Information Technology and Organizational Learning

The IT Role on OL at Accenture and ABB

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Organizational learning (OL) is a social affair of individual’s knowledge, experiences, routines, relationships and organizational rules to increase organizational capacity to take effective actions to change the range of organizational behavior. Information technology (IT) is an infrastructure to Information system in promoting organizational learning.

What is the IT role on OL?

Identify the relationship between IT and OL and describe the role of IT on OL.

Qualitative research

Parties involve in OL debates

It is clear from this study that information technology has an impact over organizational learning as IT facilitates OL at both the individual level and the organizational level in creating knowledge which ultimately enables organizations to improve capabilities and enhance performances to cope with change. Companies are using various IT application or tools to promote OL either through knowledge depository database, online training, staff rotation planning or various IT based communication channels. The use of knowledge management strategy and the role of IT on OL coincide with the strategic objective set by the company. Companies also use different combinations between tacit and explicit knowledge in respond to the strategic goal. Both tacit and explicit knowledge are always used in all companies but the mixture produces different results. It is the management that has to determine the right combination between them to create the maximum impact on OL. IT can be a tool help managing tacit and explicit knowledge but people are more important in the process of knowledge creation as it is individuals who possess the critical minds led to learning. It is important to realize a fact that organization will never learn if its people do not learn.

Organizational Learning (OL), Information Technology (IT), Knowledge, Knowledge Management
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1 INTRODUCTION

In this chapter, the authors present the problem background serving as an inspiration to our study, the study purpose, the study problem, the study delimitation and the target audience intended.

1.1 BACKGROUND

For the last two hundred years, neo-classical economics has recognised only two factors of production: labour and capital. Knowledge, productivity, education, and intellectual capital were all regarded as exogenous factors that is, falling outside the system. New Growth Theory is based on work by Stanford economist Paul Romer and others who have attempted to deal with the causes of long-term growth, something that traditional economic models have had difficulty with. Following from the work of economists such as Joseph Schumpeter, Robert Solow and others, Romer has proposed a change to the neo-classical model by seeing technology (and the knowledge on which it is based) as an intrinsic part of the economic system. Knowledge has become the third factor of production in leading economies.

Source: Romer (1986) in Ernst & Young (1999)

The excerpt above points out the importance of knowledge in today's highly competitive business environment. Knowledge has become the fundamental in increasing productivity, exploiting growth opportunities in emerging markets and creating knowledge driven competitive advantage (Forfas, 2004). In other words, Knowledge is the most basic form of capital as knowledge accumulation generates economic growth at both micro and macro economics levels. The rise of the term “Knowledge Economies” indicates the growing awareness of knowledge during the past recent years. The implication of Knowledge Economies is that there is no other way to prosperity other than to make knowledge and knowledge creation the ultimate goal (Ernst & Young, 1999). Similarly, the notion of Organizational learning (OL) has received a widespread attention from organizations which focus on how they can learn in order to increase their performances and capabilities to gain competitive advantage, innovativeness, and effectiveness (Balasubramaniam, n.d.). OL is not an end process by itself, rather it is a tool to help an organization better satisfy its customers, create state-of-the-art products or services and win its war or improve the quality of life (Marsick and Watkins, 1999, p.9). Organizations have always had to learn, but the rapid pace of changes in market conditions has magnified the learning speed that have to occur. In the current business environment organizations
must learn to understand the environmental change (business and technological) in order to effectively sense and respond to it as quickly as possible (Lyytinen and Rose, 2006).

Schein (1992) exposes that technology profession has received a wide criticism on its inability to perform business functions as technology has been changing at a rapid pace and organizations could not meet the pace by assimilating the new technology. This demands the organizations to employ the learning in order to build capabilities to rapidly adopt the change. Today, Information Technology (IT) is capable enough to offer a great support to the OL by creating an environment for both employees and organizations to learn in new, innovative ways which mobilizes them to share, distribute, transfer knowledge and experiences and ultimately enhance the overall organization’s performance to accept the challenges. However, proper and effective implementation of IT to support OL functions can change the nature of business and the way it is managed leading the organizations towards strategic advantage (Daniels, 1994, p.1). In fact, IT not only affects how organizations learn but also indirectly affects their capabilities and performances via OL. This suggests that IT improves the organization’s capability to recognize the new knowledge, adopt it in a rapid manner and apply it to enhance the organization’s performance responding to changes which, further, enables employees to better help themselves as well as improve collaboration with partners and relationship with customers helping the organizations to gain competitiveness. There is no other phrase that better draw attention to the importance of IT than that mentioned by Bjorn Boldt-Chirstmas, Director of strategies at Scandinavian Airlines in Daniels (1994) that “To be a competitive player, IT is a must”.

The issue of organizational learning is not entirely new as many researchers has written much about the key issue, then why other study on the same subject should appear. The reason is that in this study, the authors’ interest in the use of IT to improve OL at both the individual and organizational levels develops a strong motivation to understand the internal organizational mechanism in the use of IT to manage knowledge in order to sustain competitive advantages (Lyytinen and Rose, 2006). In order to have a thorough understanding of the research topic, the authors represent the concept of knowledge management using Hansen et al. (1999)’s knowledge management strategies focusing on the use of IT. As far as OL is concerned, the authors intend to divide OL at two levels; learning at individual level to know that how individuals learn in an organization and how IT affect them and learning at organizational level to better understand the learning process of an organization and how IT affects it. To study the learning at individual level, the authors use the SECI model of knowledge creation developed by Nonaka (1994), whereas the concept of Huber (1991) represents learning at the organizational level. The authors refer to the study result on the IT role per the Nonaka’s SECI model from Xue and Zhang (2006) and per Huber’s model from Malhotra (1996) that IT can be used in all learning processes. The authors examine all the learning processes and reconfirm previous researches that IT has impact over OL. However, the authors see that IT does not directly have an impact on all learning processes but rather assist the learning, the IT role is then divided in primary and secondary role depending if IT directly or indirectly promote OL. Direct means that IT is the platform to store knowledge while indirect means that IT assists knowledge creating through various means such as communications among people. The study aims at giving recommendation for those interested in how to use IT to promote OL capacity.
1.2  PROBLEM DISCUSSION

The concept behind this research is to place IT in a management context and examine its role on OL within organizations. Earlier section depicts that OL is an effective theory for the development of organizations to improve capabilities and performances thus gain competitive advantage. Equally, organizations are increasingly dependent on IT which set the new platform for business operations. The speed and increased efficiency gained from effective IT implementation are not only changing the attitude of employees but also the way organizations perform their businesses. This suggests that IT can play a major role in enhancing OL.

In the same way, learning occurs due to the influence of different factors like structure, strategy, technology, culture and cognitive factors. Accordingly, in this competitive environment it is an urgent requirement that organizations develop and utilize IT in a more efficient way so that they can enhance the functions and performance concerning to said factors, create a sustained learning environment so that employees can learn in new ways and organizations can increase their capabilities to cope with any unexpected change (Balasubramaniam, n.d.).

The above discussion recognizes that a sound connection exists between IT and OL, but the question remains how IT impacts OL in such a way that organizations can improve performances and capabilities complying with organization’s strategic goals.

1.3  PROBLEM QUESTION

The authors’ interest in finding out how the selected companies use IT to promote OL at both the individual and organizational levels leads to investigate ‘What is the IT role on OL’. However, the authors think it is important to identify several relevant sub-questions that will be answered in this study to reach the conclusion:

- Sub-question 1: How do companies use IT to manage knowledge?
- Sub-question 2: How does IT affect learning at individual level?
- Sub-question 3: How does IT affect learning at organizational level?

1.4  PURPOSE

The purpose of this study is to identify the relationship between IT and OL and describe the role of IT in promoting OL through the study of two selected companies employing the OL concept.

Since the authors perceive OL as learning at both individual and organizational level, the study will represent IT impact on OL at both levels. The authors will conclude the study result with recommendation to companies interested in employing OL concept and/or those would like to enhance learning within their organizations.
1.5 DELIMITATION

This study is designed on the principle of validity and it is the authors’ goal to investigate and better understand the role of IT on OL. The authors do not intend to develop a study that is replicable within other contexts. Thus, other factors that promote learning such as structure, strategy, and culture are out of scope of this study.

As graduate students at Mälardalen University, the authors are given ten weeks to develop and complete this study. In order to complete the study within such a limited time frame, the authors selected to focus the study on two companies pursuing different knowledge management strategies. In addition, the authors believe that the narrow focus on these two companies will help them developing a thorough and well-researched study.

The limited time constrain in the study also influences the authors to study research questions from an internal perspective only. To conduct this study the authors intend to gather information by interviewing organizations working within the OL area to know how IT enhance learning capabilities of their employees and how these organizations improve performance through enhanced learning capabilities. Further, the authors recognize that with additional time and resources, it would be useful to include a study of the efficiency and effectiveness on the use of IT in promoting OL by further collecting information from the intended users of OL theory; the company’s employees.

1.6 TARGET GROUP

This study will be of interest to a wide base of actors involved in OL debates. In particular, the authors believe it will have the greatest appeal to those consider trying to influence the level of OL within organizations and those trying to introduce and/or implement OL concept within organizations.
2 METHODOLOGY

This chapter describes the different methodological aspects used throughout the study in order to create a better understanding. It starts with the description of qualitative research approach selected for this study following the data collection process will be discussed to explain how data is gathered from the respondents. After presenting the research model developed for this study, the authors discuss the validity and reliability of the study to assure the authenticity and truthfulness of the data.

