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Learning Enough from Projects?

--A Study of Organizational Learning in SCA Hygiene Products AB

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Abstract

It is widely acknowledged that organizational learning capability is a critical factor that differentiates successful companies. The quality of individual and collective learning is a key determinant of organizational success. Project learning is critical to increasing the company competitiveness to improve their knowledge faster than the competition.

The knowledge transformation within a project and between projects involves sharing knowledge and experiences. If experiences are useful for a group of people, a transition between individual knowledge and collective knowledge must happen.

The learning patterns will influence the knowledge transformation. The widely used plan-do-study-act (PDSA) model ensures the continuous process of plan-versus-actual comparison in which intra-project learning will happen. Lessons learned which are the output of learning activities will be transferred from one project to another based on certain knowledge transfer processes.

Learning must be supported and facilitated by a learning mechanism from structural and cultural aspects.

Key Words

Organizational learning, project learning, knowledge transformation, PDSA, lessons learned, knowledge transfer process, learning mechanism.

Acknowledgement

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1 Introduction

1.1 Background

The impact of globalization, technology change, and uncertainty has clearly set the stage for a new era of economic development. The driving variables in this development are knowledge, the pace of its development and how effectively companies learn to utilize it (Miles *et al*, 1998).

It is widely acknowledged that organizational learning capability is a critical factor that differentiates successful companies. The quality of individual and collective learning is a key determinant of organizational success. For project organization, the majority of work within the organization is project-based, and accordingly the major learning activities, both individual learning and collective learning, which occur in projects, are an important part of organizational learning.

Theorists have recognized the strategic importance of organizational learning as a means of providing a sustainable competitive advantage (DeGeus, 1988; Stata, 1989; Lank and Lank 1995). Lank and Lank (1995) advocate the "continuously learning organization" and de Geus (1988) argues that the ability to learn faster than competitors may be the only sustainable competitive advantage.

As companies around the world continue to transform their strategies and organization designs to become more agile and responsible for their environments, sources of competitive advantage in the future will increasingly shift away from traditional economic drivers such as large size, economies of scale, and proprietary technologies (Drucker, 1993). Already, some of today's most successful firms are building new strategies and organization designs based on creating and cultivating new sources of knowledge and ideas to develop products and services that will redefine their industry's landscapes (Lei, D.; Slocum J. W; Pitts R. A, 1999). This is especially true for project

organizations which focus on accomplishing long-term business strategies through short-term operational projects. In this sense, the project organizations are creators of new sources of knowledge and value that can deliver breakthrough products and services to their customers almost immediately (Lei, D.; Slocum J. W; Pitts R. A, 1999). Again the ability to learn in a project organization is much effected by the quality of the project learning.

Project organizations are faced with two important competitive forces: the shift to a knowledge-based society (Toffler, 1990) and the need to improve their knowledge faster than their competitors (Stata, 1989).

A list of companies frequently cited as learning organizations confirms this fact. These companies include Motorola, Wal-Mart, British Petroleum (BP), Xerox, Shell, Analog Devices, GE, 3M, Honda, Sony, Nortel, Harley-Davidson, Corning, Kodak, and Chaparral Steel. Not only have these organizations maximized their competitive positions in good times, they have also been carefully nurtured in turbulent times. As a result, these companies are envied by their competitors (McGill, Slocum & Lei, 1993).

However project learning can not stand alone. The concept of the learning organization has been offered to emphasize the need for creating an environment to support project learning throughout the organization. A learning organization is "an organization continually expanding its capacity to create its future" (Senge, 1990). According to Garvin (1993) a learning organization is "an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights."

Organizational learning is a long-term activity that will build competitive advantage over time and requires sustained management attention, commitment, and effort (Goh, 1998).

According to Goh (1998) a learning organization has several core strategic building blocks:

1. Mission and Vision - Clarity and employee support of the mission, strategy, and espoused values of the organization.

2. Leadership - Leadership that is perceived as empowering employees, encouraging an experimenting culture, and showing strong commitment to the organization.

