might not cover other problems that can be encountered by non-IT companies and as a consequence, the results may not be fully applicable to these kinds of organizations.

3.7 Research ethics

Importance of research ethics is widely debated by Israel and Hay (2006). They claim that “ethical behavior helps protect individuals, communities and environments, and offers the potential to increase the sum of good in the world”. In addition, the authors acknowledge that acting honestly and honorably will determine the others to contribute with more interest to the researchers’ work.

Informed consent is one of the most important factors for preserving research ethics (Kvale, 2009; Israel and Hay, 2006). It implies that informants understand the nature of research and that they agree with their contribution to the current research. As a consequence, all the participants were informed by e-mails about the subject and the reasons for performing the current study. Being notified in advance offered them the chance to accept or reject the idea of participating to the interviews. Before proceeding with the actual interviews, the informants were asked for permission for recording the conversations. Moreover, they have been informed that the content

of the study will be publicly available. Fortunately, all of them agreed to have their interviews recorded.

Another significant ethical aspect is related to *confidentiality*. According to Israel and Hay (2006), participants may specify the way in which information can be used by researchers. The information has a private nature and it is offered to researchers in confidence. Before beginning to pose the actual research interview questions, the interviewees have been asked if it is allowed to reveal their names and current positions within the companies. As a result, three participant companies have chosen to be anonymous. In addition, it was agreed which company-related information should be disclosed and which not.

During the interviews, the participants have answered to all the questions and described their experiences of using specific KM systems in order to enhance Organizational Learning. Many of their statements have been described using adequate examples and this contributed a lot in gaining a more practical view of the way such systems work. Finally, after the interviews, it was agreed that the transcriptions will be sent to them for approval. All the participants have reviewed their corresponding transcripts and have clarified uncertain statements.

3.8 Reduction bias

An important aspect is the consideration of possible sources of bias. The ambiguity of bias has caused a lot of controversy between researchers who had tried to define this notion. Hemmersley and Gomm (1997) describe bias as a systematic deviation from validity, or some deformation of research practice that is likely to produce such kind of deviation.

Ehrlinger et. al. (2005) bring into discussion the “bias blind spot” which is the conviction that one’s personal judgments are less susceptible to bias than others’ judgments. It is likely that company representatives will tend to regard their KM Systems as being better than those of their competitors and present them in a favorable way. As a consequence, it is mandatory to assess the objectivity of the statements. The objectivity of the statements was measured by applying one guideline suggested by Ehrlinger et. al. (2005): comparison with other participants’ opinions about the same issues.

In addition to this, there are many other possible sources of bias that can influence the research, as described by Norris (1997):

- the reactivity of researchers with the providers and consumers of information
- selection biases including the sampling of times, places, events, people, questions

- the availability and reliability of various sources or kinds of data, either in general or their availability to different researchers
- the affinity of researchers with certain kinds of people, designs, data, theories, concepts, explanations
- the ability of researchers, including their knowledge, skills, methodological strengths, capacity for imagination
- the value preferences and commitments of researchers
- personal qualities of researchers (their ability to concentrate on a certain issue, their tolerance to boredom etc.)

In order to avoid possible sources of bias, the interview questions have been grounded on relevant literature, mainly on the Five Learning Cycles Model (Sanchez, 2005) and on the dimensions for evaluating the effectiveness of Organizational Learning (Watkins et al., 1997). The reliability of each source has been verified by taking into consideration the number of times the resource was cited by other authors. There was a certain affinity towards some theoretical frameworks and concepts, but all of them have been chosen after a proper evaluation of equivalent theories. The selection of informants and the elaborated questions have been discussed in detail with the supervisors before proceeding with the actual interviews. After the analysis of the collected material, the corresponding findings have been reviewed by existent peers and by supervisors. However, there are other sources of bias (like skills of researchers) that are closely related to the experience in performing interviews and which can be improved only after long and extensive training.

3.9 Summary

This chapter has motivated the selection of performing a qualitative study in order to answer the research question. Moreover, there were explained the main reasons for using semi structured research interviews as a data collection technique. All the aspects regarding the design of interview questions were presented in the interview guide. After data had been gathered, it was analyzed by focusing on its meaning. Several issues (credibility, transferability, reliability and objectivity) have been taken into consideration in order to enhance the quality of the research. Confidentiality and informed consent were two main ethical aspects that had received special attention when performing the current study. The last part of this chapter described the possible sources of bias and the methods used for overcoming them.

4. Empirical findings

This section provides an overview of the interviews that have been conducted with representatives of different companies in order to investigate the role that KM has in achieving effective Organizational Learning. The chapter contains five sections that present the empirical findings for each case. Each section begins with a presentation of the core business of the organization and a description of the job position of the participant to the interview. It continues by specifying KM systems that have been deployed by the company and by giving relevant examples of usage scenarios that contribute to enhanced knowledge transfer and sharing between employees.

4.1 Axis Communications

Axis Communications is an IT company that offers network video solutions for professional equipments. The company was founded in Sweden in 1984 and is nowadays a global market leader in network video, providing top-quality products that focus on security surveillance and network monitoring. In the present, Axis Communications is a global organization having many employees working in more than 20 countries in the world and it is cooperating with international partners from more than 70 countries. (axis.com)

Interviewee 1: In order to gain a detailed perspective on the use of KM systems within the organization, we have conducted an interview with the global intranet editor at Axis Communications. He is responsible for the transition from the old intranet that has been used by the company for more than a decade, to a new and innovative platform that will be implemented in Sharepoint and will reflect the latest technological improvements. His aim is to ensure that the intranet is a business driven and a motivational tool that can be effectively used by the global workforce of Axis.

4.1.1 KM systems used by Axis

Axis Communications is in the process of a gradual transition from the old intranet to the new one. According to Interviewee 1, the old intranet has been used mostly as a publishing system in

the collaborative area. He acknowledged that until now, they have not used a well-defined IT-based platform for collaborative knowledge sharing.

- Wikis

A lot of focus has been placed on wikis which have been used as the primary way of transmitting information: *"we had competence teams where people from different departments and some other areas had mutual wikis where they could publish everything regarding their competence area"* (Interviewee 1, Appendix B). Being an IT company, Axis has invested considerable effort in maintaining wikis at the desired standards.

- Active Directory

According to Interviewee 1, people that work for Axis Communications are highly specialized and are grouped into teams together with other colleagues having the same competencies. An essential issue addressed during the interview was the ability of software systems to handle transfer of individuals between different organizational departments. This is done through the Active Directory that includes all the company data, individuals and their organizational roles. Being aware that people might be frequently transferred between different workgroups, the functionality of the Active Directory was based on the roles of the members. Once an employee is transferred and his role is edited, the system will take care of all the other changes and will display accordingly the new groups and projects assigned to that member.

- Metadata

One of the key features of the new intranet is the employ of metadata, which has not been used to its full extent until present. Having a correct set of metadata enables people to tag each uploaded content with the right description. This results in faster response times for subsequent searches that are enabled internally by utilizing advanced heuristics. In addition, metadata allows generation of different views that can be customized according to the user's interests. Interviewee 1 envisions that the future system will display content in a form similar to RSS feeds: *"it will be more or less like an RSS feed, but for tags. Every tag you will see will be presented automatically; you will not need to explicitly look for it"* (Interviewee 1, Appendix B). This will save a lot of time that would have been otherwise spent on performing the same kind of searches in a repetitive way every day.

- Other tools

Regarding the role of video conferencing in achieving knowledge sharing, Interviewee 1 claimed that company members prefer face-to-face meetings instead of video conferences since the former are less formal and because personal conversations facilitate better communication.

There are some features that are not supported by the current system and which will be included in the functionality of the upcoming platform. Among them we can mention forums, discussion

boards, best practices and lessons learned. So far, wikis have been substituting discussion boards:” *if you display wiki in one way it will look like a discussion forum*” (Interviewee 1, Appendix B). In this context, tagging what people are posting can be regarded as a discussion-related aspect. All the new features are added one by one to the new platform in order to ensure a smooth transition to the upcoming intranet.

4.1.2 Usage and impact

Regarding the role played by Organizational Learning in daily business and operations, Interviewee 1 stated that they do put a lot of emphasis on personal, face to face communication. IT tools are regarded only as a complementary tool used for enhancing mutual learning:

This is a people company and that's how we also manage a lot of organizational learning and we want to keep it like that. If you work in one of our daughter companies, we help you to go to the right people that is responsible for this or that and talk to them.[...] So far, this is a competence driven company and we cannot be a worldwide leader if we lack knowledge in some areas, but I would say that this has been handled so far by e-mails, wikis and people meeting each other. (Interviewee 1, Appendix B)

Another important aspect discussed during the interview was related to the way employees are more engaged in using the intranet of the company. Interviewee 1 agreed that he prefers the classical approach consisting of classroom trainings where employees sit in front of the computers and he explains them how to use the platform of the company. This method is following one of the company’s main policies: assisting all members on a regular basis.

Even though the future platform will contain many social networking features, there are many aspects that cannot be replaced by IT systems, as suggested by the interview participant. The members of the company have two categories of non-IT methods for sharing knowledge: monthly meetings and regular meetings on a daily basis. Since many employees are working on complex projects, they need to share a lot of information and therefore can spend considerable time on personal meetings.

4.2 Mobile communications company

The mobile communications company has research and development departments in various countries around the world. Since it is a global company, the organization invests considerable effort in fostering communication and knowledge sharing between its employees.

Interviewee 2: We have interviewed an application architect at the mobile company. He is responsible for the maintenance of several requirements like performance, usability and stability of the applications. Moreover, he monitors the functionalities that are added or changed when a new system/ module is deployed within the organization.

4.2.1 KM systems used by the company

Members of the enterprise are not relying on a single KM system; instead they are actively using several knowledge sharing platforms depending on their specific needs. However, the company has a central intranet implemented in Sharepoint that is used for knowledge sharing. It allows employees to create and update their own profiles. Moreover, the platform enables them to discover people who have a certain specialization or have an interest in a particular topic. In addition, the users can contribute to the existent information repository by adding their own content (using blogs or wikis).

- Wikis

One of the most used knowledge sharing tools within the company is the wiki. There are several wiki systems customized to different departments. For example, there are certain wikis used by the members of the phone development department, there are specific wikis used by the financial department, while other wikis that are used by the managers for keeping track of several issues and for monitoring the progress of employees.

- Document Management System

On top of these systems there is the Document Management System that has the aim of complying with ISO regulations. For instance, the Document Management System ensures that each document has a unique identification number that allows fast retrieval. Moreover, Document Management System stores artifacts that contain Best Practices and Lessons Learned, so that they are available to other members of the organization. However, Interviewee 2 states that sharing these types of documents “*is a process related activity, a support activity for a project*” and it does not have native support in any of the platforms.

- Other tools

The company has different systems that are used for keeping track of groups of employees, monitoring their tasks and updating their status when changes occur. Each such system has different features, depending on the organizational unit where it is deployed.

Discussion forums are not used currently; instead, regular, face-to-face meetings are encouraged in order to transfer knowledge between employees.

One of the most important features of the current platforms is the usage of profile pictures that contributes significantly to better knowing the employees and to match them more easily with their assigned projects.

4.2.2 Usage and Impact

Another important aspect discussed was the evolution of KM systems. Interviewee 2 claims that their systems are either updated to new versions (in order to benefit from enhanced functionality) or completely replaced (in case that the provider discontinues the support for that specific tool). He gave the example of Software Control Management, when the company made the transition from an operating system to another and they had to make many changes in order to reflect the new requirements of operating system provider.

Regarding the engagement of employees in using effectively the knowledge platforms, Interviewee 2 states that this is heavily dependent on the organizational culture. Moreover, the individuals' engagement is driven by the need of meeting the demands of the customers.

So the best way to make people use the tools that we supply is to make the tools that meet the expectations of the users or to slightly exceed the expectations. The best way is to analyze the basic need of the users. (Interviewee 2, Appendix C)

Interviewee 2 mentions that most of the times, contributions of individuals/ groups that best meet customers' needs are translated into concrete organizational practices.

4.3 Wireless semiconductor enterprise

The company deals with the design and development of mobile platforms and semiconductors of many wireless technologies. Moreover, it is a company that promotes global networking. Being involved in complex international projects, the employees of the organization are frequently using specialized software tools for knowledge transfer and sharing.

Interviewee 3: We conducted the interview with a Senior Engineer in the Research and Development Division of the enterprise. He has been a part of the company for 6 years and is a part of the team responsible for the development of one of the main products provided by this company.

4.3.1 KM Systems used by the company

The organization is relying on several KM tools that are fostering sharing of knowledge between its employees.

- Wikis

They are an integral part of the organization. This is strengthened further by the fact that the official website of the company also points to many wikis. According to Interviewee 3 there are wikis designed to cater to different groups in different manner. With his experience in the Research and Development division, he acknowledged the use of wikis as providing information regarding various teams and where to find information related to project like documentation links, shared information etc. Furthermore he also mentioned that in some cases teams have their own wikis to keep track of activities and progress of various team members in their assigned tasks.

Interestingly, Interviewee 3 also states that at the beginning of his career within the enterprise, they did not have any wikis in place and information was shared through Document Management Systems and emails etc.

- Document Management System

The company has an internal system designed as their Document Management System (DMS). The DMS acts as a central repository where all the technical and important documents are stored and version controlled. So document accessibility is as easy as clicking on a hyperlink. As they are not stored locally on one's hard disk it is crash safe.