2.1 RESEARCH APPROACH

The research approach is a strategy to describe how a data is collected and analyzed, how the experiment is conducted and how the conclusion is drawn in a research process. It is impossible to know how to conduct a research unless the researcher knows what to investigate. Once the topic of the research has been chosen it is now easy for a researcher to select the method of how to follow the research. The choice of research approach is an important stage which influences the way data is collected and which is ultimately crucial to the outcome of the study (Myers, 1997). Therefore, it is important to decide whether to use an existing theory or develop a new theory at the beginning of a research. There are two research approaches researchers can follow when conducting a research; the qualitative and the quantitative.

The qualitative research approach is an unstructured approach and aims to understand a phenomenon by collecting, analyzing and interpreting data through personal experiences and observations with the emphasis on unique, while the quantitative research is a structured approach which refers to counting and measuring data. In quantitative research data is quantified and expressed in numbers. According to Yin (2003) qualitative research helps people to have a worldview of the studies as it simulates their experiences and observations of the world. The purpose of this study demands a deeper insight on the role of IT in organizational learning and the concepts of organizational learning and information technology have broader definitions in which progress of the processes is hard to measure in figures and statistics. Further, in the past few years, there has been a significant shift in the way organizations evolve in the network economy as their focus has moved from traditional neo-classical economy and personnel development to new knowledge economy and organizational development (Balasubramaniam, n.d.). This leads the authors to view the research with an explorative approach and thus develop an increasing interest in the qualitative research method as it allows the authors to gain a deeper understanding of the organizational learning and information technology than if they would be measured and shown statistically.

2.2 DATA COLLECTION

The collection of data is an important and vital to a research to analyze a phenomenon and reach a conclusion. Fisher et al. (2004, p.126-131) suggest that there are several methods of data collection; interviews, panel, questionnaire, observation, and documentary. However, the selection of data collection method is based upon the research manner whether it is qualitative or quantitative. Following table gives a summary of the methods of data collection:
Any research study consists of a systematic collection of different kinds of data where quality and quantity are important issues concerning to the success of investigation. The data in qualitative method is usually based on words rather than numbers, and words may be represented or obtained by observations, interviews and documents (Miles & Huberman, 1994, p. 56). The authors explain the data collection method by dividing the data into two categories, theoretical data and empirical data, in order to describe that how they manage to collect theoretical and field data for this study.

**Literature Review**

Fisher et al. (2004, p.126-131) suggest that, after deciding the research topic, next stage is to review the literature to create an initial understanding of the research area as well as build a theoretical framework. The theoretical data consists of literature including books, journals, articles, magazines and Internet research. Books provide a wide and reliable source of information while journals and articles provide more specific and recent information on the subject. In order to achieve a broader overview of the research topic several relevant secondary sources were approached so that a firm understanding of IT and organizational leaning can be built. There are many books available on both topics of Information technology and Organizational learning which are used to conduct this study. However, authors also include articles and research papers to get the recent opinions and developments related to the subject that were retrieved from the electronic databases, such as Elin@Malardalen (an online journal database available from Malardalen University), Emerald, JSTOR and Google Scholar. In addition, Internet was also used to search for most recent developments and for general information about the selected companies. The literature on information technology and organizational learning provide an overview of earlier research in both areas that helps the authors to build a basic understanding of IT and OL theories and their relationship that is necessary to conduct this study. Using these theories, the authors develop their research model to guide this study.

**Empirical Data**

Empirical data is described as the data collected from the contributing organizations by the researcher(s) through questionnaires and interviews. There are several ways of collecting empirical data but in this case it is collected by conducting face-to-face semi-structured interviews which allow the authors to be more open as there are no strict rules in the semi-structured interview method.
According to Fisher et al. (2004, p.132), semi-structured interviews are in between the two extremes of structured and unstructured approaches and more focused in comparison to the aforementioned interview approaches. In a semi-structured interview the interviewer has a schedule to remind the main issues and topics that need to be addressed by the interviewees. The interviewees, however, have much freedom to answer the questions in the way that makes the most sense to them. Since the authors pursue an explorative research method, the semi-structured interviews are found as appropriate data collection method to conduct the study ensuring the relevance of issues the authors are interested in finding out yet remain enough spaces for interviewees to put interesting relevance issues to the discussions.

The two companies selected to collect the primary data are **Accenture**, a global management consulting firm and **ABB**, a global company in automation and power technology. Although both companies are present in the world market, the authors only conduct their study in Sweden as they believe and further confirm with the company’s representatives that both companies employ similar OL concept at all of their business locations throughout the world.

### 2.3 GAINING ACCESS TO INFORMATION

To obtain necessary information to conduct the study, the authors began with a list of potential companies currently employ the OL concept. The authors dictated the need to study companies employing different knowledge management strategies which can be roughly differentiated whether the companies are in services or production sectors. The logic to select companies in both the services and production sectors is adopted from the article by Hansen et al. (1999) on Knowledge Management strategy. The authors approached several companies through the help of our supervisor, Peter Ekman whose current research is associated with the engineering firms within the Automation Region (see www.automationregion.com), and finally got response from Accenture in Stockholm and ABB in Vasteras. Accenture is the representative of companies in the service sector while ABB is the representative of companies in production sectors. Authors conducted the semi structured interviews with both companies employing the OL concept in two phases.

In the first phase, Accenture was approached in early April, 2008 for the purpose of arranging an interview and the authors instantly received a reply from the company showing an interest in this study. At Accenture, the authors had an opportunity to conduct an interview with Lena Mindus, Senior Manager at Accenture office in Stockholm, Sweden on 23 April 2008. Lena Mindus has been working with Accenture for 11 years as Sweden & Nordic Human Resource Leader. She possesses a strong understanding of company’s background, overall business structure and particularly the human resource and knowledge management practices. Lena Mindus, in this extensive interview, provided detailed information about the company’s business, individual and organizational learning and how Accenture uses IT in learning processes at both levels. The interview session lasted approximately four hours.

In the second phase, the authors also approached ABB in the approximate time as did with Accenture. ABB replied in the late April opening an opportunity for an interview session with Marie Bello Yngveson, Training and Development Manager on 14 May 2008 at ABB HR Center in Vasteras, Sweden. Marie Bello has been working in the company for the last 11 years and is now managing the ABB’s HR Center and directly associated with the learning practices. Empirical data from ABB was collected by two consecutive interviews. In the first interview, lasted for one and half hour, questions concerned the individual learning and the IT role on it, while, the second interview focused on the
learning at organizational level and how IT supports it. The follow up interview session was conducted on 27 May 2008 and lasted for the same time as the first interview.

### 2.4 RESEARCH MODEL

Research structure model begins with problem formulation which in this case is the IT role on OL. Thus the authors conduct a critical literature review to create a theoretical framework and a conceptual model that will be useful in analyzing the empirical data obtained from two selected companies employing OL concept. Empirical data will be obtained through semi-structure interviews conducted with companies’ representatives from related departments. The authors will then analyze information and data obtained through interviews and prepare a summary chapter of the study.

![Figure 1: The Study Structure](image)

### 2.5 VALIDITY AND RELIABILITY

Validity determines whether the research measures what it is supposed to measure or how truthful the results of the research are. Validity can be increased by arranging interviews at the interviewee’s premises as it gives the opportunity to interviewee to express information in the most adequate manner. On the other hand, reliability, according to Yin (2003, p.37-39), means that a result from a study should be consistent over time if similar research is conducted using same procedure by other researcher. It focuses on the authenticity and reuse of the data collection techniques as well as the analysis procedures to produce the same result if the research is conducted all over again. A research is considered having a high reliability if it gives the same result repeatedly, while low reliability gives the different result each time the study is conducted. Yin (2003, p.39) further advices that a good rule for carrying out case studies is to conduct the research in such a way that allows researchers to repeat the same procedures so that same results can be achieved. The goal of reliability is to minimize errors.

In this research all primary data has been collected from the Accenture Sweden and ABB Sweden. Therefore the authors believe that data is highly valid and trustworthy. However, we did not get chance to interview the employee(s) of both companies which might lower the validity of this study. The interview questions are based on the author’s conceptual model which is derived from the theories presented in this study. The questions are thoroughly developed to ensure that the respondents understand them and give faultless answers as they will lead to the conclusion of the study. This increases the level of validity and reliability by eliminating the possibility of misinterpretation. All interviews, in this study, were arranged at the respondents’ premises which allowed them to freely express their opinions in response to the authors’ open-ended questions. Therefore, the authors believe that it strengthen the validity of this study. Since the interviews were recorded in audio format, all audio information was converted into texts so that relevant information can be included into the study as well as any misunderstanding, misinterpretation and partiality can be avoided.
3 THEORETICAL FRAMEWORK

In this chapter the authors describe the theoretical frame of references used to guide this thesis. It begins with an overview of knowledge, organizational learning, information technology and the relationship between IT and OL. At the end, the authors’ conceptual model is presented to lead the research for further empirical analysis and conclusion which will give a better understanding of the whole research process to the readers.

3.1 DATA, INFORMATION AND KNOWLEDGE

Turban et al. (2002, p.388) define that knowledge is information which is contextual, relevance and actionable. Having knowledge implies that it can be used to solve problems at hand, while having information is not always helpful in solving problems. Organizations possess data, information and knowledge which are seen as assets. Knowledge is the highest form of all since it conveys meaning in itself. Data can directly transfer to knowledge provide that such data is relevant and lead to action. Relationship between data, information and knowledge is shown in the figure below.

\[\text{Data} \rightarrow \text{Processed} \rightarrow \text{Information} \rightarrow \text{Relevance & Actionable} \rightarrow \text{Knowledge} \]

![Figure 2: Data, Information and Knowledge](Source: Turban et al (2002, p.389))

Nonaka (1994) depicts the differences between information and knowledge that information is created from messages while knowledge originates from information together with personal beliefs and commitments. Nonaka (1994) tries to relate knowledge to human actions which lies in commitments and beliefs of those who hold the knowledge. Davenport and Prusak (1998 in Marsick and Watkins, 1999, p.82) give definition of knowledge as “a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information”. It originates and is applied in the mind of knowers. In organizations, it often becomes embedded only in documents or repositories but also in organization routines, processes, practices and norms.