3. Experimentation - A strong culture of experimentation that is rewarded and supported at all levels in the organization.

4. Transfer of Knowledge - The ability of an organization to transfer knowledge within and from outside the organization and to learn from failures.

5. Teamwork and Cooperation - An emphasis on teamwork and group problem-solving as the mode of operation and for developing innovative ideas.

1.2 Problem description

It has often been stated that learning starts at the individual level (Simon,1991; Kim, 1993). Nonaka (1994) and Hedlund (1994) agree upon this and suggest that knowledge transformation could be seen as an expanding process starting at the individual level, expanding to the group and organizational level through interaction. Knowledge transformation is thus a process in which knowledge is transformed through learning at different levels. In modern society it is argued that much of the work takes place at the team level (Hedlund, 1994).

Crossan, Lane, and White (1996) found that in today's complex world, individual static jobs have shifted to solving a series of problems as knowledge workers within a project. These problem solving activities often occur cross-functionally and require cross-functional team work. Because of the interconnection of issues, more work will involve integrating viewpoints and activities of specialists, and less will involve performing tasks completely

within those specialties. These teams learn together in social interaction as the project evolves and shared understanding is developed.

In this environment, project managers face a profession coupled with a number of unique challenges. Tasked with the successful implementation of their project, these leaders are given a mandate to operate their project teams as de facto profit centers for the organization as a whole (Thomas & Pinto, 1999). Project leaders must possess or develop a number of skills to match the various tasks and situations they are called upon to address, and the ability to attune their skills to the nature of the work they are called upon to perform. Different aspects of their duties require appropriate management skills (Thomas & Pinto, 1999). The whole project management process is also a perfect chance for project leaders to enhance individual learning and develop various management skills and abilities.

However, project leaders cannot only limit themselves to individual learning. When a team is seen as different individual contributions and learning as an individual activity, the individual will most probably try to capture his or her knowledge rather than share it voluntarily (von Krogh, 1998; Gherardi, Nicolini & Odella, 1998). As Shaw and Perkins (1991) state, the role of leaders in organizations is to set the necessary conditions for the organization to develop an effective learning capability. That is, managers need to take strategic action and make specific interventions to ensure that learning both at individual and organizational levels can occur. For example, introducing mechanisms to facilitate the transfer of knowledge between work teams and developing a widely shared vision supported by employees, can influence the learning capability of an organization.

This normative perspective suggests that a set of internal conditions is required for a project to facilitate organizational learning.

Actually, certain effective organizational learning mechanisms have been introduced. As we move from the industrial era to the knowledge era, it has been suggested that the steep hierarchies will need to be replaced by flatter

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and more integrative network structures, where much of the learning takes place within teams. The ability to facilitate such teams and create an organization that can effectively use them will thus be of essential importance for organizations (Kasl, Marsick & Dechant, 1997).

The problem is that there is a huge gap between the learning efforts and the recognition of the importance of learning. That is, on the one hand people agree that it is important to enhance organizational learning, and on the other hand few know how to implement organizational learning or they tend to separate certain parts of organizational learning from what they are doing in the organization. As a result the learning is incomplete and ineffective.

Then I may ask:

In what way can the gap affect the quality of knowledge transformation and organizational learning?

What are the possible reasons for the gap?

What areas can the organization look into so that the gap can be finally narrowed and eliminated?

1.3 Purpose

The aim of this paper is to investigate how projects can generate the learning processes in a project environment which, in turn, contribute to establishing effective organizational learning mechanisms. The focus is on the learning process on two levels: project leaders individual learning and group learning (intra-project and inter-project learning). Thus, a comparison between normative learning frameworks in project management and empirical findings through surveys and interviews, will be given so that those project managers, who tend to ignore organizational learning or find it hard to integrate learning into project management, can reflect on it and use it as a tool to assess the learning processes in their daily project management. Meanwhile, the implications of the learning processes in the project environment establishing

organizational learning mechanisms will provide management teams with a clearer picture of their role in enhancing organizational learning.