- Microsoft SharePoint

Interviewee 2 mentions that SharePoint is generally used in their company when the information needs to be transmitted to the people. He states that even though the same thing can be achieved with wikis, SharePoint enables users to subscribe to newsletters and get news and updates via email. Interviewee 3 states that if an employee would want to obtain information regarding another group, he or she is most likely to use SharePoint rather than wikis.

- Web based tool

The company has a web based tool through which information related to deliverables (for e.g. software code) is tracked. It is basically a wiki wherein a specific group publishes the information needed.

- Other tools

Interviewee also states that they have web based tutorials that are helpful for training and/or training purposes in the company. They use LiveMeeting video conferencing for discussing issues which proves to be extremely helpful as they have an internal tracking code number assigned to each participant, which allows future tracking of the discussed issue and the easier addressing.

4.3.2 Usage and Impact

Usage of KM systems by the organization is inherent to the 'ways of working' of the enterprise. The organization has a flexible approach to using KM Systems. Interviewee 3 states that the usage of the different tools in place can be role based. The team that Interviewee 3 was a part of earlier, used SharePoint extensively and now the team that he is a part of is using wikis a lot more.

An interesting viewpoint that Interviewee 3 brings up is the ease of spreading information through wikis compared with DMS, which may be one of the factors of wikis becoming an integral part of the organization. With reference to new ideas and employees being receptive to changes with the help of KM tools in place Interviewee 3 states:

We deal with new hardware all the time. What happens is that maybe one or two guys work on it to get it started and to spread the information they send the link on the wiki and everybody gets to know how to do it. Instead of creating a whole document, wiki is so informal that you could just write down what you did instead of having a formal documentation and go through a review process. If somebody wants to make a correction because of say different iterations of the same platform occur and then a person can change data on the wiki accordingly. (Interviewee 3, Appendix D)

They have a practice of documenting Lessons Learned and Best Practices after the end of each project. It starts from the highest point of the project to each team involved in the project which allows the employees to better themselves for their subsequent work. Adding further with response to the question whether best practices or lessons learned documents have been effective in shorter task times for subsequent tasks of similar nature documented, Interviewee 3 elaborates:

... at least if not shorter task times, but better designs when it comes to executing something. So we end up having a better solution for the same thing. So definitely those things help and if the same person or same team does some

new work they know the mistakes committed earlier and they can better themselves. (Interviewee 3, Appendix D)

With respect to areas of improvement, Interviewee 3 mentions the difficulty in searching for documents within their DMS, hindered due to inconsistency in naming the titles of documents. They do have a document number in place, but according to Interviewee 3, it is hard to remember them and data mining is something that they need to work on.

4.4 IBM

IBM is a worldwide corporation that provides IT services, software solutions and consultancy. The IT Services is a complex division of the company that deals with software development and localized support of hardware and desktop applications. IBM has teams located in various places all over the world and its employees need to collaborate closely to work on multiple projects. In addition, there are many channels within the company like transition, delivery, development, maintenance etc. Due to this diversity, efficient sharing of knowledge is required at all levels. As a result of all the previously mentioned reasons, the company regards usage of KM systems as an essential part in performing everyday operations.

Interviewee 4 and Interviewee 5: Both participants are transition managers at IBM. Their main goal is to ensure that all processes meet the standards of the organization whenever a new company is acquired by IBM.

4.4.1 KM systems used by IBM

IBM is actively using several KM systems that are presented below. The company relies on several specialized tools that support daily operations.

- Rational Portofolio Manager (RPM) and Teamroom

Teamroom is a specialized knowledge platform that is actively used by IBM. It allows easy creation of groups that are focusing on one or more projects. In addition, it provides a simple way of creating and categorizing documents with specific content that can be uploaded through the platform.

RPM is a tool that has a similar functionality. It provides a repository containing the documentation for all the previous projects. One of the main advantages of using this kind of tools is easy tracking of existent information:

I have certain documents that I have created 2 years back and it is still there in the RPM repository. So if some person who is working for the project now and has some doubts to be clarified in the data of the document. I can first get the access to the document which I may not remember about 2 years hence and help the person out thereafter. (Interviewee 4, Appendix E)

- Best Practices and Lessons Learned

One of the most important ways of fostering learning is through documents that contain Best Practices and Lessons Learned. According to Interviewee 4 and Interviewee 5, these types of documents are included in a Practitioner's portal that is deployed by the company.

Best practices are regarded as a proper way of enhancing the current performance of employees based on the outcomes of previous experiences. Interviewee 4 (Appendix E) states that *"there are many things that happen. That's how Best Practices exist. Best practices come from different experiences."*

The importance of Lessons Learned is acknowledged by Interviewee 4. He mentions that at the end of each project, employees take into consideration all the lessons that have been learned; they discuss about the good and the bad issues, the improvisations that had been made, the challenges that had been encountered and the solutions for solving them. All these findings are reported in a dedicated section of the portal. Therefore, each time an individual joins a new project, the first thing that he/she does is to consult the Lessons Learned from previous tasks.

- Discussion forums

Each time a new problem occurs, IBM employees form collaboration groups in order to solve it. These groups give rise to discussion forums that are seen as one of the main sources of information. As a result, each time something new needs to be planned, the existent information (derived from discussion forums) is available through email or references. The main benefit of using this feature is time saving: *"I might have spent 2 days in finding a document earlier, but with these forums I get information maybe in 2 minutes"* (Interviewee 4, Appendix E).

4.4.2 Usage and Impact

KM systems are used at multiple levels, since there are many requirements specific to certain accounts or projects. Moreover, there are specific KM platforms that are shared also with the clients.

Regarding the previous KM platform, both interviewees agreed that technology was the basic reason that determined changes. Many of the systems have been continuously updated to newer versions. However, there were cases when a system was completely replaced. Interviewee 5 gives the example of Software Delivery Management System, which is proper for environments where team members are working on a single project. Since employees of IBM started to work on several projects simultaneously, this system was not suitable anymore and it was replaced with RPM and Teamroom.

IBM is a corporation where work is done by teams of highly specialized individuals. The systems used by the company allow migration of employees between different working groups. According to Interviewee 4, this is done through the email ID, which has certain access privileges. When a member moves to a different group, his access rights are modified accordingly.

Another significant aspect mentioned during the interview is the organization's support for innovation. Each time individuals have brilliant ideas, they can patent them. As a result, they are rewarded by the company and their contribution is published to knowledge platforms so that other members of the organization can access it.

4.5 Handset producer

The company is a worldwide corporation that produces smartphones and tablets for both the enterprise environment and for regular customers. The company has offices in several countries around the world, where highly-skilled employees are collaborating in order to deliver innovative mobile products. As a result, the company needs to be sure that knowledge is properly shared between members through efficient KM systems.

Interviewee 6: We have conducted an interview with the Information Architect of the enterprise. His main responsibility is to provide all the information developers need in order to develop based on the company's platform. In other words, he has to verify that the sites have a proper content and structure, and that they include all the features that are necessary for a suitable usage.

4.5.1 KM systems used by the company

The employees of the organization are relying on various KM systems that represent useful resources for the sharing of knowledge between the members of the organization.

- Wikis

One of the main tools for knowledge transfer within the company are wikis. Interviewee 6 describes wiki pages as tools which are “powerful to explore and easy to use”. They are used for providing instructions to people regarding the usage of some particular systems or for describing the ways some tasks should be performed. People are using also wikis to post questions or to improve existent content. The company regards wikis as a sort of static emails and prefers using them as the main way for sending instructions, rather than using regular emails.

- Confluence

The primary KM system used by the company is called Confluence. This system allows users and their teams to connect their businesses in one single place, by combining documents, ideas, specifications and entire projects. Like wikis, Confluence is actively used to store content backlogs and to provide the necessary instructions to the members of the organizations.

- Over Flow

Besides the aforementioned components, Over Flow is another system that plays an important role in performing everyday operations. It is mainly used for issue tracking and provides several other features. For instance, Interviewee 6 mentioned that Over Flow provides an advanced system for ranking the employees of the company according to their contributions. Each individual receives points based on the number of his answers to some posted questions. This is conditioned by the acceptance of the answer by the person who sent the question. Further on, the received points are used to rank all members and to monitor who had the largest contribution.

4.5.2 Usage and impact

KM systems have a great impact on the tasks performed within the organization. According to Interviewee 6, the company has been using different issue tracking systems in the past (like MKS), but now they are mainly using Confluence and wikis.

The work is done either by highly specialized individuals or by groups of employees, depending on the nature of the particular tasks. The individuals are using discussion forums and many of the remote conversations are performed though online conferencing tools, like Skype. However, Interviewee 6 claims that it is hard to maximize the efficiency of discussion forums unless individuals are frequently using them.

IT-based means of sharing knowledge are also combined with other non-IT ways. The members of the corporation are conducting SCRUM meetings every day where each employee informs the rest of the team about his current progress. In addition to this, Interviewee 6 highlights again the

importance of wikis, which are frequently used to inform the other members of some content of general interest.

4.6 Summary

This chapter presented the empirical findings for four different companies: Axis Communications, the mobile communications company, the wireless semiconductor enterprise, IBM and a large handset producer. Each of the cases started with a description of the usage of KM systems within company. These descriptions were used for motivating the relevance of each case for the current study. In addition, there were presented several knowledge sharing tools that are specific to each organization. The usage of these tools and their impact on Organizational Learning were emphasized in all of the five cases.

5. Data analysis

This chapter provides a detailed description of the analysis process. The first section presents an overview of all the steps of the data analysis. Then, a cross-case analysis is performed according to the Five Learning Cycles Model and to the dimensions that measure the efficiency of Organizational Learning. The findings for each of the five cases are compared in relation to the theoretical framework (described in chapter 2). The outcomes of the analysis process serve as a basis for forming the conclusions that will be presented in the following chapter.

5.1 Overview of the analysis process

As mentioned in Chapter 3, the data will be analyzed by focusing on its meaning. The entire process of analysis is grounded on the Five Learning Cycles model (elaborated by Sanchez (2005)), which was presented in Chapter 2. As a result, there will be five analysis steps, each one corresponding to a learning cycle: individual, individual/ group, group, group/ organization and organization.

In addition, we have put a strong emphasis on the dimensions that measure the effectiveness of Organizational Learning: Continuous Learning, Inquiry and Dialogue, Team Learning, Employee Empowerment, Embedded System, System Connection and Strategic Leadership for Learning. As described in section 3.5, all these dimensions/enablers have been correlated to an organizational learning cycle based on the previous study done by Jyothibabu et. al (2010).

5.2 Learning at Individual Level

As mentioned in section 3.5, there are two main enablers of efficient Organizational Learning that occur at individual level: Employee Empowerment and Continuous Learning.

Regarding empowerment of employees, all four participant companies are following several approaches in order to engage their employees in using KM Systems. In each of the five cases, the members are utilizing these systems in order to comply with both company's internal and external standards.

For instance, employees of Axis Communications learn how to use the company's intranet through regular classroom trainings. People prefer being tutored personally instead of having online training sessions. This is done mainly because the company prefers to assist its members on a daily basis.

On the other hand, the main factor that is driving employees' usage of knowledge platforms within the mobile company is the need of the users. This attitude is highly reflected by the organizational culture. The members of this organization are basing their work not only on internal feedback received from their colleagues, but also from ideas received from the customers' side. Therefore, each time users are signaling that improvements should be made; the employees of the company are actively using knowledge portals in order to solve the existent demands. Having a user-driven attitude is an approach that should be followed by every company in order to engage its members to collaborate more through KM systems.

Interviewees from the wireless semiconductor enterprise and IBM acknowledge that KM systems have become a regular component of the individual's daily work. In both cases, the company does not impose to its members to use any specific tools; instead, the usage of such tools has become inherent to the ways people are working.

Most of the informants did not mention anything about special features that would involve individuals even more in using Knowledge platforms. For example, a proper way of engaging members and of monitoring their performance is keeping track of the number of contributions each individual had during a certain period of time. This information can be used by the system to rank individuals; therefore, members who had most contributions can be rewarded by the company. The handset designer is a company that is following this approach: one of their systems enables members to gain points depending on the number of answered questions and these points are used later to establish rankings.

Another important dimension that has been assessed is Continuous Learning. This aspect is related to the way in which KM systems have contributed to shorter times in performing similar tasks. None of the five companies is currently measuring time/performance ratio with the KM systems they have in place in a unified and detailed manner. The main reasons for this are the complexity of the projects and the heterogeneity of the organizational units. Regarding this issue, Interviewee 1 from Axis Communications stated that increasing individual's performance is one of the main goals of the current intranet in development.

Some essential resources for increasing employees' receptiveness are wikis. They are frequently used by the members of the wireless semiconductor enterprise. In addition to overcoming the rigors of formal documentation, wikis become a knowledge base for all people who will be working on similar projects in the future. In a similar way, IBM uses RPM in order to enhance the competitiveness of individuals. This system's repository contains all relevant documents and allows easy access for employees who require them when starting to work on new projects. An

important problem was acknowledged by the representative of the handset producer company: the difficulty to make individuals to read thoroughly and not just skim relevant content. This problem is encountered frequently and has a negative impact on the performance of the employees. Moreover, this issue is closely related to employees' engagement in using KM systems. Therefore, the content should be properly structured and displayed so that it would increase reader's attention and responsiveness.

To sum up, using such systems enable better decision making based on previous documented content. However, according to some interviewees, these tools are useful only for routine tasks and do not foster other aspects (like intuiting or innovation) at individual level.