The authors thus view knowledge according to the definition proposed by Davenport and Prusak (1998) which takes experience, values and contextual information to considerations. However, the strong emphasis is given on knowledge creation which is an interaction between data and/or information and individual base upon personal beliefs and commencements. As explained above, data can be described as the raw material which is processed to produce information. Knowledge is a more broad term which describes the use of information to perform analysis and actions.
### 3.1.1 TACIT AND EXPLICIT KNOWLEDGE

Polanyi (1958) is the first to draw the line between tacit and explicit knowledge. Tacit knowledge is usually deep in action, commitment, and involvement in specific context. Tacit knowledge is highly personalized and hard to formalize. For example, painting is one kind of tacit knowledge, though there are numerous numbers of literatures about how to paint professionally, few are able to paint from studying through books. Painting is a skill that needs to be taught personally. Explicit knowledge deals with more objective, rational knowledge which is transmittable through formal, systematic language. Data, policies, software and documents are examples of explicit knowledge which can be easily written and codified as a mean to transfer knowledge.

### 3.2 ORGANIZATIONAL LEARNING

This part begins with exploring the definitions of OL purposed by many scholars and select the definition that best reflects the purpose of this study, different OL perspectives are then discussed and an OL perspective is chosen as the basic to conduct the study, learning processes in organizations is discussed at both the individual level and the organizational level and lastly, the strategic knowledge management technique is examined.

#### 3.2.1 DEFINING ORGANIZATIONAL LEARNING (OL)

In 1990s, several scholars and researchers have researched on how organizations can sustain their competitive position in the industry. They developed and modernized different theories; OL was one of them which received attention from the industry. OL can be seen as an organization development theme consisting of various factors including organization culture, human resources, cognitive factors, organizational structure and organization strategy.

Fiol & Lyles (1985) hold that organizational learning is a process of improving actions through better knowledge and understanding. Dodgson (1993) describes that organizational learning enables firms to create, supplement, and organize knowledge and routines around their activities and within their cultures and adapt and develop overall organizational efficiency by improving the use of the broad range of skills of their workforces. The different views to OL both stress the importance of learning and knowledge on achieving proprietary advantage by being better at what organizations are doing. Since organization is the collection of individuals, Argyris and Schon (1978) emphasize on the individual learning and explain that OL is the process which allows organizational members to detect and correct errors using organization theory-in-use. Schneider & Angelmar (1993 in Janson et al., 2007), also perceive learning as an individual attribute and argue that organizational learning can be seen as an aggregate of individual learning. While, Glynn et al. (1992) discuss learning at the organizational level and express that OL is the process whereby organizations understand and manage their experiences. Daft & Weick (1984), on the contrary, see OL as the knowledge about the interrelationships between organization’s action and environment. Glen et al. (1992) and Daft & Weick (1984) view OL differently as Glen et al (1992) put the emphasis within the organization context only while Daft & Weick (1984)’s view incorporate the external context to OL. Kim (1993) discusses that “OL is defined as increasing an organization capacity to take effective action”. However, Schwandt & Marquardt (2000) present a social approach to organizational learning and state that OL is an interdependent among people, action, symbols and processes. Lave & Wenger
(1991) also consider OL as a social affair and argue that it can be seen as an indivisible part of the society.

On the other hand, Argyris & Schon (1978) expose the nature of organizational learning and explain that as organizations are not merely collections of individuals, however, no organization can be formed without such collections. They further argue that organizational learning is not only dependent on individual learning and can not be the sum of learning of its members, but they also accept that organizations learn only through the experiences and actions of individuals. Crossan et al. (1999 in Janson et al., 2007) try to address this dilemma by combining both views and describe OL as “a process encompassing intuiting and interpreting at the individual level, integrating at the group level and institutionalizing at the organizational level”.

In view of the above definitions of OL, the authors agree with Crossan et al. (1999) and define organizational learning as a social affair of individual’s knowledge, experiences, relationships, routines and organizational rules to increase organizational capacity to take effective actions to change the range of organizational behavior.

3.2.2 ORGANIZATIONAL LEARNING PERSPECTIVES

Easterby-Smith et al. (1999, p.3-8) divides the literature on OL into two significant distinctions between OL school of thoughts. One follows the social view while the other follows the technical view:

Social Perspective

Chiva-Gomez (2003) describe that social perspective of OL focuses on the group, community and organizations. In addition, Easterby-Smith et al. (1999, p.3-8) explain that social perspective emphasizes on how people make senses of experiences at work obtained either through explicit sources or tacit sources. In this view, learning can be seen as a process of social interactions. Three dominating schools of thoughts contributed largely to the social perspective of organizational learning are to see it as a socially contracted, a political process and a cultural artifact. The socially constructed thought recognizes that data has no value unless people interpret what it means. To put it in another way, community as whole plays an important role in coaching new entrances to the society about unwritten anecdotes and stories of how to perform tasks effectively. The political process demonstrates that political often acts in constrain to individual learning since people need to protect themselves against political threat. However, it is virtually impossible to eliminate the organizational politics from the social perspective since politics are the nature of social processes. If learning is form through individuals and groups, politics are always inevitable. A concept of organizational learning that embraces political process is indeed needed to promote learning, rather than elimination of politics. The last process in social perspective is learning as a cultural artifact. In this view, learning is seen as an organization culture. Learning takes place through socialization and interactions to individuals within organizations.

Technical Perspective

The technical view assumes that organizational learning is about the effective processing, interpretation of, and response to information both inside and outside the organization. Such information can be in both qualitative and quantitative term but it is explicit in public domains. Technical perspective covers the concept of Argyris & Schon (1978)’s single-loop learning and
double-loop learning. Single-loop learning (SLL) is an incremental and low-level learning which occurs when errors in processes are detected and corrected encouraging the firms to continue with their current policies and goals. Where as, Double-loop learning (DLL) is a radical and high-level learning which occurs when error is detected and corrected in the way that forces the firm to modify its norms, procedures, policies and goals. Further, Levinthal & March (1993)’s research lies in this perspective and discuss that OL copes with the problem of balancing the competing goals of developing new knowledge (exploration) and exploiting current competencies (exploitation) in the face of dynamic tendencies to emphasize one or another.

The authors, referring to perspectives on OL, develop interest in the social perspective of OL since this view allows the authors to examine further the IT role on OL.

### 3.2.3 LEARNING IN ORGANIZATIONS

Organizations learn through their individual members and it can be said that organizational learning is the process through which individual learning becomes embedded in the organization’s memory and structure (Kim, 1993).

Nonaka and Takeuchi (1995) develop a four stage model of organizational learning which assumes that knowledge is created through conversion between tacit and explicit knowledge. Their model presents four different modes of knowledge conversions including: 1) from tacit knowledge to tacit knowledge, 2) from explicit knowledge to explicit knowledge, 3) from tacit knowledge to explicit knowledge and 4) from explicit knowledge to tacit knowledge. Four different modes of knowledge conversion namely Socialization, Externalization, Combination and Internalization (SECI) can be represented in the following figure.

![Figure 3: The SECI Model](source: Nonaka and Takeuchi (1995))

First, socialization enables organization to convert tacit knowledge to tacit knowledge through interactions between individuals. Languages are not the barrier for transferal of tacit knowledge among individuals since observations, imitation and practice are more dominant in creating new tacit knowledge. It is noted that on-the-job training shares the same principle of socialization. The key to
socialization is experiences among members. Experiences facilitate sharing of thinking processes which are at the heart of tacit knowledge transfers. Second, combination domain allows new knowledge to be created though sorting, adding, re-categorizing, and re-contextualizing of existing explicit knowledge. Modern computer system facilitates the creation of new knowledge based upon the combination definition. Third, externalization involves the conversion of tacit knowledge into explicit knowledge. Metaphor is important in externalization process. Lastly, internalization refers to the conversion of explicit knowledge into tacit knowledge which complies with the notion of learning. Action is required to the internalization process. (Nonaka and Takeuchi, 1995)

In view of Weick (1995 in Gasson and Shelfer, 2007) Nonaka and Takeuchi (1995)’s SECI model provides an environment to the organizations to create a management control system that reflects organizational norms and values. In this way socialization, combination and internalization can be linked with other theories. Socialization can be connected with the theory of organization culture, combination links to information processing and internalization derives the thoughts from organizational learning. Note that the concept of externalization is not well developed in other theory even in the organizational learning theory itself.

Huber (1991) states that an organization learns “if through processing of information the range of its potential behaviours is changed” and presents four learning processes consisting of; Knowledge acquisition which is the stage when an organization acquires new knowledge from its internal and external environment that causes learning, Information distribution where organization shares information among all organizational units and members which in turn creates new knowledge and promote learning, Information interpretation involves the sense-making or the establishing one or more meaning of the distributed information. Huber (1991) further states that individual and groups have some prior belief structures which dominate when formulating meanings of the distributed information and Organizational memory which involves the process of storing knowledge in a repository for future use. This contains both the explicit (facts, figures, rules) and tacit (expertise, experiences, stories) knowledge.