1.4 Delimitation

When one decides to write a thesis, the first consideration is to select a suitable subject.

After that, information about the subject may be collected and several possible perspectives may be discovered. But, due to constraints, such as time and costs etc., it is impossible to investigate from all the perspectives found. Delimitation has to be made.

Applied to management, theories about learning get increasing attention, especially those on organizational learning. One important level of learning is inter-organizational learning which involves learning from other companies and competitors. Inter-company learning takes place as members of the organization meet the business partners, suppliers, customers and competitors. It occurs especially when a company watches and uses the experience of another company in connection with joint venture.

However in this paper, I will solely concentrate on intra-organizational learning from a project perspective.

I chose to make case studies, which means that the first delimitation is quite naturally the selection of suitable companies. A knowledge based approach seems to be a pre-requisite for learning. I felt that suitable companies would be those that are dependent on knowledge intensive processes, which means without an adequate knowledge base and the ability to update and put it into practice, it is difficult for companies to live up to the expectations of the changing environment.

2 Method

2.1 Research method

Depending on what the results of a study are to be used for, different methods for collecting information are more or less relevant. My choice was whether I should use a qualitative or a quantitative research method or a combination of both.

The main difference is that in the quantitative method the researcher transforms information to numbers and quantities, while in the qualitative method the researcher interprets the information (Yin, 1994). Since my study deals with how project managers learn in a project environment and their roles in leading organizational learning, it would be quite difficult to measure that in terms of numbers and quantities. I believe it would be quite difficult to describe how the learning experiences are shaped and interpreted with any other research method than the qualitative. However, in the analysis, I do use some numbers, such as the percent of a certain opinion expressed by the project managers, just for the purpose of clarifying the situation of the learning efforts.

In order to understand the situation which an individual faces, it is important to create a close relationship with that individual (Kinnear & Taylor, 1996). Therefore, it has been important for me to create a close relationship between me as the researcher and the respondent, as well as building up an informal atmosphere. With the qualitative method I have tried to overcome the subject-object relationship, which is important in the quantitative method. My aim has been to understand how the respondent relates to the context he or she is a part of. According to Yin (1994) such an approach puts an emphasis on how the individuals interpret different situations and actions. Through interviews I have tried to study the social phenomenon which is the object of the research, i.e. the project managers, in order to create a deep understanding.

I want to gain an understanding of how the project managers' individual learning and intra- and inter- project learning occur in the organizational learning environment. In order to do that, I need to investigate the social processes of how people construct their reality. I believe it essential to create close contact with the respondent, which makes it easier to gain an insight to the person's deeper knowledge about the subject. This in turn, is only achievable through a qualitative method.

As a qualitative researcher I am directly confronted with the problems occurring in the social reality to a larger extent than quantitative researchers. The latter tend to abstract themselves from the current reality instead of studying it directly. Quantitative research briefly explores a large number of objects. In my research I have concentrated on meeting a limited number of project managers face-to-face in SCA Hygiene Products AB.

In the research literature different conclusion methods are found, for example induction and deduction. Induction implies that concepts and theories are developed when the practice is being studied (Kinnear & Taylor, 1996). The researcher uses theory to compare with his or her own interpretation (Kinnear & Taylor, 1996). This procedure differs from the conclusion technique often used in quantitative research, namely deduction. Deduction implies that the researcher verifies theories and hypotheses developed beforehand. Thus, induction is related to practice, while deduction is related to theory. There is also a third form of conclusion method, abduction, which is suitable for case studies (Yin, 1994). Abduction, induction and deduction complement each other as the researcher is able to move between them. I started my thesis with extensive reading of theory, complemented by discussions with the contact person at SCA, who had the role as a discussion partner. This was done in order to create a pre-understanding of the subject and to formulate the research problem. When I began the empirical work, my understanding of the subject was widened, which resulted in that the research problem was complemented. The empirical study was also analyzed and compared with the theoretical

framework. This study could therefore be viewed to be of an abductive character.