5.3 Learning at Individual/group level

The individual/group learning cycle can be improved by creating an organizational culture based on dialogues and inquiries. Besides this, a company should use systems that allow easy connection to its internal and external environments. (Jyothibabu et. al, 2010)

An essential issue discussed during all the five interviews was whether highly-specialized individuals or groups are preferred when distributing tasks. All the respondents agreed that their companies are encouraging group-based work. According to their descriptions, the complexity of the projects and the intention of mutual learning are the premises for this kind of team work. Interviewees from IBM and from the handset producer company mention that in some cases, there are niche activities that may require a single highly skilled individual, but these situations are only temporary. An interesting aspect was mentioned by Interviewee 3 from the wireless semiconductor enterprise. The company makes a distinction between teams and groups: the former is specialized in a certain field, while the latter consists of a much larger set of teams of people who work together for achieving a specific goal.

In addition, we have investigated another significant IT issue related to individual/group learning cycle: the ability of the systems to perform all operations required when an individual is transferred between different groups. All the KM systems of the companies have such features that allow quick and efficient transition of employees from one team to another.

This kind of feature is also present in some of the systems used by the mobile communications company. However, not all the systems of the company have implemented this feature. The organization keeps track of transfers through user accounts and security groups.

The wireless semiconductor company employs a system for Project Allocation that handles the migration of individuals between different projects. As pointed out by Interviewee 3, the main advantage is time saving since the system matches the right person to the right task in a short

amount of time. There was no clear reference to issues regarding how changes within teams/groups are technically supported.

The employees of IBM have email ids and certain associated access privileges. As a consequence, each time an individual leaves a team and joins another one, his access rights are changed according to his competences and according to the requirements of the new group. However, this method might be inefficient in case that multiple individuals are moving simultaneously, since it would require many changes in the system.

Regarding the same issue, members of the handset producer enterprise have used previously group permissions but have switched now to individual permissions. They motivate their decision on the fact that it is easier to handle access rights at individual level and this way facilitates better monitoring of transfers of employees between different projects.

Perhaps the most efficient solution is the Active Directory used by Axis Communications, which is based entirely on the role of the individuals. Therefore, when an employee is transferred, his role is edited and the system takes care of all the other changes. The role based implementation of the system reduces the overhead that would be caused by making many changes in different parts. Moreover, this kind of Active Directory is a good way to develop Knowledge maps within the organization by allowing easy identification of experts according to their roles.

In conclusion, all companies prefer to base their work on groups of people; moreover, their systems in-place ensure that the transition of individuals between different groups is performed transparently and in an efficient manner.

5.4 Learning at Group Level

Based on the findings of the previous cycle (individual/group), all informants described their way of working as team-based and this aspect sets the proper foundation for analyzing the group learning cycle. In the group learning cycle, the work of a team becomes coordinated and coherent as its members accept some core set of beliefs (Sanchez, 2005). According to Watkins et. al (1997), team learning facilitates group level learning. As a result, feasibility for formation of groups with similar interest through KM systems will supplement learning at this stage.

When analyzing team learning, we investigated if the KM systems that were in place have Groupware features that allow formation of teams of people who are specialized in certain areas. All the informants agreed about the presence of such a facility in their system. However, this facility is not explored at its full potential. The representative of the mobile communications company mentioned accessibility (for example, access based solely on invitations) as a factor that can allow or disallow individuals to participate in such groups. This is a significant gap

because the presence or absence of KM systems as a full supporter for Organizational Learning is restricted. We consider that Groupware features can be enhanced by using advanced Artificial Intelligence techniques (like data mining). This would allow the system to deduct which team compositions are the best ones based on previous searches, interests and accomplishments of employees. As a result, this would increase the likelihood that a member will be placed in a team where he feels comfortable to work and therefore can achieve optimum performance.

In addition, our informants claimed that documentation of best practices and lessons learned at the end of a team-work is done within their CMS at their respective companies. This form of inquiry and dialogue allows feedback as a form of learning at this stage. However, we can see that only documenting and storage in CMS is not sufficient for the optimum usage that can be provided by this activity. Tagging the documents properly to allow easy access is important as well. For example, Interviewee 1 from Axis discussed one of the challenges that they plan to solve with their new platform: the possibility of using metadata to tag these documents to their respective projects instead of dispersing all the information in different areas. This finding reflects the importance of using tags that was highlighted by Woods et al. (2006). On similar lines, Interviewee 3 from the wireless semiconductor enterprise mentioned data mining as something that they need to work on in their current DMS since searching for a document is tedious given the inconsistencies in naming the documents. The same problem is acknowledged by Interviewee 6 from the handset producer company, who claims that some wiki pages are very long and that searching for content may become burdensome. Hence the KM systems in place should not only act as a repository but should also be supported by easy accessibility to find the documented best practices and lessons learned. This goal can be achieved by dividing content into smaller units and structuring them in a proper way.

Furthermore, Interviewee 2 from the mobile communications company regards this form of documentation in the KM systems more as a process level activity – a support activity of a group. Best practices and lessons learned may be a form of benchmarking which is ingrained in the organizational ways of working; moreover, KM systems can support this activity further in the form of storage and accessibility.

The effect of documenting best practices and lessons learned is further explored at the analysis of group-organization cycle.

In conclusion, companies have team based learning which is analogous to learning at the group level. Their KM systems allow formation of teams of people with specialized topics of interest. However, access restrictions limit the usage of those systems to their full potential. The practice of documenting best practices and lessons learnt in the KM systems is done occasionally by companies. While KM systems function as storage systems for these documents, accessibility to those documents through the KM system is a concern which was voiced by all our informants unanimously.

5.5 Learning at Group/Organization Level

An important factor that has been analyzed at this level is Embedded Systems. Best practices and lessons learned are closely related to this factor since Embedded Systems focus on the organization's ability to capture learning (Jyothibabu et. al, 2010). The outcome of documenting best practices and lessons learned is perceived differently by each of the participants. Interviewee 3 from the wireless semiconductor enterprise sees this as a positive contribution where each team can be better prepared for the next project. However, the informants from IBM claim that documented best practices and lessons learned in their system do help, but the employees are more driven by their personal experiences. This reiterates out the challenge of extracting tacit knowledge which hinders Organizational Learning from realizing its full potential. Since the employees of Axis are in the middle of a transition of their current KM systems, they consider that best practices and lessons learned will have better contributions in a few years, once all the features of the new system are up and running.

Additionally, the interviewees from IBM say that while interacting with their clients they usually present their best practices. This can be seen as a way to strengthen mutual learning between a company and its clients.

The second aspect at this level of learning is System Connection. Discussion forums are a way to strengthen collaborative inter-group level learning. They play an important role in connecting an organization to its internal environment, thus reflecting the System Connection enabler. Discussion forums can be both non-IT based and IT based. The support that KM tools provide in this context can increase the collaborative efforts in an organization. Our study has found a multiple level of importance on this aspect.

IBM members regard discussion forums as a main source of information to solve new problems. They put equal emphasis both on information that can be obtained by word-of-mouth and on discussion forums that can arise through group emails. On the other hand, the wireless semiconductor company prefers IT supported discussion forums because of the ease of tracking discussion areas resulting in a more structured way of collaboration. Interviewee 1 from Axis Communications brought out an interesting aspect of non-IT discussion forums that can take place at a fika, which is a Swedish culture of meeting for a coffee break. Moreover the employees of the aforementioned company leverage the use of wikis as a platform for discussion forums. Wikis are also used by the handset producer enterprise for the same purpose; in addition to them, the members are also relying on online conferencing tools for some critical discussions. However, wikis are tools that offer very limited functionality in comparison to other software solutions designed especially for discussion forums.

The current study shows that organizations view team learning as a way of working, This perception is strengthened additionally through discussion forums via IT tools. These tools can be organized into a hierarchy based on their interactivity and resemblance to real world communication, starting from regular wikis(Axis, the handset producer), going on with email groups (IBM) and Teamroom (IBM) and ending with Live conferencing (the wireless semiconductor enterprise, the handset producer). The findings from Axis and IBM show that non-IT methods are still having a significant contribution in achieving collaboration.

In conclusion, discussion forums play an important role, while the choice of non-IT and/or IT forms varies according to personal preferences. We also see that wikis are commonly used as medium for online discussion forums. Moreover positive effects from documented best practices and lessons learnt are acknowledged. However, apart from these activities, reliance on personal experience, which is reflective of implicit knowledge, represents a challenge for learning and knowledge sharing.

5.6 Learning at Organizational Level

Group contributions have been converted into standard business practices according to all our informants. This again can be related to Embedded Systems enabler that was highlighted by Jyothibabu et. al (2010) because conversion of group contributions into business practices derives from the organization's ability to capture learning. However, the role of KM systems in achieving this goal varies from case to case. A positive aspect of the contribution is elaborated by Axis with an example of how weekly meetings discussions performed on portal structures have led to a structural homogeneity of the portal within various departments of the company. This reflects a learning transition from group-organizational cycle to the organizational cycle. On the other hand, the participant from the wireless semiconductor enterprise acknowledges the presence of internal group contributions that have been converted into organizational level standards. In addition, he also mentions the influence of the external environment – by what the world is doing. IBM informants talk about the strong innovation support tools that they are provided by their organization in form of patents for individual or group contributions.

However, accessibility of this information depends on the usage and the role of the employee. The representative of the handset producer company states that emergence of practices at organizational level is a process related activity. Cognizance of this information will allow embedding information and learning at the other cycles and again, as discussed before, the contribution of KM systems is limited by the accessibility factor based on the role of the employees.

The main principle in using information technology is to allow information to flow internally in an organization without any impediments. However, this objective is hard to achieve because of hierarchical differences (Easterby-Smith, 1997).

In conclusion, there are significant efforts made to identify best practices and standardize them at the organizational level. This can further drive individuals and groups to share their knowledge. KM systems can thus contribute at this level of learning by transferring this knowledge in the organization. However, the contribution is hindered by variable accessibility based on roles and hierarchical differences.

The summary of the identified aspects is presented in table 5.1. They are grouped according to several factors that have an important contribution in increasing the effectiveness of the five learning cycles.

5.7 Secondary findings

There are certain aspects related to KM and to organizational cultures that are depicting the usage of KM systems in a different light. These secondary findings have been grouped into three main categories that offer a broad image of some general issues concerning KM systems: flexibility of usage, quality management and cost.

- Flexibility in the usage of KM systems

Informants of IBM, The mobile communications company and the wireless semiconductor enterprise both mention that the usage of KM tools in their organization is varying according to the role, the group or the department of the organization. This reflects flexibility in using KM systems to facilitate Organizational Learning and also propagates customization of KM tools that are beneficial to Organizational Learning.

- Quality Management

The informant representing The mobile communications company discussed an aspect of ISO-9001 that is abided by to manage the quality of documents in their CMS. The uniqueness of each document is ascertained and this allows employees to track each document easily and this facilitates learning. Using such features will help reduce the gap of accessibility that was discussed by informants from the wireless semiconductor enterprise and Axis Communications and thus can prove to be more beneficial in the long run for Organizational Learning.

- Cost

IBM talked about cost playing a role in selection of KM tools. IBM has in-house KM tools such as Lotus Notes which are usually preferred since they are free. In general, there are two ways to regard this issue. Free cost can allow more KM tools to be in place while cost can also be seen as detrimental to choose a less competent KM tool over a better one. In other words, there is a tradeoff between quantity (more KM systems would provide more content to be shared) and quality (professional and expensive KM systems may be more efficient for Organizational Learning).

Table 5.1 Summary of the outcomes of the analysis

Factor	Learning cycle	Axis	Mobile communications company	Wireless semiconductor enterprise	IBM	Handset producer company
Employee usage of KM systems	Individual	Improved during regular classroom trainings	Driven by the needs of the customers	Inherent part of daily work	Inherent part of daily work	Inherent part of daily work
Continuous Learning	Individual	One of the goals of the upcoming intranet	Not monitored	Partially monitored through wikis	Monitored through RPM	Not monitored in an explicit way
Traceability of employee transfers between different working groups	Individual/group	Done by changing roles within the Active Directory	Done by making changes of security groups	Done by Project Allocation system	Done by modifying email ids and associated access rights	Done by setting access rights at individual level
Documentation of Best Practices and Lessons Learned	Group	Will be improved through effective tagging of content	Stored and accessed through KM systems	Will be improved through better data mining	Supported by the DMS	Through wikis and Confluence
Discussion forums	Group/organization	IT based (Wikis) and non-IT based methods (monthly and daily meetings)	Non-IT based methods (daily meetings)	Live Conferencing	Teamroom and email groups	Wikis and Live Conferencing
Organizational practices	Organization	Homogeneity of portals of different departments	Driven by both customer requests and individual/ group contributions	Internal group contributions converted into organizational business practices	Patents for rewarding original contributions	Derived from processes documented through wikis

5.8 Summary

This chapter offered a detailed explanation of the analysis process. Section 5.1 presented an overview of all the steps that have been followed during the analysis, from gathering the input data to achieving relevant outcomes that form the basis of the conclusions. Sections 5.2 – 5.6 described the analysis of the empirical data according to each of the Five Learning Cycles and to their corresponding facilitators. The last part of this chapter brought into discussion other relevant findings that have a strong impact on the way KM systems are used in relation to Organizational Learning.