The authors perceive that the SECI Model from Nonaka and Takeuchi (1995) represent learning at individual level related to sub-question number two while Huber (1991)’s Learning Process represents learning at organizational level that address the sub-question number three mentioned in section 1.4. These two concepts will be used throughout the study to represent the OL concept.

3.2.4 MANAGING KNOWLEDGE IN ORGANIZATIONS

Easterby-Smith and Lyles (2003) claim that management of knowledge in the organizations rests on the heads of a giant concept of OL. Hansen et al. (1999) introduce two strategic approaches to knowledge management; the codification strategy and the personalization strategy.
The **codification strategy** is best used when problems are uniform, non-customized and non-creative. Firms pursuing this kind of strategy can use IT in codifying knowledge through “people-to-document” approach which captures and extracts knowledge from the person who developed it, makes irrelevance specific information, documents and stores it on electronic databases that allow members in firms to access, retrieve and use such knowledge without contacting the person who developed it. The economic benefit arises from this kind of knowledge management strategy comes from the reuse characteristic of knowledge stored in electronic databases. Although investment in IT infrastructure to host such knowledge sharing databases is costly, the unit cost per usage is low since knowledge stored can be easily retrieved and reused over and over again. (Hansen et al., 1999)

The **personalization strategy** emphasizes on individuals interactions and dialogues as a mean to share knowledge. In personalization knowledge is not codified and stored on databases but rather is transferred and created though mentoring with experienced members within companies. This suggests that communications, between members of the organizations who follow personalization strategy, are highly encouraged through various means such as meetings, telephone calls, e-mails and video conference. Although knowledge is not stored on electronic databases in this strategy, IT plays a supportive role in connecting members within organization to share knowledge. Database containing contact information of members enables members in need of particular knowledge to connect with other members who possess such knowledge. Building network of people is at the heart of personalization strategy. The personalization strategy is best use to support innovative, unique solutions to problems. In the personalization process of knowledge management strong analytical and creative skills are highly required to create knowledge from the person-to-person knowledge sharing. The economics benefit arises from using the personalization strategy lie on the ability of firms to charge high fees and/or prices to services or products due to their unique characteristics. Achieving a high profit margin is a key for firms employing the personalization strategy. (Hansen et al., 1999)

Putting an equal emphasis on both knowledge management strategies is not recommended. The management should focus dominantly on either one of the approaches based on firms’ competitive advantages. It is crucial that the management correctly employs the right knowledge management approach that will enhance firm’s competitive advantages. However, a total emphasis on either one is not recommended either. Firms should always remain a balance between the two approaches as suggested by Hansen et al (1999) as an **80:20 mix** between the chosen strategy and the supportive strategy. For example, firm using codification knowledge can not entirely depend on electronic databases as communications between members at meetings are also important in ensuring the effectiveness that suitable written instructions are applied to the suitable situations. On the other hand, firms pursing the personalization strategy have to maintain a modest electronic document system that support members by providing background materials on topics and by pointing them to the experts who can provide further advice

According to Cross and Baird (2000), employees learn the most by interacting with other employees; when seeking information, they are more likely to turn to trusted colleagues than to databases. However, technology can be a tool for building relationships. Ruiz-Mercader et al. (2006) argue that relationship between IT and OL exist as organizations use IT to collect, process, store and exchange knowledge. Authors see that the view purposed by Cross and Baird (2000) is similar to the **personalization strategy** from Hansen et al (1999). While the view of Ruiz-Mercader et al. (2006) is similar to the **codification strategy** from Hansen et al. (1999).

In this study, the authors use Hansen et al. (1999)’s strategic approach to knowledge management to study how companies use IT to support knowledge. Thus personalization and codification strategies
can be related to sub-question 1 – How do companies use IT to manage knowledge – raised in the section 1.4.

### 3.3 INFORMATION TECHNOLOGY

The term “Information technology” has received an enormous attention in the management studies. When people talk about information technology they usually consider server, PCs, routers, network, etc. However, Broendsted and Elkjaer (2001) claim that IT has become an increasingly integrated part of organizational life which enables organization to search for, collect, acquire and distribute knowledge as well as to create an electronic organizational memory. Ward and Peppard (2002) state that IT facilitates the acquisition, storing, processing, sharing and delivery of knowledge and other digital contents.

According to Turban et al. (2002) IT can be viewed as a technological side of an information system which includes hardware, database, software, network and other devices. Subsequently, in the broader way, Turban et al. (2002) describe IT as “collection of several information systems, users and management for an entire organization”. Van der Zee (2002) also emphasize on the user of IT and argue that IT is a converging term for computer hardware, software, communication networks, databases and specialized personnel which collectively provide information through the computers, PDAs and other smart devices connected through Local Area Networks (LANs,) Wide Area Networks (WANs) and Personal Area Networks (PANs). Similar view can be seen in Chalmeta and Grangel (2008)’s definition of IT as they state that IT supports the smart integration of all enterprise computer components and individuals who analyze and access data and information in order to make decisions and/or carry out activities assigned. Consequently, Ruiz-Mercader et al. (2006) extend the role of IT including the OL aspect and state that IT can be regarded as an infrastructure to information systems having a role as an enabler of organizational learning by extending the human capacity of creating knowledge through the speed, memory extension and communication facilities of technology.

In the view of the authors, IT is best viewed per definition purposed by Ruiz-Mercader et al. (2006) as an infrastructure to IS in promoting OL.

### 3.4 RELATIONSHIP BETWEEN IT AND OL

Robey et al. (2000) describe the twofold nature of the relationship between IT and OL that utilization of IT, at one side, supports the learning processes and increases the OL capacity, while on the other hand OL facilitates the adoption and implementation of new technological change (new IT) in the organization. Figure 5 demonstrates the relationship between IT and OL.
3.5 **CONCEPTUAL MODEL**

After reviewing different literatures on OL and IT, the authors develop a conceptual model to describe the relationship between OL and IT based on how companies use IT to support learning processes in order to create, increase and improve organizational performance and capabilities. Following figure represents the authors’ conceptual model.

![Conceptual Model Diagram](image)

**Figure 6: Authors’ Conceptual Model**

The authors hold that it is important to understand the user of IT systems in order to understand the role of IT on OL. Nonaka & Takeuchi (1995)’s SECI model is perceived here as a descriptive model describing learning at individual level through the conversion of tacit and explicit knowledge. Individuals learn new knowledge through four ways namely: socialization, externalization, combination and internalization. While Huber (1991)’s learning processes describe how an organization learns. The interconnection between learning at individual level and at organizational
level is that individuals must learn to create and enhance organizational knowledge. The accumulated organizational knowledge will then in turn promote individual learning process. Please note to distinguish the difference between “learning at organizational level” and “OL”. Learning at organizational level is the term intended to represent the way an organization acquires, distributes, interprets and creates an organizational memory. OL, in contrast, is a broader term which represents the process of learning at both the individual and organizational levels. The relationship between learning at individual level and learning at organizational level is depicted by Crossan et al. (1999) that OL is the interaction between learning at the two levels.

Knowing that OL is the interconnection between learning at the two levels, the relationship of IT and OL derives from the concept proposed by Robey et al. (2000) that utilization of information technology supports the learning processes and increases the organization’s learning capacity. On the other hand, OL facilitates the adoption and implementation of new technological change.

Since the authors view IT as an infrastructure utilized in promoting OL, IT is placed in between the learning at individual level and learning at organizational level. Hansen et al (1999)’s knowledge management strategy, namely codification and personalization strategy, is seen as a mechanism companies apply to cope with the use of IT in promoting OL according to company’s specific strategic goals. The conceptual model is intended to help the authors to find out how organizations use IT to support different knowledge management strategy described by Hansen et al (1999) and, correspondingly, how IT enables or facilitates the individuals to create and share knowledge as well as how IT enhance the organizational capabilities and performances by affecting the learning processes.

The conceptual model will be used throughout the analysis of empirical data obtained.
4 EMPIRICAL DATA

This chapter explains the empirical information collected from Accenture and ABB in Sweden. The authors present Accenture first followed by ABB for the ease of understanding. In this chapter the authors begin with the introduction of both companies, then proceed to define how these companies manage their learning and finally describe the IT based knowledge management tools utilized by the companies.

4.1 ACCENTURE

4.1.1 ACCENTURE - COMPANY BACKGROUND

Accenture, a large global consulting firm, was established in 1989 as a technology consultant and systems integrator which later extended its offerings with business integrations solutions serving in three service lines; management consulting, technology services and outsourcing. The company generated net revenue of US$19.70 billion for the fiscal year 2007. Accenture collaborates with its client to help them become competitive and make change in their competitive landscape by entering new markets, increasing revenues in existing markets, improving operational performance and delivering their products and services more effectively and efficiently. Lena Mindus describes Accenture business as:

“We are helping our clients to make change. We are not delivering reports to clients; we actually work with clients so that they can feel that something is delivered not just suggested”. (Lena Mindus, Interview, 23 April 2008)

Accenture operates in 150 cities of 49 countries with the strength of 178,000 employees who grasp deep knowledge in different industries, business processes and technologies and provides solutions to Accenture’s clients maintaining strong value chain from analysis and strategy to development, implementation, maintenance and operations. Its business structure is composed of five main operating groups and industry segments within three service lines. The operating groups are further categorized as Communication & High-tech, Financial services, Products, Resources and Public service provides services and solutions in seventeen focused industry groups. A matrix relationship between the three service lines and the five operating groups is depicted as follow:
Figure 7: A matrix relationship between Service Lines and Operating Group  
*Source: Lena Mindus, Interview, 23 April 2008*

The matrix relationship enables Accenture to deliver its expertise and services with the right competency. In addition, Accenture sustains the competitive advantage over its competitors through its vast industry expertise, incomparable experience, comprehensive capabilities across all industries, extensive research on world’s most successful companies and broad and evolving service offerings to its clients. Accenture works with organizations of all sizes in which 94 organizations are recognized as the Fortune Global 100 while more than two-thirds of the Fortune Global 500 are clients of Accenture.