2.2 Case studies

The case study is often used in qualitative research. Case studies imply that the researcher explores a few objects from several angles. The purpose of the case study can be to illustrate and point out certain conditions and also to serve as a tool in order to create a hypothesis. The case study can also serve as a method for researching processes of change and as a tool to create new theses. The case study is suitable when answers, such as how and why a phenomenon occurs and furthermore when the investigated study is out of reach for the researchers to affect (Yin, 1994)

I have studied several projects within one company and am quite aware that the outcome of the study might be general and influenced by subjectivity. However, the aim is to create an understanding and valuable insights, which can be used in future projects. A challenge that I faced was to balance the case studies, so that they did not emphasize details too much, but still maintained the focus on the information that would help me to solve the problem. The aim was that each respondent was allowed to express what he or she felt was important for me to know, but still it was I that steered the interview into the research area if I felt that the answers were not related to it. The case study gave me the advantage to relatively freely search for the information needed. Furthermore, it also gave me the possibility to use a flexible way of collecting information. When conducting a case study there are several methods the researcher can use in order to collect data, namely interviews, questionnaires and observations (Yin, 1994)

To help in providing a more complete understanding of learning in a project environment, a lessons-learned-oriented research was conducted through interviewing with 10 project managers. The interviews used the lessons-

learned terminology because it is more familiar to project managers than organizational learning. The qualitative open-ended interview guide is shown in Appendix I. The respondents had an average of 10 years' experience as project managers. The research was conducted to determine (1) if there is a gap between learning efforts and recognition of importance of learning (2) how it is like for intra- and inter-project learning and (3) the effectiveness of learning mechanisms.

2.3 Gathering of data

2.3.1 Types of data

In a research it is possible to differ between primary and secondary data. Primary data is new data collected by the researcher specifically for the study's purpose. This collection can be done through personal interviews, observations, questionnaires and telephone interviews. Secondary data is data that has already been published for other reasons than the specific research (Yin, 1994). I have chosen to mainly use primary data for the study, which I consider to be essential to gaining new information for the specific study. The primary data consists of planned interviews which are accompanied by an open-ended interview guide. During the interviews I got each conversation recorded for the convenience of after-interview reflection, which I believe increases the reliability of the data collected.

I am aware that it is possible to use observation as primary data, which focus more on behavior and actions. This would have made it possible to observe how projects learn in real time. However, observation would have restricted me to only look at the learning process at the individual level, which is not in line with the aim.

I could also have used telephone interviews. However, in face-to-face interviews it is possible to establish a trust based relationship between the

interviewer and respondent, which might be difficult in telephone interviews. Personal interviews are a necessary means to get an insight to the respondents' understanding of the subject. Through the interviews the respondents are able to transfer their personal observations concerning the subject, and at the same time, I am able to make own observations.

2.3.2 Selection

As mentioned before the selection of the company is very important. SCA Hygiene Products AB is continuously launching new products as a means of strengthening its competitiveness. Most of the projects' goal is to deliver new products. However, the inevitable barrage of changes has pushed company to initiate dozens of change efforts to enhance organizational performance via projects. These projects normally change the organizational structure, improve the way of working and introduce new IT systems, etc. For example, the recent project of Nordic Business Service Center is an initiative of regionalization of financial service with the installment of SAP system.

So the status and quality of learning in the project environment is critical for the organizational learning in SCA. Accordingly, it will be meaningful to select several projects in the organizations to examine the learning quality.

In order not to make the study partial, I tried to interview the project managers from different divisions.