6. Conclusions

The last chapter emphasizes the main conclusions that were reached after performing the analysis. These conclusions are related to the purpose of our research by showing how the three sub questions and the main research question have been answered by this study.

How are KM systems contributing to effective learning at individual level?

Individual Learning is foremost challenged by the extraction of personal or tacit knowledge that can be propagated further on to subsequent levels. During the investigation, we have not discovered any effective methods that the organization would apply to fully engage individuals in using KM systems. Using KM platforms seem to be inherent in the organizational culture or ways of working and thus KM tools have a contribution to Organizational Learning. However, when asking about the effectiveness of best practices and lessons learned at an individual level, we see that personal experience plays a role that overshadows these practices. Therefore, the challenge to study the conversion of tacit knowledge into explicit knowledge is still a major concern that should be addressed in the future.

Furthermore, there is a preference for face to face interaction and learning against online discussions that can be provided by KM systems. Even though these methods encourage learning, they undermine the full potential of KM systems. However, in our study we found that informal way of discussions that are completed by wikis seem to gather a lot of interest. As a consequence, if the informal way of communicating can be combined with encouragement from the management and technological thrust to make online interactions more feasible, KM tools can be effectively used for Organizational Learning.

How are KM systems contributing to effective learning at group level?

In our study we see that the individual level learning was leveraged by KM systems, but there were also some significant impediments. We notice that as learning progresses to the group level, there seems to be a more obvious preference in using KM systems. The convergence is noticed due to the structural feasibility in tracking discussions/interactions that can take place between organization members at different locations, through features like live conferencing.

Time saving is an advantage that surfaces as learning enabled by KM tools progresses to group level. Finding solutions for problems through group discussions/email groups, mail trails or

identifying people with adequate competencies are occurring faster through the KM systems in place. Beyond that, multi-tasking is handled by KM systems that monitor the migration of employees between various projects. Through the KM systems, employees are able to support different projects and have their respective documents in the right place.

Despite of all these advantages, accessibility is a factor that slows down organizational performance. A strong factor that has a significant impact on the effectiveness of the contribution of KM systems to Organizational Learning is the ease and speed of accessing the required documents in a CMS. Consistency in naming documents and data mining seem to be a prospective focus that will strengthen KM systems in relation to Organizational Learning.

A major concern that was unanimously voiced by all our participants was the search functionality. The paucity of finding relevant information in the right time weakens the contribution of KM systems in place. To leverage the contribution of KM tools, it is recommended to supplement existent features with good search functionalities. Therefore, it is not sufficient to view the current KM systems as a repository for all the relevant information. This aspect was also pointed out by Huber (1991) who claimed that systems are regarded just as a repository and are not performing well in finding whether certain information within the organization is known. As our study shows, this problem is encountered even today. We consider that a part of the true measure for effective KM is accessibility. In other words, accessibility to relevant information in minimum amount of time is what fosters effective Organizational Learning.

How are KM systems contributing to effective learning at organizational level?

As seen within group level learning, accessibility undermines the effect to Organizational learning through KM systems. A tension between authenticated access according to roles and limited access due to roles has become clearer. There are group contributions that have been validated at the organizational level and accepted as standard policies. However, this process seems to occur as a combination of both IT and non-IT KM practices. The process of selecting and identifying practices at the group level that can be qualified for organizational level learning is done mostly through non-IT methods of face to face interactive meetings. However, once the standard practices are established, the dispersion of knowledge to the individual level can be easily expedited through KM systems.

How are KM systems contributing to effective Organizational Learning?

The answers for the three sub-questions that were stated in the problem area provide us with an appropriate basis for elaborating a response for the main research question. The contribution of KM systems to Organizational Learning is widely acknowledged by all the participants of this study. The effectiveness of learning is currently improved either by IT methods (KM systems that facilitate remote collaboration, easy monitoring of employees and proper categorization and retrieval of content) and by non-IT methods (face to face communication). Another advantage of

KM systems is their strong support for group communication, an aspect which is highly encouraged by all enterprises. Each of the participant companies is using KM systems for enhancing Organizational Learning at a smaller or larger extent. Moreover, the degree of learning efficiency is highly determined by the number and the heterogeneity of KM systems in place. Companies that are deploying several interrelated systems (that have specialized features) are increasing organizational performance to a larger degree than companies that are using centralized and standardized systems.

In conclusion, leveraging the use of KM systems for achieving effective Organizational Learning is definitely a challenging process due to the complexity of learning cycles. As it can be noticed from the interviews, there are current initiatives that aim towards this objective. However, several improvements should be made in the future. Even though lot of time and effort must be invested in enhancing KM systems, once this ultimate goal is reached, the benefits provided by effective Organizational Learning will broaden the opportunities of an enterprise.

Appendix A

Interview Guide

Examples of interview questions grouped according to learning cycles (Sanchez, 2005) and to the dimensions that facilitate Organizational Learning (Watkins et al., 1997)

Category	Dimension facilitating Organizational Learning	Example
general aspects regarding KM and Organizational Learning	Embedded Systems	<p>What is your general conception regarding the specific IT platform(s)/ systems that you use for knowledge sharing within your organization?</p> <p>What role does Organizational Learning play in your daily business operations as a way to achieve your business goals?</p> <p>Could you briefly explain the IT systems you have in place?</p> <p>What are the main features that you use for organizational operations and why do you use them?</p> <p>Have you used different KM platforms previously?</p> <ol style="list-style-type: none"> If you have a different system now what were the main reasons for replacing them? Why have you adopted the current KM system? What do you aim to achieve with those systems with respect to your business processes and goals?
individual	Employee Empowerment Continuous Learning	<p>How are individuals actively engaged in using current knowledge sharing systems?</p> <p>Do you consider that the system you have in place has helped in quicker response times to new ideas and determined employees to become more receptive to changes?</p>
individual/group	Inquiry and Dialogue System Connection	<p>How do you view the organizations way of working? Is it more towards a specialized individual employee effort or team work based?</p> <p>Do IT systems provide support for easy migration of individuals between certain working groups?</p>

group	<p>Team Learning</p> <p>Inquiry and Dialogue</p>	<p>Does the system provide support for forming groups of employees specialized on a certain topic?</p> <p>Best Practices and Lessons learned, are they documented and shared at the end of a team work effort through a shared document system in place?</p>
group/organization	<p>System Connection</p> <p>Embedded Systems (feedback loop- Embedding)</p>	<p>How important are discussion forums to the everyday operations performed within the organization?</p> <p>Have Best Practices or Lessons Learned documents been effective in shorter task times for subsequent tasks of similar nature documented?</p>
organization	<p>Embedded Systems (feedforward loop - Emergence)</p>	<p>Are there any group contributions/ideas that have been translated into concrete business practices?</p> <p>Were some relevant group findings discovered through the KM system?</p>

Appendix B

Transcription of the interview with the Global Intranet Editor of Axis Communications (Interviewee 1)

Claudiu: *We would like to ask you about your current position?*

Interviewee1: I am the global editor of our new and upcoming intranet which means that we at Axis have an intranet which is over 10 years now and it's more a publishing system than collaborative area. It's fine for publishing information for others and for having projects, sites and describing a process, menu finding stuff like that and it's very basic and it has been built on for a whole decade from a small resource to a bigger and bigger one. But now, since maybe a year back, we focus on creating a new intranet based on Sharepoint and my role (I have worked here for 3 years) and since beginning of January this year I am in charge of the intranet.

Claudiu: *Our first question is to describe briefly the core business of Axis ?*

Interviewee1: We produce and sell surveillance cameras and other products such as encoders and decoders, but we are mainly focusing on surveillance cameras and we are the largest supplier in the world. A lot of cameras today are still analog and more and more are turning into IT based systems.

Claudiu: *What role does OL play in your daily business and operations? How does it help you in achieving your desired goals?*

Interviewee1: I think so far it has been not very IT-oriented, because we lacked a collaborative platform for knowledge sharing. We have had a few wikis. For example, we had competence teams where people from different organizations and some other areas had mutual wikis where they could publish everything regarding their competence area. For being an IT company so far, we have placed a lot of effort in it. This is a people company and that's how we also manage a lot of organizational learning and we want to keep it like that. If you work in one of our daughter companies, we help you to go to the right people that is responsible for this or that and talk to them. That's why we have a fika in the morning at 9 and that's also providing an opportunity to meet people when they are not in a meeting. So far, this is a competence driven company and we cannot be a worldwide leader if we lack knowledge in some areas, but I would say that this has been handled so far by e-mails, wikis and people meeting each other. Now we aim to use the platform not only to replace those, but also add on it and to benefit from our virtual teams that are global. Instead of only calling and trying to schedule meetings, we get these collaborative areas immediately and they can start document sharing and have wikis and other collaborative areas. We have not switched on all the capabilities of the platform to avoid many people getting confused. We will go from 10 % to 100 % functionality in time.

Claudiu: *So this is a gradual transition?*

Interviewee1: It is. I mean in Sharepoint there are a lot of social functionalities, it's like a mini Facebook where you can rate things. You can rate how well an article was, how interesting is a news. You can tag things, use metadata to structure things. And right now we have not switched on all features, but that's my role to work with KM for the whole organization and we will use metadata to help people tag content. You can have addons to this platform that will display how metadata is structured and use it for purpose-based navigation. And that means that you get to know your company in another way. For example, you can see easily how we structure our products, how things are

called and that's related to organizational knowledge which requires you to be here for lot of time to get to know them if you want to cover them more and more.

Claudiu: And a question regarding how do you plan to engage employees to use your current systems? Do you plan to motivate them to use your platform?

Interviewee1: That's a big question and a big challenge. We have had the same system for a decade and we are growing dramatically in the last years and we are hiring people like crazy. And we are growing on a global basis as well. So we need to keep people working all over the places. We have core values that say to be always open. For example, people are open in the sense that they accept new things if they know they are good. But the answer is yes, we work a lot in meeting them personally instead of only emailing and doing tutorials on how to use the platforms. It's much easier to meet the people face to face. We schedule meetings to the regional office (for example I went to Madrid one month ago) or when people from other offices are visiting Lund, we talk to them and ask them about their needs. So they feel they are also a part of this; it's not a policy to enforce them to use something, it's their intention to contribute to . What you expect from this and how we can assist them on a daily basis. For example, what kind of material do you need from us. I'm also in charge with training people. It's mainly regular classroom trainings where people sit down at a computer and I say this is your homepage, this is how you edit things, this is your personal profile and stuff like that.

Claudiu: We would like to know more about your approach as a company: are you more towards a specialized individual task or you like to divide the work in teams of more specialized people?

Interviewee1: It's an interesting question. I can't say we are doing either or, but we are doing both of them. One thing that Axis is good at is hiring highly specialized people. If you work here you will see that most of them are friendly and open and they are extremely good at the things they do. So we hire people who are specialized in one thing. As a specialist you are expected to work always in teams, and in different teams in the same time. And it will be not for the same people all the time and the line of the organization crosses the line of the project. You report some things to your project manager and some things to your manager and there can be conflicts of interest. So, I will say both, people are highly specialized and they work in teams.

Claudiu: And for example in certain cases, when an individual needs to be transferred between different groups; does your current system provide features that enhance performing such a transfer and monitor it easily ?

Interviewee1: Yes, behind this we have an Active Directory which we are building now which includes all the individuals, organizational data and roles. We have based the intranet mainly on roles because people can come and go and change often. But for example, you can have any role and a role can be associated with any person: you, you or me. We say that whoever has that role should have access to this. That role is the owner of that site. We have such features, and there are other features planned by the HR department. But today, yes, we do this, once you transfer someone and edit the role in the system and then the system will take care of the rest. For example, it monitors in which groups you belong and in which projects you appear.

Claudiu: Now let's move to another topic: discussion forums. How do you regard discussion forums as a medium for knowledge gathering and knowledge sharing?

Interviewee1: Today, we do not use discussion forums as such a large extent. We have had wikis; it's hard to say what, for example, if you display wiki in one way it will look like a discussion forum. You can tag how people are responding or you can just post everything. So I would say the closest thing to using discussion forums are the wikis we have used. On the platform we are building now, one of the features not yet implemented fully are the regular discussion forums.

Pallavi: *You mentioned that it's a people centered organization and you have fika in the morning? So you consider fika as a non-IT based way of sharing knowledge?*

Interviewee1: Absolutely. And I would say it's the most important non-IT because that's where you meet people you normally not meet otherwise and we encourage people to use this. It's a window of opportunity for meeting people. You can always email people but it's better if you said 'hello' before and that's also one thing now that Active Directory displays images and that's a huge improvement. And that's now a feature that Active Directory displays every face and that's a huge improvement. When you mail somebody, you will know that's the right person. So, you don't mail to the wrong people.

Claudiu: *I assume that you have for example best practices and lessons learned. Are they well documented and shown through system at the end of successful collaboration?*

Interviewee1: I would say that it's up and down. That's one of the key challenges we are trying to solve with the new platform because like I said, people can work in different projects and once a project has ended, it is a question of who owns the material produced by the project. Instead of dispersing all that information into five different areas, we need one place to collect it and to use metadata; everything in the project X is tagged with the project X. You can have views on your home button or in any page, and automatically run searches in the background based on metadata so you don't need to go and search for all, if that's your interest. Whenever anyone tags something with audio, you can just play it.