4.1.2 LEARNING AT ACCENTURE

Accenture Institute of Strategic Change claims that “*To create value, companies must focus on how knowledge is used to build critical capabilities*” (Donoghue et al. 1999). Since Accenture was established as an IT consulting company, IT is considered as a very fundamental part of the business. On the other hand, learning is also assumed as a continuous process to move the business forward through their employees. IT is utilized in every process at Accenture to ensure similar processes throughout the world. The importance of IT and knowledge at Accenture is pointed by Lena Mindus as follow:

*It is a knowledge company and we are selling knowledge. We don’t have any other asset than what people have in their heads. We don’t do anything without IT, and no manual processes work here, we are an IT-based company and trying to make sure that our clients are doing better and getting more competitive than their competitors.* (Lena Mindus, Interview, 23 April 2008)

Accenture regards and values knowledge and learning because it strictly conducts business based on knowledge. Each employee is required to have a general knowledge in broad areas with a specialization skill in any specific areas which can be either in industry or a special area such as SAP, Customer Relationship Management (CRM), Supply Chain Management (SCM), administration, human resource management, finance etc. The model is known as the T-profile to Knowledge Management. The illustration of the T-profile is as follow:
In order to move along the Accenture’s career path, for example in the management consulting service line where one moves along the company’s career path from analyst to consultant, consultant to manager, manager to senior manager and from senior manager to senior executive, employee’s knowledge and expertise in specific areas are the most fundamental promotion criteria applied. The average time spent on certain level varies from 2-4 years depending on the individual’s learning capacity, current work performance and employee’s potential to perform well on the next level. Accenture expects its employees to move along the career path within the specific time frame.

Most of the projects undertake are carried out in the form of project execution teams consisting of employees from different levels depending on the project requirements. An example is when a new individual is employed in the analyst position in the management consulting service line, he/ she is expected to stay in the analyst position for 2 years on average, during these years he/ she will be assigned to work on different projects with other analysts, consultants, managers, senior managers, senior executives in order to gain the broad knowledge in all areas and build the specialization in certain industry in compliance with his/ her individual career objective set with the career counselor. Upon project completion, project leader is responsible for documenting all relevance information of the project including the problems faced, the techniques utilized, the solutions and the results. Project documentations are stored on Accenture intranet which can be retrieved by all employees. Project documentation is a large part of how Accenture creates and stores its knowledge. A promotion policy helps enforcing the importance of project documentation process. Accenture strictly employs the same procedures around the globe. Documentation procedure is highly standardized. A description is provided along with the document template. Sometimes, document templates can be in a form of check list to ensure that the team complies with all the necessary procedures.

Training is conducted through both classroom and online, however, approximately 90% of training sessions are online as they are more cost effective. Accenture has designed different training modules in all three different service lines for the personal and professional development of its employees. Training sessions are tailored to meet the knowledge requirements at certain job level and are given on a need basis. Employees are notified via intranet about the upcoming training sessions which they are required to attend.

Accenture relies on both internal and external sources to obtain knowledge. Accenture Research Center and information from clients are the main sources of knowledge.
4.1.3 KNOWLEDGE MANAGEMENT TOOLS

Accenture’s well equipped IT infrastructure offers several IT-based information systems to its employees for sharing knowledge across the firm. Each employee at Accenture has his/her own assigned login ID and password to access the company’s intranet which is where all the knowledge management tools are. Important IT knowledge management applications available on company’s portal (Lena Mindus, Interview, 23 April 2008) are:

- **MyLearning** – a customized online learning content. Each employee is periodically reminded and updated about the up and coming mandatory and voluntarily training sessions corresponding to his/her own level. Accenture only utilizes the option of class room training when it evolves a discussion and learning at the tacit level.

- **MyScheduling** – an online employee scheduling management tool. Only the authorized HR personnel who have the responsibilities in planning and allocating staff, the project lead, employee him/herself, and his/her career counselor have access to the online schedule. MyScheduling is an important tool to knowledge management strategy of the company. As mentioned earlier about the T-profile of knowledge management, MyScheduling helps the employee as well as his/her career advisor to review whether such employee needs further training and work experiences in any specific area in order to gain both the broad knowledge and expertise in specific area.

- **Knowledge Exchange Database** – a repository database containing past knowledge and expertise of Accenture in all projects conducted by the company. It is one of the major internet-based information technologies that stores all the explicit information including proposals, credentials, references, external contents, discussion forums. Discussion forum is the place providing an opportunity to capture personal knowledge and distribute it. Employees can discuss the ideas, share information and ask any specific information from other employees concerning to their needs related to the projects on this forum. However not all information can be explained and documented in the database, some information including expertise and judgments can not be documented. In the case that information can not be documented, a list of reference persons on the project is indicated for further consultation and contact. The database serves as the first point of contact for employees working on any particular project to gain some ideas and necessary background information about the project assigned. The knowledge contain in this database is practical and properly categorized.

- **People Directory** – an online database containing contact information of each individual employee at Accenture around the globe. This database eases the process of getting into contact with the persons who possess the right expertise needed. The database can be accessed by Accenture staff anywhere in world.

- **Email** – Accenture provide e-mail services to all employees to facilitate faster and efficient communications.

All Accenture’s knowledge management tools are IT based because the company would like to ensure the consistency in procedures and knowledge at all its offices and operations throughout the world.
4.2 ABB

4.2.1 ABB - COMPANY BACKGROUND

ABB is a leader in power and automation technologies enabling utility and industry customer to improve performance while lowering environmental impact. It is currently operating in 100 countries and employs more than 110,000 people around the globe. (ABB Group profile, 2008) It is headquartered in Zurich, Switzerland.

ABB’s business consists of five main divisions which are power products, power systems, automation products, process automation, and robotics. ABB’s products, systems, solutions are used in electronic, gas and water utilities, automotive, chemical, metals, minerals and mining, power generation, cement, commercial and industrial buildings, food and beverages, pulp and paper, oil and gas, refining, railways, petrochemicals, marine and turbo charging, telecommunication and data communication (ABB Group profile, 2008). Based on revenues on each five division, the power product is the largest division, follows by power system, automations products, process automation and robotics. Revenues per division are shown as follow: (The ABB Group Annual Report 2007, 2008)

![Revenues per division](image)

**Figure 9: ABB’s revenues per division 2007**

*Source: The ABB Group Annual Report 2007 (2008).*

4.2.2 LEARNING AT ABB

ABB well values knowledge since it is aware that the knowledge will secure ABB’s number one position in the market of power generation and automation. The support from top management regarding the knowledge has been very positive and is high up on the agenda.

Learning and training at ABB are regarded as the main responsibility of the employees. Each employee has his/ her own “fadder” or buddy when he/ she starts working at ABB. Fadder helps newly hired employee adjust to the ABB’s environment and culture during the transitional period. Each year, employee together with his/ her manager plans the direction of individual development plan. Manager will access employee’s knowledge and agree upon with the employee about the training sessions that employee needs to attend in order to increase his/ her own competency according to the “Gap close” principle. The Gap close principle matches individual competency with the necessary skills required to secure ABB’s number one position. Either through employee’s consultation with his/ her manager or self-recognition that knowledge gap exists; employee is held
responsible in closing the gap. Training sessions, on-the-job-training and mentorship are alternative approaches to handle the knowledge gap problem.

Training is divided into two main principles; technical training and common function training. Technical training refers to the technical, industrial, and scientific knowledge and skills required to perform specific tasks in each of the five divisions at ABB. Technical trainings are such as project management and computer language. Each division is responsible for its own training which sometimes can be shared within the same division across the globe or it can be country specific content. The HR department helps the divisions getting contact with essential training suppliers to conduct technical training sessions but it does not provide the training contents.

The common function training refers to knowledge related to the administrative areas such as Accounting and Finance which can be in term of accounting standard update or financial statement consolidation procedure. It also refers to personal development training topics such as leadership training which are given out to employees in both technical and administrative areas. HR department is directly responsible for the common function training. All employee training records related to technical and common function are stored on an Access database. In addition, ABB also has codes of conduct training which is now under the management of a consultant partner named Personik. The codes of conduct training records are maintained by Personik and thus are separated from the Access database. However, ABB is in the process of SAP installation which will be competed in 2009. It plans to consolidate the Access database and Personik Database together for a completed employee training record.

ABB applies both online and classroom training approaches most appropriate for the target audiences, the content type, and the number of participants. Classroom trainings are applied when the target audience is at the national level, the learning content requires simulations and the number of participants is limited. On the contrary, online trainings are most appropriate when the target audience is at the international level, the learning content is easily explained and understood in words, and the number of participants is large. ABB uses more of classroom trainings compared to online trainings. (Marie Bello Yngveson., Interview, 14 May 2008)

In the technical area, the work approaches at ABB differ from division to division depending on the nature of the product and the degree of cross divisional required. For example, when ABB sells a power plant project, it requires work from both power products and power systems divisions. Scope of work is complex and requires simultaneous responds from several divisions. In general, ABB employs the stage-gate model to project management. Stage-gate model is one type of project management models dividing tasks into several stages and put gates which represent the set of requirements the project needs to fulfill before passing on to the next stage. (Cooper, 1990) Each division has a slightly different stage gate model but a new model is created once the project requires collaboration among divisions such as in the case of power plant project. The division specific stage gate model is utilized because the work nature in each division varies. In the power products and robotics division where product descriptions and specifications received from client are vital, ABB employees reply more on previous blueprints and technical descriptions in working. On the contrary, in the power systems, process automation and robotics where the nature of work involves system design and implementation, discussion among colleagues to find the best available solution is widely used. The stage gate model requires quality manager, project leader and project manager to document relevant information about the project and store it on ABB’s databases, some documents such as blueprints are archived in either paper or electronic form. Project documentation is part of the role description which describes the responsibility of each person under the stage gate model that everyone has to comply with in order to complete the project.
ABB has its own research center and work in collaboration with several university based research centers in order to stay up to date and be a step ahead of competitors in technology. It concurrently monitors market conditions and competition environment in all markets. (Marie Bello Yngveson, Interview, 27 May 2008)

4.2.3 KNOWLEDGE MANAGEMENT TOOLS

There are various IT based knowledge management tools available at ABB which are best presented for the ease of understanding by platforms. Following are important IT knowledge management applications. (Marie Bello Yngveson, Interview, 14 May 2008 and 27 May 2008)

- IBM Lotus Notes – a client-server application useful for accessing business e-mails, calendars and various applications on IBM Lotus Domino Server. IBM Lotus Notes is available through ABB inside portal which is accessible within ABB’s office only. Each employee has his/ her own assigned username and password in order to access the IBM Lotus Notes. Various applications and knowledge management databases are available on IBM Lotus Notes depending on job responsibility and division of individual employee. Employees only have access to databases relating to his/ her job responsibilities. Some important knowledge management databases on Lotus Notes are
  - E-mail – ABB provides e-mail services to all employees to facilitate the communication process.
  - Sametime – an instant messaging client allowing real time discussion among participants. Sametime allows users to see other users online and conduct a chat session.
  - ABB People – an online phonebook provides contact information of all ABB employees around the globe. The database is available in English and can be accessed by any employee.
  - ABB Local Phonebook - the country specific phonebook which is Sweden in this case providing contact information of all employees in ABB Sweden. It allows employees to search for contact persons using Swedish keywords.
  - MyData – Curriculum Vitae database containing information about employee competencies, skills, salaries and knowledge. The database also contains information about promotions and development plans. The development plan is also printed out and signed by both employee and manager. ABB retains both hardcopy and softcopy of the development plan. However, more emphasis is given to the softcopy since it is easier to disseminate in the future. MyData can only be accessed by authorized HR personnel and it is not available to ABB employees in general.
  - Team Room – an ad hoc database created by project leader and project manager containing relevant project information such as scope of the project, offers made to customers, project specifications and project blueprints. Team room is accessible by employees working on the project. There is an Q&A session, a discussion forum and a search function allowing key word search. Examples of the team room databases
are “UK Team Room” which contains all information about the projects undertaken in all ABB’s UK divisions and “Swedish Market Team Room” which contains information about Swedish customers. Team Room database is used at multi levels as it can involve only specific division when the project work requires one single division or it can involve several divisions when the project work requires collaboration among divisions. Sometimes, it can be in a form of country specific database containing all divisions’ information such as in the case of UK Team Room.

- ABB University – a web based application accessible on the public network or ABB’s outside portal. It is available at www.abb.com/abbuniversity. ABB University is created to provide technical training to both ABB’s customers and employees. The training programs are intended for engineers, programmers, maintenance and operational personals. They provide the latest technical expertise for existing and new products, processes and technology advances. (ABB University, n.d.) ABB’s customers and employees can search and register to available training sessions on ABB University. Training sessions are both class room and online training depending on the content. Training contents on ABB University are such as force measurement, instrumentation and analytical, power electronics, high voltage products, medium voltage products and robotics. ABB University users can register for courses online through “Training Partner”, an online database managing training schedule, using assigned ID and password.

- SAP – an Enterprise Resource Planning system (ERP) under installation by ABB and will be completed in 2009. It provides a learning management solution and will be a dominant learning platform of ABB in the future. Online training available on SAP is in common area function such as those related to Human Resource Management, Accounting and Finance and Ethics. It is used in training both the technical and administrative areas. Currently there are two versions of learning solutions in ABB which are Training and Event Manager (TEM) and Learning Solution because the SAP installation process is not yet completed. There is no material difference between the two versions only that TEM is an older version.
5 ANALYSIS

In this chapter, the authors present their analysis formed on the basis of their conceptual framework represented in figure 6 and findings obtained through the interviews with Accenture and ABB. In order to reach a better conclusion both the companies are analyzed in terms of IT concerning to knowledge management strategies, learning at individual level using Nonaka and Takeuchi (1995)’s SECI model of knowledge creation and learning at organizational level using Huber (1991)’s learning processes presented in theoretical framework.

5.1 ACCENTURE

Accenture is presented first beginning with the analysis of information technology used, follow by learning at the individual level and learning at the organizational level.

5.1.1 INFORMATION TECHNOLOGY

Several IT based tools are used to support the knowledge management process. The authors categorize IT tools based on the purpose whether they support the personalization or codification strategy as follow:

<table>
<thead>
<tr>
<th>Personalization</th>
<th>Codification</th>
</tr>
</thead>
<tbody>
<tr>
<td>MyScheduling</td>
<td>MyLearning</td>
</tr>
<tr>
<td>People Directory</td>
<td></td>
</tr>
<tr>
<td>E-Mail</td>
<td></td>
</tr>
<tr>
<td>&lt;&lt; Knowledge Exchange &gt;&gt;</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: IT tools in Accenture’s Knowledge Management Strategy

MyScheduling falls under the personalization strategy because it helps supporting job rotation among employees. It helps placing employees where they can best develop their knowledge. People Directory and E-mail ease the communication between Accenture employees so that they can share ideas and knowledge in a more efficient manner. MyLearning, in comparison, represents the codification strategy because it contains written online training sessions and delivers them to every employee of Accenture. During the training session participants (employees) are responsible to read and understand those training materials in order to create a new knowledge.

The Knowledge Exchange (KE) database falls into both categories because of the wide range of functions in the database itself. The primary role of the Knowledge Exchange is to provide the first point of contact for employees working on any particular project to gain some ideas and necessary background information about the project in the descriptive form. The primary role of Knowledge Exchange supports the codification strategy of knowledge management. However, in the case, when employees need to consult with persons who previously have worked on such project in order to gain
more help and insights, the KE also facilitates them getting into contact with the experts by providing contact information. The secondary role of the database serves the personalization strategy.

Accenture relies more on codifications strategy to knowledge management as there is a high degree of knowledge reuse and standardization and through its worldwide standardized work process.

5.1.2 LEARNING AT INDIVIDUAL LEVEL

In order to analyze Accenture’s learning process at individual level, the authors, referring to their conceptual framework represented in Figure 6, use Nonaka and Takeuchi (1995)’s SECI model of knowledge creation by conversion of explicit and tacit knowledge and further analyze that how IT affects each conversion process.

SOCIALIZATION

Tacit knowledge is transferred and created when individuals are working together through face-to-face communications (cf. Nonaka & Takeuchi, 1995). Employee rotation among different project is a mean to further promote socialization since it opens up new opportunities for employees to interact, discuss and learn new different perspective with other employees from diverse backgrounds.

MyScheduling is the IT based application that facilitates the socialization process as it helps managing employee rotations among different projects. People directory and E-mail system also support communications among employees. Knowledge exchange further facilitates the socialization process by providing contact information of relevant personnel on projects so that employees accessing the database can have a direct contact to experienced persons in the area. IT applications, playing the secondary role, serve socialization in managing employee rotation and assisting communication processes. However, it should be noted that IT based tools do not create the socialization as it is the employees themselves who create the socialization.

EXTERNALIZATION

Externalization learning process is created when tacit knowledge is transferred and codified into an explicit form (cf. Nonaka & Takeuchi, 1995). This is the process when project leaders write project documents and subsequently submit to the ‘Knowledge Exchange’. E-mail messaging system is an IT based communication tool that facilitates the externalization process as it allows employees to write the tacit information to share with others.

IT tools do not directly support the externalization learning process but serve the secondary role to externalization process. Transferring and creating of tacit knowledge to explicit knowledge still needs to be carried out by individuals. IT tool such as the Knowledge Exchange provides a platform to store project documents or explicit knowledge so that they can be easily retrieved for later use.
In the combination process, the explicit knowledge generated at the externalization stage should be classified and combined, and then the new knowledge should be added to the existing knowledge and integrated with it (cf. Nonaka & Takeuchi, 1995; Xue and Zhang 2006). Knowledge Exchange database allows all the combination processes to take place in the way that best serves the knowledge usage. Project reports generated during the externalization process are combined and classified on the Knowledge Exchange database. Those searching the database use the IT application to search for the knowledge they want and/or use the IT application to analyze knowledge stored on the database and obtain a new knowledge. The IT application allows easy retrieval and search of knowledge from the large knowledge pool which would not have been possible through the traditional way.

Employees assigned to work on new projects are able to reuse the knowledge and/or documents stored on the Knowledge Exchange Database in order to reduce the project work time. IT tools, thus, serve the primary role in combination process.

Internalization refers to the conversion of explicit knowledge into tacit knowledge (cf. Nonaka & Takeuchi, 1995). MyLearning is the online training tool that helps employees converting explicit knowledge into tacit knowledge. Training sessions given on MyLearning are important in helping employees understand more about the projects and scope of work undertake. Through learning the written contents, employees can apply the knowledge to work. Knowledge Exchange is another important IT-based database that supports the internalization process allowing employees to internalize knowledge when they read knowledge stored in the databases or documents and implement it at the project work.