Claudiu: *And have you seen improvements after using these features? Did you see that it takes less time for people to solve problems, as opposed to previous years?*

Interviewee1: I can't tell you everything about that because I don't work for R&D department and this is mainly where such problems occur. You work on projects and then you spread out, then you work on projects and spread out and there is no unified way of collecting that results from the projects and make comparisons to others. So I can't tell you if today it is better than 3 years ago, but if you ask me in 3 years, hopefully I will say that now it's much better because all the features of the platform used for collecting knowledge.

Claudiu: *Could you give us some examples where group contributions or ideas were made available through the system and you have decided to transform them into concrete business practices?*

Interviewee1: Yes. For example, we are meeting regularly once a week with a team of 4 developers. They are from different areas within the R&D department. And before that they have had their own ways of building their sites. You know, for their purposes. And that made it quite hard for people outside that to understand how to structure material, therefore for every hour spent on searching for irrelevant items will cost a lot the company. So right now, people from different departments are agreeing on how to build their portals focused more on knowledge areas or subjects. So, no matter if you are in one, you can go to one department portal where they have views, they have competence areas, they have the projects they work for. And that structure is duplicated for different ways. We use that platform to make sure that every regional office has more or less the same structure. So, the internal knowledge are becomes much easier. You don't need to open a page in the portal to say 'what is this?', 'how can I...?' and then go and ask someone, sit there for half an hour and waste time. It should be self-evident. That's one example of how we use the system to be able to work in the same manner.

Pallavi: *You said that it's a global company. So you don't have people in the same place. Do you have sort of video conferencing that enables sharing of information?*

Interviewee1: We don't use video conferencing as much as Adobe Connect. Sharing your best thought with others doesn't always require you to see each other. It is a big advantage if you have met face-to-face first, especially if you are new at the company. Then you don't necessarily need to see people sitting at the table saying 'hello', and then

talking. But you hear them on the phone and then you share their area. If I talk to someone, we collaborate and agree that 'this is how we should do it'.

Pallavi: In your upcoming system, are there features that you are very excited about and you consider them very important for the organization?

Interviewee1: Yes, if I should mention one is again the use of metadata, because it hasn't been used to its full extent until now. If you have a correct set of metadata then people can tag every content they upload with the right description. This internally results in correct search and you can search for project menus, you can always directly narrow down your search based on the metadata, that is who publishes it, when does it publish it, is it an image you are looking for or a document or pdf. You can narrow your search to find quickly what you are looking for. And then the other thing is if you are using an add-on tool, then you can help people understand the organization and how it is structured. There are different views generated from the metadata. For example, the views I mentioned, if you have an interest in audio then you don't need to perform the same search each and every morning to see what's new, sit there and hopefully find something relevant. Later on, we will have views in the system and in the background you will tag it and say 'do search for these tags in the metadata'. So, it will be more or less like an RSS feed, but for tags. Every tag you will see will be presented automatically, you will not need to explicitly look for it. And there are of course many other collaborative areas, but if I should mention one thing that makes a difference, that is metadata. People in each and every department should list the metadata they think it's relevant. That will take also some time, but we need visions in our project. We are starting with some basic functionality, but in the upcoming years, we will have more functionalities and it will be more social and you will be able to see, for example, what are people talking about, what kind of files are they accessing. And that's quite fun because that's also another way of getting to know your company.

Claudiu: I suppose that you are basing your upcoming platform on ontologies and semantic networks.

Interviewee1: We have discussed it and it's interesting that you mention it, but that's one of the add-ons that I was mentioning. They use advanced heuristics and algorithms to see what people are talking about and what kind of documents are they using. They build a knowledge structure from all the content that is produced and then present it. That feature will come a bit later, but we have usability experts here in the company and I also focus on usability of course, given my role. And that's also a job done in parallel with building a platform. But before I came on board, they have done quite a lot of user studies with using questionnaires and cards with tasks, for example. And that's also something we are experimenting right now, with building more task-based intranet, based on the things people actually need to do. It's now always easy to structure the whole intranet on what you are supposed to do, or what you are expecting to do. In some cases it's not about what you do, it's the project homepage. We display the basic information about the project, and the files people need and this is a collaborative area. But in some areas, for example in handbooks, we have started to do that. I think it's an excellent goal to have a user-centric approach. But in some cases, that will be hard because you don't always know what your user expects. So, maybe there will be instead a product homepage, a project homepage. My view and what I think I can add to this project is hopefully more in line with what you are interested in and using smarter software. That goes beyond what people can themselves understand. For example, if you are writing and uploading something, and you have the system which has a clue of what you do, that would be much better. And that goes back to how we name things. And the next time you are there typing for something the system will give you suitable tips. That's my goals but that's within a few years from now on. We are growing so quickly and the migration will take some time; now we are doing the first steps of migrating from the old intranet to the new one. And we need to respect that first, that people need to do an inventory of what should be kept and stuff like that. After information is taken and well structured, there come the next steps: we need to take it to the next level and then to the next level and so on, and that will take years. I think you need patience in this work and you should like talking to people. You should never forget this: the platform is here to serve people in the daily business and if we don't talk to them or understand their business, we can have any system; they couldn't care less how smart the heuristics are. If it doesn't serve their business need, then there's no

point in investing time and money in changing the system. So that's really our top priority to make the lives of our colleagues easier.

Pallavi: *Could you just give some examples of other non-IT ways of collaborating?*

Interviewee1: Here in Lund we have for example a monthly meeting where the CEO is in charge of this. And then if you have something of interest that you would like to talk about, there is this meeting where you always have an agenda of discussion. So that's a non-IT way where you sit down and listen to people presenting something. Other than that, there are regular meetings. It's a meeting intensive company. So that's where the knowledge sharing happens today. A lot of people here, if they have organizational projects, tend to mix and can be in meetings all day long. But that's a way of sharing information: meeting people, sitting down and talking about things. I would say the monthly meeting and the regular meetings on a daily basis. And we will not replace this with the system. It's far too important to meet people face to face.

Claudiu: *I suppose we are done with our questions.*

Interviewee1: You talk to me today, but like I said, we are just at the beginning of the transfer between the systems. So if you will ask me in a year from now on, you will hear another view of how this works and now I can more tell you about what we are planning to do. I am doing my best to work with collaborative areas and tagging content and all the things that are interesting and can be used by the system to help0 you understand something, instead of only relying on individuals.

Claudiu: *We will send you our report and will try to offer you some guidelines, if we identify some gaps we will present you our suggestions and you can take them into consideration.*

Interviewee1: I'm very interested in hearing about what you achieve because right now I have a big interest in working with KM. Right now, what I do on a daily basis is migrate things and help people sort old material from the material that we should keep. On a long term, KM requires looking at the horizons and what's ahead, how should we work with this. I'm firmly grounded right now in talking to people about how to migrate from one platform to another. In a few weeks, I will have more time to think about how we should work with some materials and how to effectively use the platform to support the business. I think now it is Content Management and then there will be Content Configuration. And then we will add more functionality so that people will easily configure their content so that it doesn't look boring. I hope that our discussion will help you. If you have any further questions, just email me and I will do my best to try to answer them.

Claudiu: *Thank you very much for your time.*

Appendix C

Transcription of the interview with the application architect from the mobile communications company

Claudiu: *Are we allowed to mention your name and your current position within the company?*

Interviewee2: Let me get back to you on that because we have a policy where we do not officially. I know the policy is that if a vendor asks us for being mentioned as a referenced customer we do not participate in such activities.

Claudiu: *Okay*

Pallavi: *All right. Okay*

Interviewee2: So I will have to get back to you on that.

Pallavi: *So shall we start?*

Claudiu: *So first if you could just describe briefly your position within the company.*

Interviewee2: I am an application architect which means that I am responsible for several different applications, when it comes to securing the stability, performance, scalability, security, usability, such factors when it comes to the applications. When we do changes to the application, and also when we make some changes like we fix something that should make it better, when we introduce new functionality or when we introduce a new system, a new function or a new module into an existing or new environment.

Claudiu: *Ok. And what is the core business of your organization?*

Interviewee2: To make money of course. I don't know, I could give a politically official statement on the core value. Of course our business is to sell and produce and sort of bring products to the market that people find fantastic of course and are willing to buy them. That's what we do. Our purpose is to bring exciting, entertaining consumer products within the mobile division.

Claudiu: *What is your general conception regarding the specific platform that you are using for knowledge sharing within your organization?*

Interviewee2: Let me then ask you in my world we start with data, data is just no value attached to whatsoever. From data we can build information. Information is slightly higher level of data, where you process and it may be put into context etc. From information you can maybe gain knowledge and when you use knowledge you gain experience and experience is what gives you a professional approach to problem solving or to give in order for you to build your abilities in your careers.

Interviewee2: So when we talk about knowledge, do we talk about knowledge in the same sense or do you mean information, data what?

Pallavi: *We mean information sharing within the company.*

Interviewee2: Because you said knowledge sharing, that's quite a different thing for me.

Pallavi: *So essentially how you have a system in place that allows collaboration.*

Interviewee2: That's not knowledge, that's information. So that I don't answer a question where I make an interpretation of what you mean by knowledge and we haven't thought that interpretation. So we are talking about information sharing and not knowledge sharing. So I am going to answer the question from an information sharing perspective and not a knowledge sharing perspective. Right?

Interviewee2: So then could you please read that question again.

Claudiu: *Yes, what is your general conception regarding the specific IT platform that you are using for sharing of information within the organization?*

Interviewee2: Well there is no such thing as one platform used for information sharing. We have several of them.

Claudiu: *Could you name some of them?*

Interviewee2: I mean we have an intranet system which is used for publishing of information in a web page format and you can look at the user profile and they can add metadata to the profile like I am interested in, or these are my colleagues or I am interested in these topics and these are my specialties and "ask me about this and that". And then you can add your blog or wiki or whatever. That is the intranet platform based on Sharepoint.

Claudiu and Pallavi: *Okay.*

Interviewee2: Then of course we have major other systems like the Phone development - a wiki system, a different wiki system for the information and sort of track keeping on what is going in what project and how different things keeping together. We use wikis a lot. Then of course on top of that we have a generic document management system where we have controlled document management. I don't know you know about ISO-9001?

Pallavi: *The standard.*

Interviewee2: Yes, so ISO 9001 is more about quality. In document management it says that you shall be able to keep track of each document so that you can see that it is unique, to be able to see who made what changes to each document when, if the state of the document is approved or not and that is taken care of in a Document Management System. Where we have lots of different, Word, Excel, Powerpoint, zip files, images, videos like that. So those entities are taken care of in a Document Management System.

Claudiu: *Okay.*

Interviewee2: Then of course, on top of that we have lots of other systems for project data and management where for example, if we make a phone, the phone is made of different parts and we have the parts structure and we have documents related to each part and relationship between the parts and you have statuses and lifecycles about the product. And you have different other systems for tracking bugs or tracking defects or soft control management, lots of it. There is not one such thing as one information sharing tool.

Claudiu: *Okay.*

Interviewee2: Because it is a complex business. The legal department may have different needs than the software development, engineers and the finance department or the sourcing department. Different needs and we cannot fit all our data, all our processes, all our information all into one lump.

Claudiu: *Okay, have you used previously some specific information sharing tools that you have changed and incase your answer is yes, what were the main reasons why you have changed them?*

Interviewee2: There I cannot answer anything generic. Of course you change if you change to an updated version. If that is counted as a change then, maybe added functionality might be that the new platform is more scalable and can handle more traffic or more users or more data. Might be performance or it might be everything like that. Or plainly the vendor stops supporting the old version. So we have to update to get the support. It can be multitude of different reasons for change. In some cases we change due to consolidating systems, so we might see that we have two different ways of working and we may merge that into one way of working, so try to see which is the best? Do we go for solution A or Solution B? Or merge solution A and B? Or analyze the needs that we have behind these two solutions A and B? Or the third solution C? So it is really different cases, why we do change. It might be functionality or technical. It is not only vendor driven or IT driven. It can also be because we change a process and maybe the cost of changing the tool to fit the process might be too high. Or maybe the business has new needs so instead so if we think of source control management, so in the development of our old phones we used Symbian and going to Android and Android comes with Google and they have a set of specifications of how you handle things and you might have to switch system to build in order to better fit to developing in Android from developing in Symbian.

Claudiu: *Okay, our next question focuses on the way how are your preferred ways to engage individuals to use more your information sharing platforms?*

Interviewee2: To engage individuals more?

Claudiu: *Yes, individuals to use more your current sharing system.*

Claudiu: *Are there any ways to motivate them, maybe through system you have some kind of rankings, something where they can be highlighted.*

Interviewee2: No. If I think of the opposite of motivating, that would be either demotivating. So and I can't see that we either motivate or demotivate them. Since people are creative in this company, there must be a culture, because we are supposed to be ahead of others. The culture can be, in some cases, if users think that they know what is better, they do their work in such way. So it's hard to enforce a strict top down decision structure so it's not that someone manages that now you are supposed to do everything in this tool, if you don't like the tool or the tool is bad they can change the tool to make it better or they can tweak something. Or do a small Javascript in the web browser to actually use it better. People do that. So and we as IT department I feel are sort of boring in enforcing things. So the best way to make people use the tools that we supply is to make the tools that meet the people's expectations of the users or to slightly exceed the expectations. The best way is to analyze the basic need of the users. I want to be able to slice and dice the data and see exactly the figure and take the decision. That is the need. This is generic, not related to the company. So basically to match the user expectations to what they will get. If the user has a need, so you shall be ahead of the user. Look at users who say 'I need that' and then confirm "yes, I can do this".