IT-based tools serve the primary role to internalization learning process such as the use of online training in MyLearning and project information provided on Knowledge exchange database.

5.1.3 LEARNING AT ORGANIZATIONAL LEVEL

Conceptual framework represented in figure 6 allows the authors to use Huber (1991)’s learning process to analyze the learning process at the organizational level and how IT affects it.

Accenture acquires new knowledge from the internal and external sources such as Accenture Institute for Strategic Change, Knowledge Exchange, industry and clients. IT assists the process of knowledge acquisition especially from the external sources. IT-based communication channels such as the internet and E-mail system support Accenture to effectively communicate with not only its clients but also with the market in order to acquire new knowledge. However, IT is only one part of knowledge acquisition process. Accenture Research Center also plays an important role to obtain other knowledge from different sources. Thus, IT serves the secondary role to knowledge acquisition.
KNOWLEDGE DISTRIBUTION

Knowledge Exchange is an internet based database application which allows Accenture to efficiently distribute acquired knowledge to all employees working around the globe. Additionally, the database is not the only way to convey knowledge, discussion and interactions among employees are also crucial, at Accenture, in knowledge distribution process.

Since IT tools are only part of the knowledge distribution processes, they only serve the secondary role to knowledge distribution process at Accenture.

KNOWLEDGE INTERPRETATION

Knowledge interpretation is an attempt to develop one or more common distribution of knowledge. It occurs in individual’s mind using background knowledge and sets of corporate culture. At Accenture, IT plays its role in knowledge interpretation through the use of IT based communications channels such as the discussion forum on Knowledge Exchange database, E-mails and phonebook. Employees using these IT tools to contact other colleagues to help them with the interpretation process.

IT does not play a direct role in knowledge interpretation but assists the process through communications. Thus, IT serves the secondary role to knowledge interpretation.

ORGANIZATIONAL MEMORY

Accenture institutionalize the learning process by storing company’s past knowledge in the Knowledge Exchange Database for future use. Accenture’s management is well aware of the problem that employees come and go but whatever they have learned should not go with them when they leave the company. Therefore, Accenture can not rely on its employees to create organizational memory, however, the company recognizes that what those people know is vital to its business. Knowledge Exchange Database is how Accenture captures what people know and stores it inside the company so that the stored knowledge can be used in the future. IT tools serve the primary role in institutionalizing the learning process by creating an organizational memory. Accenture’s database contains all company’s explicit knowledge throughout the years.

5.2 ABB

Analysis of ABB is also presented starting with the IT followed by learning at both the individual and organizational levels.

5.2.1 INFORMATION TECHNOLOGY

At ABB, several IT based tools are used to support the knowledge management process. The authors categorize IT tools based on the purpose whether they support the personalization or codification strategy as follow:
MyData falls under the personalization strategy because it assists ABB in finding the right employees based upon competency so that their expertise and knowledge will be transferred to other colleagues working together. ABB People and ABB Local Phone Book providing employee contact information allows an easy access to colleagues who possess the knowledge. E-mail system and Sametime are IT based communication channels allowing world wide instant communications and discussions. All of these IT based tools possess the same purpose in allowing communication and discussion among employees to take place so that they can transfer and create new tacit knowledge. ABB University and SAP Learning Solution, in contrast, fall under the codification strategy because they convey the written form of knowledge to employees. Furthermore, online training sessions available on both ABB University and SAP Learning Solution aim to educate employees of objective and rational knowledge easy to understand in systematic languages.

Similarly, Team Room Databases serve both the codification and personalization strategies to knowledge management for the reason that they provide initial project information yet allow discussions among colleagues. The primary role of Team Room Databases is to serve the codification strategy as employees read about project information but will contact others through the discussion forums when seek clarification. The secondary role is thus to serve the personalization strategy.

Because of ABB’s wide business coverage in five different divisions, the dominating knowledge management strategy used differs among divisions depending on the product nature. In power products and automation products divisions where ABB obtain specifications from clients to produce products, it relies more on the codification strategy to knowledge management. On the contrary, in power systems, process automation and robotics divisions where the business principle involves systems design and implementation, it relies more on the personalization strategy to manage knowledge. ABB adapts knowledge management strategy to comply with the work nature in order to achieve the maximum benefits from knowledge.

5.2.2 LEARNING AT INDIVIDUAL LEVEL

To conduct analysis of learning process at individual level at ABB the authors, referring to their conceptual framework represented in Figure 6, use Nonaka and Takeuchi (1995)’s SECI model of knowledge creation by conversion of explicit and tacit knowledge and further analyze that how IT affects each conversion process.
SOCIALIZATION

MyData is an IT based application that facilitates the socialization process since it contains all employees’ competencies and allows ABB to use these competencies as basis for employee reallocation decisions. Through reallocations, ABB promotes socialization process by allowing more experienced, knowledgeable individuals to work with less experienced colleagues. Discussions, coaching and on-the-job trainings involuntarily take place in conversion of tacit to tacit knowledge. ABB also has other IT based applications to assist the socialization among employees such as E-mail system, Sametime, ABB Local phonebook, ABB people and Team Room Databases.

IT tools serve the secondary role in socialization process as they do not create the socialization but it is employees themselves who create the socialization process. However, IT applications assist the socialization process in placing the right employees where their skills and expertise are in need and assists communication processes.

EXTERNALIZATION

Team Room Databases is an IT based tool that facilitates the externalization process at ABB by providing a platform for quality control manager, project leader and project manager to submit their project report which contains techniques and information of the project. Further, the Email system also allows individuals to share their tacit information in written form. The role of IT can be seen as secondary in this process of knowledge conversion as project documentation involving transfer of tacit to explicit knowledge still needs to be carried out by concerning individuals. There is no IT applications that help with the documentation but it can provide a platform for project document or transferred explicit knowledge, to be stored so that it can be easily retrieved for later use.

COMBINATION

Team Room Databases is the IT tool facilitating the conversion of explicit to explicit knowledge. The search function allows employees working on the project to search for relevant information by key words. By sorting project documents under different topics, new knowledge such as success factors among projects with similar nature are found. These success factors become useful for employees working on current project. IT tools, in this type of knowledge conversion, serve the primary role. This suggests that, IT allows easy retrieval of knowledge not possible under the traditional method.

INTERNALIZATION

ABB provides wide opportunity of internalization to its employees through various IT applications. In particular, ABB University, SAP Learning Solution and Team Room Databases are IT tools constructing internalization. Online training sessions available on ABB University and SAP Learning Solution provide job-related general knowledge. Team Room Databases provide information and basic understanding of the project undertaken. ABB employees have access to log on to these on-line learning sources and databases to study the contents and internalize the new knowledge.

IT Tools serve the primary role to internalization process. ABB directly depends on IT to deliver learning contents to employees.
5.2.3 LEARNING AT ORGANIZATIONAL LEVEL

Huber (1994)’s learning processes discussed in the author’s conceptual framework are used to analyze the learning at the organizational level as well as affect of IT on it.

KNOWLEDGE ACQUISITION

ABB acquires new knowledge from the internal and external sources such as ABB Research Center and current market trend. IT assists the process of acquiring new knowledge especially from the external sources. IT based communication channels such as the internet and E-mail system bring necessary information to ABB quicker. However, IT is only one source of knowledge acquisition processes. ABB also relies on research center and collaborations with university research centers to obtain other knowledge. Thus, IT serves the secondary role in acquisition of new knowledge at ABB as it does not create knowledge but helps bringing the knowledge to ABB.

KNOWLEDGE DISTRIBUTION

ABB disseminates knowledge through both IT based platforms and people. Databases and online trainings are the examples of knowledge contents distributed using IT. However, much of the tacit knowledge including skills and expertise can only transferred by personal coaching and discussions among employees. IT facilitates the transfer of tacit knowledge by providing communication channels such as web-conferencing, E-mail system, etc. Thus, IT serves the secondary role to knowledge acquisition.

KNOWLEDGE INTERPRETATION

IT plays a standard role in knowledge interpretation through the use of IT based communications channels such as the discussion forum on Team Room Databases, E-mail system, Sametime and phonebook. Employees using these IT tools to contact other colleagues to help them in the sense making process of distributed knowledge. IT does not play a direct role in knowledge interpretation but assists the process through communications. Thus, IT serves the secondary role to knowledge interpretation.

ORGANIZATIONAL MEMORY

Team Room Database is the place to store ABB’s past knowledge that allows easy retrieval and access to all company’s explicit knowledge stored throughout the years. ABB can not rely on its employees alone to create organizational memory because people come and go but what those people know is vital to the business. Team Room Databases is an electronic archive which makes it possible for the company to capture what people know and store it inside the company. Thus, IT tools serve the primary role on organizational memory.
6 CONCLUSION

In this chapter, the authors present the result of this study follow by recommendation for companies interested in introducing OL concept or already have employed the concept but are interested in introducing IT based knowledge management tools.

6.1 STUDY RESULT SUMMARY

With regard to the main research question, the IT role on OL, the authors study companies pursuing different knowledge management strategy in order to understand the IT impact on OL believing that the study result will serve a ground for selection of knowledge management tools most appropriate for company’s strategy.