It is good if you can get a community where people talk to each other. Because that's what people do. People talk to colleagues and ask them 'how you do this?'. So, I don't know if I answered you question.

Claudiu: *Yes.*

Claudiu: *So this is also related to my next question. So your attitude is more towards having highly specialized individuals that are working by themselves or to divide them into teams?*

Interviewee2: What do you mean by you? Do you mean the company or me?

Claudiu: *The general company attitude.*

Interviewee2: I cannot answer this question. We are a company of 10000 people, working on 4 or 5 different continents.

Claudiu: *Maybe you can give the approach within your department.*

Interviewee2: I don't think so, it cannot give you the view of company as a whole, or you cannot extrapolate anything from that.

Claudiu: *Does the system allow easy monitoring users who are switching groups?*

Interviewee2: Do you mean like a web based access or do you mean monitoring of authorities changing?

Claudiu: *For e.g. if some individuals have initially joined a particular team and then they are moving to another team or other department. Does the system keep track of all these changes?*

Interviewee2: That's from system to system. Ofcourse most of our, one part of our infrastructure is ofcourse our directory with people users accounts, Windows users, who is your manager, security group that are you a member of . That has some kind of tracking on what changes go on. In some systems we do the same to keep track of what changes go on with people. For example, if we had an employee called EvaBenson and then her name became Svensonafter marriage. So in some systems we keep track of that, in some don't care. It all depends on the need.

Claudiu: *How do you view discussion forums as a medium of knowledge sharing and gathering?*

Interviewee2: In my daily work and in the tools that I am aware of I don't think we use discussion forums. I am not aware of discussion forums as a work group.

Pallavi: *Do you have informal ways of meeting that could benefit the company. Non IT based information sharing?*

Interviewee2: Coffee machine, meetings throughout the day. In an organized meeting for decision making, ofcourse knowledge gained from that. If the discussion derails into another topic and you gain knowledge from that. Maybe it happens a bit too much. Sometimes it is the way people find out and its unstructured, thus it is hard to actively seek knowledge.

Claudiu: *In general, do your current IT systems provide support for people to form groups according to their specializations. If yes, could you us give some concrete examples?*

Interviewee2: Do you mean ad-hoc collaboration?

Pallavi: *A kind of Communities of Practice.*

Claudiu: *Specialized group of individuals working on certain specific tasks.*

Interviewee2: Do you mean a closed collaboration that no one has access to? Or just collaboration where no one else can but only those who are invited?

Pallavi: *Any sort of collaboration where people with similar interests come together and they discuss over the information sharing system that you have in place?*

Interviewee2: Yes, but do you see the difference?

Interviewee2: Because if you have a solution on invites only, then how can you, if you are not invited and you are interested in the topic, you have something to contribute, then how can you know if the discussion is ongoing. So in that scenario, having such as solution is not maybe answer yes we have it. It might not be the same thing as that we

are ineffective in capturing people's knowledge. So but that's why I don't really know if my answer will contribute to your understanding of our work. Because there are both openly such solutions that looks similar to Facebook with groups. But they are just not Facebook and not with groups.

So in one case you can see it and in the other case its ongoing but you don't know how to find that out. So how do you know to search for the needle in the haystack when you don't know if it is in the haystack or if it is the needle.

Claudiu: *Supposing you have some groups, do you have some features like Best practices and Lessons learnt that are well document and shared at the end of a team work through your current system?*

Interviewee2: Let me then elaborate about that interpretation also. Yes, of course if you think of a word document that we report from a project, or a question and answer Excel spread sheet or whatever, think of that as one of those items that you are relating to. You can store any such document in DMS. But then this is in itself does not have any tracking or features or connection to what you are trying to describe. So its not a structured way of, like if you think of a word document, a word doc can be stored in multiple different systems like Sharepoint, Document Management System, emails anyway, different levels of control, but it doesn't really support the tool itself, or does not support the process of learning or information management. So if you instead think of, okay, in an ideal world, maybe you have a project portal, I am not saying that we don't have a project portal but you have project portal once you have a project model, and once a project passes by a project milestone then at that point you have a mature way of working and you document what you have done and you look at the variations prior to starting the next phase, you look at how can I learn from other. But then it is built into the system and the system promotes and supports a mature way of working and the process of learning and knowledge sharing or information sharing etc., but a word doc does not support the process for the activity of improving your ability to do a project next time. So if you could get back to the question.

Claudiu: *You have features like Best Practices or Lessons Learned that are well documented and shared at the end of team work*

Interviewee2: Of course, but that is not related to any system. That is a process related activity, a support activity for a project. I don't know if we have that support in the system, it might be that we have, but I am not aware of it.

Claudiu: *Through the time have you seen several improvements in quicker response times of individuals and groups to given tasks since they are using the current IT platforms within the company.*

Interviewee2: I don't have any records of such improvement. Of course when introducing new systems for specific needs, there are always such hopes of such parts in business cases, if you change the way of document and people are under the conception that if we have more structured better system, better visibility, better tracking etc. then we may be able to perform better maybe use less man hours in trying to find information that we don't know where it is or who to talk to. But I don't have any track if that has been measured or how it has been measured.

Claudiu: *Do you have any group contributions or ideas that have been translated into concrete practices. Were these ideas made available through some platform and you have viewed them and translated into concrete ideas.*

Interviewee2: General or specific?

Claudiu: *General?*

Interviewee2: Can't talk in general.

Claudiu: *Okay, what about in your particular case?*

Interviewee2: Of course, it happens here when a user has a problem or has an idea. Then we can think of “that’s not we thought about when we developed the system” or “maybe that features need to be available and we haven’t enable them”. Of course, make a change based on the need identified. Because that would be me knowing everything about software development, hardware development, sales, marketing.

Pallavi: *In your opinion that Information sharing systems that you have in place in the company. Do you have any features that you find more appealing when you use them?*

Interviewee2: That is a pretty generic question. If there are some features that I like the most in the knowledge sharing platforms?

Pallavi: *Yes.*

Interviewee2: Simple example: having a users’ profile and upload the picture. That’s a pretty decent way of working. I as a person have a hard time remembering names. If I get to see the person and I get an email and I can know how the colleague looks like or met by the coffee machine that day. It sounds pretty low level, banal feature, but that’s the kind of strong piece of information. Especially when it comes to collaboration.

Claudiu: *Do you intend to include semantic networks and ontologies as some features in your upcoming platforms?*

Interviewee2: What is an ontology?

Claudiu: *Group of related terms. For example when employees look for something, there will be displayed content related to their search terms.*

Interviewee2: Okay. You mean taxonomy. I don’t know if we have any sort of such gathering features of the system sort of pulling out. The only feature I can think of is that our internet platform based on Sharepoint, when I look at the person, you can see who are your common contacts. That is more like Facebook style. What I would like to do, a feature that I can think of right now: if you can know some properties of the user, like you are close colleagues, or are in the same roles in different organizations, or you work in the same project, or other things that connect to each other. Say that 5 persons in my project group of 7 have read a document then that document will allow me too, or if my manager has approved a document that is related to a system that I am responsible for, then that document maybe of high relevance to me, I can clearly see need of that. So these are some features that would be nice to have. But that’s not something that we have in place today.

Claudiu: *These were mainly our questions and we would like to thank you very much for the information you provided us and perhaps after our studies we will identify some gaps and offer you some suggestions for possible improvements of your current systems.*

Appendix D

Transcription of the interview with the senior engineer of Research and Development department of the wireless semiconductor enterprise

Pallavi: *Can you please give a brief overview of your name and role in the organization?*

Interviewee3: I am working as a senior engineer in the R&D (Research and Development) division of the company. We work with actually creating modem IP which includes 2G, 3G and LTE. I have worked in various teams at the company including Application, Middleware and Customer Support Organization. Work profile mostly includes design, development and debugging.

Pallavi: *What is the core business of your organization?*

Interviewee3: The company deals with generating, designing and developing core platforms for mobiles and semiconductors for devices with low power. The best thing for this would be to check our website. That gives a detailed description which you can use.

Pallavi: *What is your general conception regarding the specific platform(s)/IT tools that you use for knowledge sharing within your organization?*

Interviewee3: Our organization is divided into the R&D (Research and Development) division and business processes. With respect to R&D, what we use, as I mentioned before in the mail, Wikis are primary to us. It wasn't there before. Wikis act like a easy to access information hub, where you write what you want and it gets validated by team personnel. We share information about where to find the core documents. These core documents are stored in the cloud. All the documents that we generate from day to day basis are saved there and version controlled and the links those documents are found in the wikis

Pallavi: *So basically it is a two-way sharing process where everybody can involve themselves and share their knowledge and it is not one-way?*

Interviewee3: No, it is not one way.

Pallavi: *Okay. What role does organizational learning play in your daily business operations as a way to achieve your business goals?*

Interviewee3: Of course, there is always a drive from the mgmt. and from within teams to share knowledge in some form of the other. It varies but with respect to tools I cannot really say how much we make use of them for KM (Knowledge Management).but it is a place where we find all the information. For learning and so on, we have trainings that are conducted; we share presentation, documents and links through our DMS.

Pallavi: *You mentioned about the knowledge sharing systems that you have in place via email earlier. So moving on to the next question, were there Km tools earlier?*

Interviewee3: Earlier when I started working here, I know that we didn't have Wikis at all. Then when the world caught up we started using wikis. At some places SharePoint is also used. Some tools are limited to a group, so SharePoint is used when you want information to be pushed out to people, because you can publish announcements and so on, although you can do the same in Wikis but in SharePoint you can subscribe to them and get emails to get

information. When I was working in a different role earlier we used SharePoint a lot and now it is mostly Wikis in my new team. But I would also say that Wikis made a big difference. Earlier if I recollect, we only had a DMS and other information were spread around through emails.

Pallavi: *So is it okay to say that even your role determines the kind of knowledge sharing system that is being used in the company?*

Interviewee3: Yes, it is more or less like team oriented or group oriented (Group in the company terminology is comparable to much larger set of people who work together targeting to achieve a specific goal for example we have different groups for handling Modem IP and another group to handle customers and other group to work with application software etc, so they are like companies within a company), as there are hierarchies and then different groups in R&D. Each group uses a tool which they find more useful. At top level of the company I know that they extensively use Wikis and SharePoint. Also, say I am in a group and if I want to know about another group, at that higher level, it's mostly through SharePoint. Wikis are not that common there. Even our company website points to many wikis.

Pallavi: *Okay yes, I can check that. So there is flexibility in using KM tools in the company?*

Interviewee3: Yes

Pallavi: *Earlier you mentioned that there is a drive from the management that encourages you to use these systems. So my next question is how is it ensured that employees actively participate or engage in sharing knowledge through your knowledge management system? For example do you have any internal incentive schemes that are in place to ensure effective sharing of knowledge by an employee?*

Interviewee3: I think it is more to do with our ways of working. Every company and every team has a way of working. Nobody really go out of the ways of working and say that I want to work in a different way. So, it is imbibed in our ways of working itself. So, a new employee or new team member is presented with the tools in place and has to understand how to use them. Nobody has to request a person to use a certain tool. The only way one knows to do things is through that. It is inherent to the ways of working

Pallavi: *So if you have a new team member in your team, is this information included in the orientation?*

Interviewee3: Exactly they are introduced to all the tools, they are informed about how to create, share and update documents. It is inherent and one does not feel the need to go out of way to do it.

Pallavi: *Okay, like you mentioned 'ways of working', so do you have specialized people in your company who are very specific with their skill set or is there more emphasis on team work?*

Interviewee3: Well, there has to be some team work because you have modules and module ownership, irrespective of the size of a company. But having said that, this kind of creation of modem IP work requires very specific skill set again but to make a system work we need a team. We cannot have one person to bring up the whole thing. So, we have specialized groups and everybody is a part of a specialized group (To put it in a more correct or simplistic way each team specializes in something and teams work together to achieve a specific goal of the group). So that team has to conduct as a team in that group and they are closed knit and they have to work in a fashion. Most of the ways of working is triggered by that and teams work in a different fashion and it is needed as that's the way they can be most productive. Team work is needed but its more specialized people that are part of each team.

Pallavi: *Okay. Documents with Best Practices and Lessons learned, are they documented and shared at the end of a team work effort through a shared document system in place?*

Interviewee3: Currently I am new to the team that I am working for, but in my earlier team we used to produce documents at the completion of every project and not module. When we move from project to project, we summarized about the efforts made, what we learnt and thereafter used them in our new project. This was done from the highest point of whole project as such and then for every team too, because every team should know how to better ourselves for the next project because we are just creating platforms but the module remains but we move to a new project.

Pallavi: *So there are certain documents in the DMS that have such best practices and lessons learned documented.*

Interviewee3: Yes, The only hindsight is that it is not that easy to find that document. It is such a big thing and may be the notations and all that are so cryptic. Maybe if I want to search something, I usually search based on the subject or the title of the document. But how do I know the title of the document? Somehow the title of the document has not been kept consistent and the document number is hard to remember, but the information is of course available but it can be a good improvement. How effectively we can find documents are important because in the digitized world there is so much of content. So data mining is something that we really have to focus on.

Pallavi: *How do you view discussion forums as a medium for knowledge sharing and gathering? How important are discussion forums to the everyday operations performed within the organization?*

Interviewee3: Yes, I mean, there are discussion forums that we have but I am not sure if anybody uses that. The most convenient form that we have is Microsoft Live Meeting and most of the time everybody is here so we use face to face meetings because it's much easier to get information and credible information. Discussion forums are good if people are scattered around the world. We do have such a system set up but nonetheless we address issues through the ways of our working. For e.g. if we want to make something happen, like a technical solution, then we create a tracking point and then everybody is tracked through that. It is a different system altogether. It is mostly technical oriented and the work we do is documented and put in the DMS.

Pallavi: *So it is more structured and easier to track that way?*

Interviewee3: Yes, a tracking point is a unique number given to you and you are linked to it and the project leaders track the work through it. If five different sites are involved then they will have the same number and they can all track the same work for e.g. the target end date.

Pallavi: *Does the system provide support for forming groups of employees specialized on a certain topic? Could you give concrete example of such a feature?*

Interviewee3: Yes, I have missed that phase because now we are in the phase of execution. But in an informal way it does happen, for e.g. if I move from one technology to another, there are people to help you out and help you to learn. It doesn't happen now that formally now, but earlier it used to happen weekly where a topic was taken up for e.g. somebody talks about patents or a new technology.

Pallavi: *Have best practices or lessons learned documents been effective in shorter task times for subsequent tasks of similar nature documented?*

Interviewee3: I mean at least if not shorter task times, but better designs when it comes to executing something. So you end up having a better solution for the same thing. So of course those things help and if the same person or same team does some new work, they know what mistakes were committed and they can better themselves.

Pallavi: *Does your system provide support for easy migration of individuals between different working groups?*

Interviewee3: Those are more like project allocation related, so if such a requirement exists, a person is allocated to a project 50% and the other 50%. So it is more about time. Of course informally if one has queries and stuff, people

can approach each other and are helpful. But the official way of going about it is through Project Allocation and the person required in such a case is shared time wise.

Pallavi: *In your opinion do you feel the system you have in place as helped in quicker response times to new ideas and help employees become more receptive to changes?*

Interviewee3: Yes, of course Wikis helped us a lot, easier to edit. Say for e.g. we deal with new hardware all the time, a new board that comes out. What happens is that maybe one or two guys work on it to get it started and to spread the information they send the link on the wiki and everybody knows how to do it, instead of creating a whole new document. Wiki is so informal that you could just write down what you did instead of having a formal documentation and go through a review process.

If somebody wants to make a correction because, say different iterations of the same platform occur, then a person can change data on the wiki accordingly. Say a new version has lesser number of steps and somebody then, can remove the extra additional steps from the wiki information page. However there strict guidelines, people do it in a proactive manner. It is not a fixed thing to do especially wikis. But the document management pattern is more formal so when you do a design you have to write it down or you can't go to the next step. People are encouraged to use wiki it is more to do with how much time you have given the execution and how quickly the final product has to be released.

Pallavi: *So can we say, that through wikis, even when you are mid-way in a project, you can update and share information whereas in the DMS which is a bit more strict according to the format you have to wait till the end of the project to properly document and share information?*

Interviewee3: Not end, but it has to go through a formal process. So one has to identify a change and the old document has to be tracked etc. It has a sequence of steps. Also like I earlier mentioned notations are not that clear, so what do I search? Wiki is quite convenient, I can search for text within the page and I am most likely to get a better hit.

Pallavi: *Are there any group contributions/ideas that have been translated into concrete business practices? Could you give an example when you have discovered a relevant group finding through the K.M. system?*

Interviewee3: Not that I know, but of course there is a constant feedback that goes on from us to our higher manager and from them to theirs and so on and so forth. But that has to do with the feedback and also what the rest of the world is doing and if it's good. We learn from not only from the inside and from outside too so the trigger could have been from either of the ways. I always believe that we could have a better DMS and better way to access documents but Wikis are best thing that has happened in the organization or the teams that I have worked with.

Pallavi: *So basically your main preference is Wikis?*

Interviewee3: Yes, but since we don't actually share the actual technical documents in the Wikis, we need to have a better DMS. Now it is okay, as such accessibility is not a problem but we need to figure out when and how to search better. So the DMS could be improved.

Pallavi: *Do you have a moderator or an administrator for the wikis who overlooks whatever content is being put out and modifies things if certain things are not right?*

Interviewee3: It does not happen that way, so if somebody comes across information that may be wrong it can be corrected as everybody has an admin right. So it is taken that the person shares information responsibly and he or she makes a mistake, it is taken that it is due to lack of information or it is a mistake that was not intended. Hence it

is corrected. Moreover, no sensitive information is shared on the wiki so it cannot be that critical and it can be sorted out quickly in case there is some miscommunication.

Pallavi: *Okay, thank you. Is there something that you would like to ask or add?*

Interviewee3: I want to know if for your thesis you are trying to understand all the KM tools or propose a new thing.

Pallavi: *We are trying to understand the bridge or the link between Organizational Learning and KM. How various KM tools help Organizational Learning in a company as it is an upcoming concept and a lot of importance is being given to it.*

Interviewee3: Yes, exactly. In the previous company that I worked for in India, there were better KMS. Here, they don't have that effect KMS. Again it is all about time. Over there I did not get time to use them as much even though they were there.

Pallavi: *Okay, so we can send our interview transcript for your validation and thereafter the review report findings once we are done.*

Interviewee3: Sure, I can look at it.

Pallavi: *I would like to confirm again, are you okay to mention the role, your name and the company's name?*

Interviewee3: Yes, I don't think it should be a problem. I can check with my manager once again as and when you send me the report. If you have any doubts, you can always mail me.

Pallavi: *All right. Thank you so much for taking your time out for this interview.*

Interviewee3: Thank you.

Appendix E

Transcription of the interview with the transition managers from IBM Sweden

Claudiu: *What is the core business of your organization?*

Interviewee 4: IBM is a big organization. There are many streams such as services, software, consulting. Currently I can talk about IT Services part of IBM. IT services is a big part in itself – it deals with software development, localized support of hardware and desktop applications etc. However since I have experience with application maintenance part.

Claudiu: *What is your general conception regarding the specific platform(s)/IT tools that you use for knowledge sharing within your organization (Knowledge Management system)?*

Interviewee 4: Okay, let me give you a background about why we require KMS in IBM. Probably it will be important for you. What happens is firstly the teams are placed at different locations and there are multiple accounts (Client projects). We have resources (employees or colleagues) work for one of these different accounts.

Then there are issues which can get repeated in other areas also. Further, KMS is at multiple levels, because there may be a requirement of a certain thing at some account or some project. Now here also we have multiple channels – transition, delivery, development,(EMS) maintenance. With this diversity, sharing of knowledge is required within each of these levels. That's the reason we need different KMS.

If we consider an example of my work, application transition, we are using multiple KM Tools which are really helpful to us. One is which is shared along with the customer also. Then for e.g. a platform with version control with a working document which can get improved and then we have the latest document. Then we have a Tearoom which is utilized by us if we want to refer some of the documents specific to transition. Then we have KMS tools for infrequent transition cases which are specific to some accounts. There is another KM pillar on which KMS is based on for the transition here. We have something similar to this in delivery. Again here there are systems which are internal and those which we can share with the customer. So there are multiple reasons to utilize KMS.

Thereafter at the account level, an email serves as an effective way to address problems, where an email can be sent to account level managers (in a group) or at a broader level say to all the transition managers. I can state that I am looking for a certain document. Then I get many responses to that with relevant documents with knowledge from people with their experience.

Claudiu: *What role does organizational learning play in your daily business operations as a way to achieve your business goals?*

Interviewee 4: Here if you talk about Organizational Learning I am not well versed with the definitions used. What do you mean by Organizational Learning?

Pallavi: *We see learning that happens from an individual/employee level, the learning then goes to the group and then an organizational level. Suppose if an employee has an idea or a new way of working then that may be disseminated to the group and then to the organizational level if it is accepted. This idea can be used as a standard way of working.*

Interviewee 4: Yes, okay.

Pallavi: *It can be the other way round also. You may have certain standard ways of working at the organizational level which can go down to the group and individual level.*

Interviewee 4: Okay, so I will put it like this. This is a very big company with multiple processes and this is one of the best process-oriented companies. Multiple things happen here.

One is this whenever we get out of an account or a project, the first thing we do is we document/talk about Lessons Learnt. We discuss about the good, bad, improvisations, challenges and how they were resolved. We share it across. There is a portal where we report these Lessons Learnt. When I join a new project, I first look at the Lessons learnt from any project in a similar segment.

Then we have white paper. IBM even has patents. If I come up with some ideas, I can even patent it. This is one of the best things about this company. The idea is analyzed in a forum which approves it for patenting and is awarded, the project represented by the person is also awarded thereafter even financial rewards are given and published if it is relevant to everybody.

Another way of learning is through forums where we meet weekly and monthly. We go through our higher management objectives. Our actions are driven from that most of those times – from what we hear from our leaders.

There is word of mouth also, I am not sure if you can cover it in KMS. Say a person is in a project and I am planning to join a similar project then I can definitely ask the person about their experience and that is again a form of organizational learning here.

Interviewee 4: Could I respond to the question I asked?

Claudiu, Pallavi: *Yes.*

Pallavi: *So it does play an important role, a very important role in IBM?*

Interviewee 4: Yes, yes it does. Otherwise how will we share knowledge, otherwise I will have to invent the wheel again every time, and it is just not possible.

Claudiu: *Okay, have you used different KM platforms previously and if you have replaced with some newer systems? If so, what were the main reasons for replacing the old systems?*

Interviewee 4: One thing is technology. The systems can be either technical systems or it can be a process. This process might be changed like we have our knowledge sharing done in a forum on say an email. And we finally realize that most of the content gets lost sometimes. So it's better to have a practitioners' portal, which documents all practitioners' portal. Then if the portal needs to be updated, then it's not the process but the technical part. Say suppose you want to look at the retail segment, then banking part and we don't want to waste 10 hours searching for a document.

Interviewee 5: I would like to add to my colleague's part. I can give an example here. Earlier in IBM we were using SDMS (Software Development Management System) and now we don't use it. We have shifted to RPM, TeamRooms etc. Why changed it, initially we were working in an environment where a team member was limited to his or her project only. Now it has changed, a person works on multiple projects/area and the person may require getting data for different projects. So now we don't use SDMS and we use Tearoom, RPM–Rational Portfolio Manager, RTC .

Pallavi: *Could you just elaborate on the Knowledge Management System that you have in place right now and how you use them?*

Interviewee 5: Knowledge Management System?

Pallavi: *Yes.*

Interviewee 5: We have Teamroom, Lotus which is our own product. We have a facility where we can create a Tearoom specific to a project and we can create our own categories of the document and we can upload relevant documents. Say in my current project, half of the team works at an offshore location, we can use these tools to share large documents, which can be very difficult to share otherwise. Other than that, it depends from project to project, suppose in case of there is remote knowledge transfer then we have different tools such as D2D Lite.

The choice of tools is affected by a lot of things. Cost plays an important role in our choice of tools. If we have an IBM tool that is free for us, we will use it even if it may have some demerits. Say in a big project with critical data, there we may go for some external tools like WebEx, Lotus Life.

Interviewee 4: D2D is Desktop to Desktop.

Interviewee 4: One question here then we will go to basics.

Claudiu, Pallavi: *Yes.*

Interviewee 4: If we share knowledge through phone is this a tool?

Pallavi: *That is not a tool that will be an unstructured way of sharing knowledge.*

Interviewee 4: Then I think D2D is not a tool that you are looking for.

Pallavi: *Actually that is a system that you have a place so...*

Interviewee 5: You mean to say a knowledge repository where we keep all our documents.

Pallavi: *Where you keep your documents, where there is a 2 way communication between all your employees like you have an intranet portal.*

Interviewee 5: You can say that the main tools we use are RPM and Tearoom. D2D is used to connect via phone.

Pallavi: *Remote Desktop Connection you mean.*

Interviewee 4, Interviewee 5: *Yes.*

Pallavi: *Actually it is an effective way. Say for people if you are separated in different parts of the world then this allows you to share knowledge. So it will be a part of KM.*

Interviewee 4: It is, yes, then we have NetMeeting also.

Interviewee 4: We have a practioner's portal, forums also. We have a lessons learnt portal also.

Interviewee 5: So, actually we are from a transition team. So before going through a transition so we have to think about what tools to consider. So we need to compare tools based on costs etc. So I can show you but not share you this document where we have all KM tools listed and have characteristics of each compared based on different context. For e.g. if it is free for us, it is of first priority. Then there are some tools which work very well if there are few resources whereas for a big different it can be different. So there are different measures that we consider before choosing a tool.

Claudiu: *Okay. How do you ensure that employees actively participate or engage in sharing knowledge through your knowledge management system? For example do you have any internal incentive schemes that are in place to ensure effective sharing of knowledge by an employee?*

Interviewee 5: Yes, one thing is motivating and the other thing is implementation to be followed. A project manager's role is to motivate his or her team members. The other thing is that we have a process implemented so we have to use it anyway. So we are working on a project we will make sure all application related documents need to be shared with all team members. So if I have stuck somewhere and I need a root cause analysis for something, a team member in a different project can get access to our documents and get data which can be used for his or her requirement. SO one is motivation and the other is implementation as a mandatory process.

Claudiu: *How do you view the organizations way of working? Is it more towards a specialized individual employee effort or team work based?*

Interviewee 5: Team Based definitely. Team work is always there. In some cases it depends, in a few niche areas, we may need to give importance to specialized skill set persons. But that is temporary mostly. Our strategy is like if we have a person with specialized skill set, we need to make sure that there are more such resources and this is done through gradual internal training.