Referring to sub-question number one, how organizations use IT to manage knowledge, the authors have mentioned the two knowledge management strategies; personalization and codification. The personalization knowledge management strategy concerns social interactions and dialogues as a mean to share tacit knowledge. The codification knowledge management strategy, on the other hand, captures and extracts knowledge from individuals to document and store it on an electronic database which allows an easy reuse of explicit knowledge. Since tacit knowledge is subjective in nature, it is considered as deep in action and hard to formalize while explicit knowledge, in contrast, is objective and transmittable through systematic languages. In light of the two types and nature of knowledge it can be seen that personalization strategy is most suitable for transfer of tacit knowledge, while the codification strategy is most appropriate for transfer of explicit knowledge. Therefore, the authors place these two knowledge management strategies within IT context to investigate how companies use IT tools to manage knowledge complying with strategic goals.

The concept of organizational learning (OL) is a platform that helps explaining learning process within organizations. The authors examine OL concept concerning to both the learning at individual and organizational levels from the perspective of Crossan et al. (1999) that learning is a simultaneous interaction between individual and organization. The authors use Nonaka and Takeuchi (1995)’s SECI model to describe learning at individual level and Huber (1991)’s learning process to describe learning at organizational level. Sub-question number two concerns how IT affects learning at individual level. It assumes conversions between tacit and explicit knowledge create new knowledge in four different modes. Those are socialization concerning transfer of tacit knowledge to tacit knowledge, externalization regarding transfers of tacit knowledge to explicit knowledge, combination in respect of explicit knowledge transfer to explicit knowledge and internalization relating to transfers of explicit knowledge to tacit knowledge. Sub-question number three concerns how IT affects learning at organizational level. It looks at how organization process information in order to create new knowledge. The four stages are knowledge acquisition relating to new knowledge acquirement, knowledge distribution regarding the way organization share new knowledge among its members, knowledge interpretation involving the sense making of new knowledge and lastly organizational memory concerning knowledge storage.

The two companies presented in the study pursue different knowledge management strategies. Accenture is the representative of companies pursuing codification knowledge management strategy while ABB represents companies pursuing both the codification and personalization strategy depending on the business of their divisions. Accenture employs the codification strategy to
knowledge management because it fits the standardized work procedure utilized by Accenture’s offices and operations around the globe as the work practice in Accenture is the same regardless of location. With codification strategy, Accenture can achieve its goal in ensuring that the uniform work approach is employed resulting in delivery of fast solutions to their clients while minimizing cost. ABB, on the other hand, employs the mix knowledge management strategy depending on nature of work in each division. ABB aims to employ the best knowledge management strategy which best fits the type of product or service it delivers through the different divisions. With the mix strategy, ABB ensures that it offers unmatched product and service quality to their clients to maintain its leading market position.

For learning at the individual level, IT based application or tools play primary and secondary role on OL in both companies depending on the process of knowledge creation. This study shows that IT serves the primary role to combination and internalization processes because IT tools are used directly to deliver the learning contents and provide knowledge platform such as in the case of online trainings and electronic knowledge databases. The online trainings through MyLearning at Accenture and ABB University at ABB aim to generate knowledge at the individual level providing remote access to course material using information and communication technologies (e.g., web-based applications or e-learning systems) that support individuals’ learning processes to develop competencies, while online knowledge databases allow easy and instant retrieval of knowledge which enables employees to create new knowledge, for example, by reusing the existing knowledge saving time and cost. In addition, direct impact of IT on organizational learning through online trainings and online knowledge databases ultimately supports and supplements organizational routines and culture. On the other hand, the study also reveals that IT plays a secondary role to socialization and externalization processes because the IT based applications or tools assist companies in placing the right man to the right job, increase communications and collaborative interactions among individuals and provide a platform for explicit knowledge to be stored once employees convey their knowledge and expertise in a written form. It is true that all happens in individual’s minds but IT increases the efficiency and effectiveness in conveying what is in one’s mind to others. It should be noted that where IT tools serve the secondary role, they do not have a direct impact on learning but rather assist the learning process to take place in a more efficient and effective manner through electronic databases, phonebook, people directory and Email system.

For learning at organizational level, IT supports all learning processes at different levels and degrees. This study testifies that IT serves the primary role in creating organizational memory because it allows organizations to store soft information such as tacit knowledge of employees as they do not stay with the organizations forever. Due to the displacement of people companies loose huge amount of knowledge, but the IT based organizational memory not only preserves and integrates the organizational knowledge stored throughout the years but also helps the present decision making process using the past knowledge. Therefore, IT is the basis of how organizations retain knowledge to further promote organizational learning. Accenture’s Knowledge Exchange database and Team Room databases at ABB enables both companies to store the tacit know-how, expertise, experiences and stories of their employees for future use. Though employees’ memory is also a part of organizational memory, people do not stay with the companies forever. Storing knowledge in an electronic form in databases is the best way to ensure that it stays with the companies for good even if people leave organization. Besides, this study also shows the secondary role of IT in knowledge acquisition, knowledge distribution and knowledge interpretation as IT indirectly impacts learning in these processes through the use of IT based communication channels and intelligent systems such as internet, email, web-conferencing, online discussion forums and databases. IT tools facilitate the sharing and forming better understanding of knowledge generated by various sources including company’s research centers which allow organizations to acquire knowledge internally, university
research that helps organizations to obtain new knowledge in different areas and industry and clients which provide the information concerning to current market trend, the new knowledge and so on faster than before. Again, IT alone does not create knowledge but it is the use of IT together with analytical mind that does. The following table represents the finding summary:

<table>
<thead>
<tr>
<th>Dominating Knowledge Management Strategy</th>
<th>Accenture</th>
<th>ABB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning at Individual Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socialization</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Externalization</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Combination</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Internalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning at Organizational Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Acquisition</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Knowledge Distribution</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Knowledge Interpretation</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Organizational Memory</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Symbol interpretations: ①: Primary role, ②: Secondary role

Table 4: IT role on OL

The study result conforms to previous researches on the SECI model and Huber’s learning process from Xue and Zhang (2006) and Malhotra (1996) that IT plays a role in all learning processes. However, with this study we have taken a further attempt in identifying whether IT directly or indirectly impacts the learning processes.

It is clear from this study that information technology has an impact over organizational learning as IT facilitates OL at both the individual level and the organizational level in creating knowledge which ultimately enables organizations to improve capabilities and enhance performances to cope with change. Companies are using various IT application or tools to promote OL either through knowledge depository database, online training, staff rotation planning or various IT based communication channels. The use of knowledge management strategy and the role of IT on OL coincide with the strategic objective set by the company. Companies also use different combinations between tacit and explicit knowledge in respond to the strategic goal. Both tacit and explicit knowledge are always used in all companies but the mixture produces different results. It is the management that has to determine the right combination between them to create the maximum impact on OL. IT can be a tool help managing tacit and explicit knowledge but people are more important in the process of knowledge creation as it is individuals who possess the critical minds led to learning. It is important to realize a fact that organization will never learn if its people do not learn.

6.2 RECOMMENDATION

Companies interested in introducing OL concept should possess a clear strategic vision of where and how they want to be. The management must possess a clear strategic goal of where they want the company to be at and then use OL concept to drive it. The next step is to focus on how their people work and solve problems at hands. They can question whether tacit or explicit works best, what
should be the dominating knowledge and how they can use IT to promote particular knowledge. In particular, IT best serves the explicit knowledge but it can also assist the tacit knowledge creation process. Once the knowledge type is identified, companies can select the knowledge management strategy most appropriate. The key is in finding the proper support between the use of tacit and explicit knowledge that responds well to the company’s strategic goal. IT tools contribute largely to the achievement of OL in organizations. Nevertheless, the study result also yields that other factors such as clear management vision, people and culture within organizations are keys to success for OL as well.

People are those who create, store and utilize the company’s knowledge. HR management policy can play a significant role in selecting employees with learning attitude complying with the corporate culture. The corporate culture of an organization sets the rules in all learning procedures. It is the corporate culture that prompts employees to reply the questions asked from other colleagues, writes project report, stores it in the database, encourages others to read and ask if they do not understand, determines how company acquire new knowledge, establishes the communication most appropriate to share knowledge, helps employee interpreting knowledge and settles on how organization store knowledge. The management can influence the corporate culture in favor of learning.

Strategic goal, HR management and IT must be used simultaneously in order to enhance OL.
REFERENCES


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APPENDICES

APPENDIX 1 - INTERVIEW QUESTIONS

This appendix includes the list of questions that we used to guide our interviews with Accenture and ABB. Due to the interactive nature of the interviews, we also relied on conversational prompts to seek clarifications and additional information related to our questions, and to manage the pace of the interview. The conversational prompts are a natural part of interacting with research participants and, for this reason, have not been included in this appendix.

1. How the company promotes socialization?
   - The IT role in socialization process.
   - Degree of personal interactions between employees, customers, suppliers
   - Employee rotations

2. How the company promotes externalization?
   - The IT role in externalization process
   - Method for past knowledge capture
   - Knowledge storage on database

3. How the company promotes combination?
   - The IT role in combination process
   - Methods for database retrieval

4. How the company promotes internalization?
   - The IT role in combination process
   - Employee coaching methods
   - Opportunities for experiences

5. How the company uses IT to hire and train employees?

6. How employees understand and respond to changes?
   - Any example of change
   - The IT role in facilitating change

7. How the company acquires new knowledge?
   - Inside or outside sources of knowledge
   - The role of IT in knowledge acquisition.

8. How the company distributes knowledge?
   - The role of IT in knowledge distribution.

9. How the company interprets knowledge?
   - The role of IT in knowledge interpretation.

10. How the company uses past knowledge (organizational memory) to make decision?
• The role of IT in decision making process
• Knowledge storage in people or database

11. What are the IT based knowledge management tools within the company