Claudiu: *Does the system provide support for forming groups of employees specialized on a certain topic? Could you give an example of such a feature?*

Interviewee 5: We have a CSA group that is always ready to help with support on a project. Also the Transition team that we are a part of, Delivery Team, Lotus notes implemented for different customers. GBS team.

Interviewee 4: The other teams we have are RFP for proposals when a customer floors a proposal.

Claudiu: *Do IT tools provide support for easy migration of individuals between different working groups?*

Interviewee 4: So we are saying that, does our system help us or to monitor the exchange of employees?

Claudiu: *Yes, within different departments or projects within the organization.*

Interviewee 4: And we are talking about Knowledge Management?

Claudiu, Pallavi: *Yes.*

Interviewee 4: What happens is the other way around. I was talking about the RFP team or the Solution Team that I am a part of. Suppose, I am interested in going to another team, the way to get the right to their KMS is through my email id which has certain access privileges attached to it. So once I move to a new team, these access rights can change according to competency and the tower that I am involved with.

Interviewee 5: There is also a process where we can get an access if we want.

Interviewee 4: Yes, we need to justify why I want to access knowledge/information that is not relevant to my department which can be approved by the manager and we are provided with the access rights.

Interviewee 5: I would also like to add, we have groups like mail groups. Then we have a team with specific knowledge. We are a part of the TNT team group. Then any other team say the Delivery team that needs some information, they can contact us via that email group. Any person from our TNT email group can respond to their request. This is something which is very useful and we frequently use it.

Interviewee 4: What happens is that through an email, data can get lost. However if it is in a particular place, it is always accessible or there is 80% to 90% probability of finding the data.

Claudiu: *In your opinion do you feel the system you have in place has helped in quicker response times to new ideas and help employees become more receptive to changes?*

Interviewee 4: This is a good question.

Interviewee 5: So basically you want to ask how these tools are helpful to us.

Claudiu: *Yes, how they have been helpful in the performance, shorter task times.*

Interviewee 4, Interviewee 5: Oh yes definitely.

Interviewee 5: I mentioned earlier RPM tool. First it makes it easy to manage a project. It has a repository containing all the documentation of projects. It gives us all the information of a project, helps us keep track. Earlier I was working for some Telecom project. I have certain documents that I have created 2 years back and it is still there in the RPM repository. So if some person who is working for the project now and has some doubts to be clarified in the data of the document. I can first get the access to the document which I may not remember about 2 years hence and help the person out thereafter.

Interviewee 4: Is the question more about new ideas?

Pallavi: *Like you have all your practices like Lessons learnt, best practices. So has it helped the employees come up with new ideas, go through them and see or improvise on something that is already there.*

Interviewee 4: Okay I was just wondering if that's the right answer. This is a tricky question actually. It does help sometimes but it is mostly because of experience. If I have an idea, it is because of something that similar that I had done in the past. But if KMS helped me to come up with the idea, I really doubt it.

Interviewee 5: Yes, because KMS is something that has things that is done already in the past.

Pallavi: *Maybe it encourages?*

Interviewee 4: Yes, it is possible, but it has never happened with me.

Interviewee 5: Not with me also.

Claudiu, Pallavi: *Okay.*

Pallavi: Are there any group contributions/ideas that have been translated into concrete business practices? Could you give an example when you have discovered a relevant group finding through the K.M. system?

Interviewee 4: Oh yes.

Pallavi: *Like you mentioned patents?*

Interviewee 4: There are many things that happen. That's how Best Practices exist. Best practices come from different experiences. Like my colleague comes with his experiences and I come with my experience and gradually best practices evolve. Our customers are always presented with our best practices.

Pallavi: *It is done at an organizational level where this information is shared with all the employees and they are informed through the KMS and tools like the intranet portal?*

Interviewee 4: It is done, but it depends if it should be shared with everybody or to a specific group.

Interviewee 5: It depends on the data actually.

Interviewee 4: Some data may not be shareable with everybody.

Interviewee 5: Yes, mostly we discuss all this with our customers where we tell them about our best things that we do.

Claudiu: *Yes, so you mentioned discussion forums. Of what importance are the discussion forums to the daily operations of the organization? How do you view discussion forums as a medium for knowledge sharing and gathering?*

Pallavi: *Both, IT and non-IT based.*

Interviewee 5: Normally we have brainstorming sessions within a team on a regular basis. We summarize our discussions which we can refer to in the future.

Interviewee 4: I just talked about my experience, where whenever we face a problem we got to a common group for help. This gives rise to a discussion forum from which I can get information. Hence if I need to plan something and the basic information is already there. I get the details from these forums through email or references; I can customize the information according to my requirements and use it. It saves a lot of time. I might have spent 2 days in finding a document earlier, but with these forums I get information maybe in 2 minutes or 5 minutes.

Interviewee 5: It happened today itself actually.

Interviewee 4: Yes, we were looking for some kind of a plan. We sent an email and then we had a discussion forum and my email got bombarded with different responses.

Pallavi: *Okay, according to both of you, in your personal opinion which is the best KMS or KM tool that you have in place that you prefer to use.*

Interviewee 4: It depends on the need actually. Suppose I am going to a new project and it has a few challenges, then giving a call to somebody – word of mouth is helpful in that case. Then if suppose I am going to a customer with a proposal, then looking at the Practitioners' portal with experiences and lessons learnt will be a good option.

Interviewee 5: Same with me, it will depend on the requirement. We have different kinds of tools. It depends on number of FTE (Full Time Equivalent) who are going to take the knowledge transfer. Then it depends on the location if it is remote or local. Actually there are a lot of factors. Cost is also there. So it depends on the conditions.

Claudiu, Pallavi: *So I think we are done.*

Claudiu: *So, thank you very much for your time. We will send you the transcriptions for your approval and later on we hope to come with a report with our findings where we may come up with some suggestions/improvements that you can use in your KMS.*

Appendix F

Transcription of the interview with the Information Architect from the handset producer company

Claudiu: *So we have a couple of introductory questions. First of all, could describe the core business of your organization?*

Interviewee 6: Yes, the company makes mobile phones and smartphones and we make tablets as well. We focus on the enterprise and regular customers through the carriers.

Claudiu: *What is your general conception regarding specific KMS that you use for knowledge sharing within your organization?*

Interviewee 6: The ones which we use?

Claudiu: *Yes, the KM systems.*

Interviewee 6: We regularly use Confluence by Atlassian and we also have OverFlow for discussion and all other smaller systems, I don't know really their names. But we use mostly Confluence.

Claudiu: *Ok. The next question is what role does Organizational Learning play in your daily business operations as a way to achieve your business goals?*

Interviewee 6: Yes, so when we want to write the instructions that someone needs to use we visually write them on wiki and tell people to go there where they can read it and they can also pose questions, can make them better. In this company usually everything is on a wiki, you just need to find it.

Claudiu: *Ok.*

Interviewee 6: We always have a wiki for this and that. So we use them a lot for making sure that people get instructions about how to use some other system or how they should perform something.

Claudiu: *Ok. So these are the IT systems that you have in place and the features that you described are used for organizational operations. But have you used different KMS previously and what were the main reasons for replacing them if you had different systems?*

Interviewee 6: So, I have mostly worked with Confluence and I think it works very well, but for some other parts like issue tracking we have used a lot of other different systems and we've used Rally, MKS. There could have been different things. But for wiki we have mainly used Confluence.

Claudiu: *When you adopted the current KMS, what were your main aims to achieve with these tools with respect to your business goals?*

Interviewee 6: I mean you can create pages, you can give access rights to people. It's powerful to explore and easy to use, you can go on a wiki page, look at instructions or at some flows or whatever you want to describe.

Claudiu: *Now we will move to another set of questions. Regarding employees, how do you ensure that employees are actively participating and are engaged in sharing knowledge through the KM systems?*

Interviewee 6: Yes, in my team we try to not send a lot of emails, we try to refer to people through the wikis and if they have questions they can put them there or send them by emails. So we try to use the wiki as a sort of static email with instructions. You don't send around emails. Emails are used a lot in many companies, so it's better to have a wiki and say "you should go here and read this and that and post here".

Claudiu: *Do you have some internal incentive schemes like rankings to find out which employee had the most significant contributions in some periods of time?*

Interviewee 6: Yes. On Confluence we do not have that, but on Overflow we do have the people that comment and provide answers, they get points and then you can see the ranking of people that contributed most. It's different if you provide an answer or of you provide an answer that is accepted by the poster. There are different viewpoints. Good answers provide more findings.

Claudiu: *How do you view the organization's way of working? Is it more towards highly specialized individuals or you prefer groups, team-based work?*

Interviewee 6: I think it depends on what you aim for. I mean we have a lot to do with documentation teams, and then we aim for the entire team, they should do this and that. I think if you just aim it for like specialized persons, I think it's usually email or instant messaging. Wiki is more if you want to reach more people or if it should be there for some time so that other people can read it as well.

Claudiu: *I see. So it mainly depends on the tasks.*

Interviewee 6: Yes.

Claudiu: *Now, let's go to the next question. We suppose that you have Best Practices and Lessons Learned, are they well documented at the end of team work and shared through a Document Management System?*

Interviewee 6: Yes, I mean sometimes we are pretty good at it, sometimes we are not. So, I would say sometimes it's really good to know what you are good at and to see what you can do better next time. But it's not always the case that you have the time and you can put in that effort if you are really busy.

Claudiu: *Then another feature we want to discuss are discussion forums? How do you view discussion forums as a medium for knowledge sharing and gathering?*

Interviewee 6: I think it's very good to have discussion forums, but the probability of getting people to discussion forums dies when people don't check it regularly.

Claudiu: *So you are not actively using them?*

Interviewee 6: We had good activities sometimes and normal ones other times. I mean, it's a big company and you can get some small piece going and going on quite well, and some other parts cannot be kept engaged in some other areas.

Claudiu: *So, do the systems for forming groups of employees that are specialized on a certain topic? And could you give an example and elaborate more on such features?*

Interviewee 6: I don't think we have any specialized groups but we use the wiki as it is now. We have a Task Force on the Overflow, that is 10 people who are supposed to be experts on the cascades part and they quite answer regularly there. But we don't really have such groups of people, or at least not to my knowledge.

Claudiu: *And do your current systems provide support for monitoring the migration of individuals different working groups and how is this performed?*

Interviewee 6: I have to answer that I do not really know. I mean I'm not the responsible for the system as a whole because those people are in Canada. I actively use it. I don't know, we have groups and if you set their permissions on the page, you can set it up for groups or for individuals. And sometimes is just easier to set it for a lot of individual people than to make groups. I think we had some bug with the group permissions, so we started to use individuals then. It would be a good idea to have groups and move people between them.

Claudiu: *So you are thinking of improving this?*

Interviewee 6: I think it should be improved.

Claudiu: *And the current features like Best Practices and Lessons Learned, have they been effective in reducing the time periods that were required for performing some tasks? Did you see some improvements after using these systems?*

Interviewee 6: Yes, I mean we do have some benefits when we put information it gets a lot of time to do some tasks. If you get people to actually read the information. That is the main problem: the people reading it and not just skim though it. But for some problems, yes, definitely.

I can also add for the question before that we regularly use Skype for crucial conversations. So sometimes instead of having a wiki for a quick question, we can ask it on Skype.

Claudiu: *And were there any group contributions or ideas that were translated to concrete business practices? Could you give us an example when you discovered a relevant finding through the KM systems?*

Interviewee 6: That's a hard one. Nothing comes to my mind right now. In our group we have the processes, updated docs for developers and stuff like that. So we have wiki pages that help teams to transform their information from their system. So we could say about that part changes. It has not changed best practices, it just changed practices.

Pallavi: *In the systems that you have in place right now, do you see something that could be made better?*

Interviewee 6: What couldn't be improved? I mean probably search. When you have a big system, search can be problematic and sometimes it's so hard to find information if you don't know exactly what is that. And since everything on Confluence is collected, you can search the entire Confluence and find something that is kind of finding the needle in the haystack. If you know the right department, then it's easier to find what you are looking for. So, it's hard to find if you don't get a link to some place. We have wiki pages that are really long. If you get a link somewhere, then it's really easy. If you have to navigate there yourself, it can take a while. It's hard to make an overall structure that makes really easy to go down. I would love to have it structured, but it takes so much time and I don't know if you can spend your time on this when you build so many documents. It's hard to get them all together. I would guess it's structure.

Claudiu: *From the current features of your KM systems, which is the feature that you like the most, which is the most useful?*

Interviewee 6: I mean just regular wiki features and Confluence, they are very powerful. I mean they are used for having a content backlog to having instructions to provide someone with something.

Claudiu: *I suppose that you are having a lot of non-IT based ways of sharing knowledge. I mean regular meeting or similar things.*

Interviewee 6: Yes, we have all those regular things like meetings. We are having daily SCRUMs and we are sharing the information about what we have done a day before and all that is a standard. If you heard something and want to tell to other teams, it's really good to put it on the wiki page, so they can read.

Pallavi: *Are there certain aspects where you feel that non-IT ways of discussion or sharing knowledge are much better than through the KM systems or other IT ways, tutoring a person or having a transition?*

Interviewee 6: I think it's hard to beat face-to-face contact when you are tutoring someone. Wiki pages can get you so far, but getting someone to actually show you something, you have to invest time in that.

Claudiu: *I'm also done with my questions. Thank you very much for your time. We will send you a report with our findings and hope that you will find some guidelines.*

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