After having conducted all the interviews I tried to, first summarize the conversations and then sort out the interview results into different groups which can be found in Chapter 4. In this way I managed to select the data which is closely related to the research subject and exclude the irrelevant information.

2.4 Research validity and reliability

Concerning validity, one can differ between internal validity and external validity. The former is characterized by congruence between the theoretical and practical definition (Kinnear & Taylor, 1996). External validity in turn is characterized by that the answers given by the respondent, are in line with reality. If the researchers achieve the same result by conducting a similar research at a latter stage, the reliability could be viewed as being high (Kinnear & Taylor, 1996). A research is assumed to have good reliability when it is not influenced by the persons that are actually doing the research or by other external circumstances (Kinnear & Taylor, 1996). The reliability, i.e. accuracy and the consistency of a study, can be affected by several factors such as the research method, the interviewer, the respondent, and the environment for the interview (Kinnear & Taylor, 1996).

An "interview tool" was created from a theoretical perspective. The questions in the interview tool were designed in a way that could ensure me to get the answers that I wanted to analyze and through which I could draw conclusions on what actually happened.

When discussing the external validity one should be aware of the fact that it might be difficult to find the real "truth" in my case studies. One cannot ignore that a lot is based not only upon the respondents' subjective individual interpretation, but also on my own interpretation. Whether or not the respondents in the case studies have expressed their real view of how they perceive their reality is hard to predict. Therefore, some generalizations are unavoidable in the findings.

3 Knowledge transformation and organizational learning – a theoretical perspective

3.1 The concept of knowledge and learning

What knowledge is differs radically between different scholars and cultures. In the West the general conclusion has been that knowledge is "justified true belief", which Plato was first to mention (Nonaka & Takeuchi, 1995). This rationalistic perspective means that there exists a true reality and people are part of the real truth. Individuals are considered to have a given set of characteristics, such as knowledge and personality, and it is from these characteristics that individuals act. The rationalistic and formal perspective is closely connected to the cognitivistic approach, which has dominated the theories concerning learning in organizations (Baets, 1998). The cognitivistic school developed formal models of the brain (or any cognitive system) as a machine for information processing and logical reasoning. Knowledge was seen as something that was possible to encode and store, and easy to transmit to others (von Krogh, 1998). According to this view, organizations can never be perfectly rational due to the limited information processing ability in bureaucratic organizations (Morgan, 1986).

According to the "constructionist perspective" knowledge resides in the body of individuals and is closely tied to earlier experiences. Instead of considering that individuals have certain characteristics, the constructionists argue that people act in ways that are unique to each person (von Krog, 1998). Nonaka and Takeuchi (1995) agree with this and mean that interpretation of the world depends on a unique viewpoint, personal sense-making and individual experience.

The concept of learning is closely related to that of knowledge. Knowledge is a high value form of information that could be applied to decisions and actions (Davenport & Prusak, 1998). However knowledge in itself is static and

disregards the essential dynamism of knowledge as a process (Nonaka & Konno, 1998). Learning, on the other hand, is the process by which the state of the knowledge changes through the transformation of experience (Kim, 1993). Firms could be seen as open systems where there are asset stocks and flows, then knowledge could be seen as the stock of internalized information (Sanchez & Heene, 1997). Similar to learning, knowledge creation and knowledge transformation represent the processes of acquiring or creating knowledge (Baets, 1998).

3.1.1 Tacit and explicit knowledge

Knowledge in general can divided into tacit and explicit knowledge. Tacit knowledge means "understand without being expressed directly". Tacit knowledge is the part of the knowledge that has not (yet) been formulated in words or models, that can be communicated and it is not codified. A big part of people's everyday knowledge is tacit (Nonaka & Takeuchi, 1995). Using tacit knowledge does not require people's full attention, it often happens without people noticing that they use tacit knowledge. Due to the fact that tacit knowledge is not formulated in a communicable form, it is very hard to talk about tacit knowledge, because in order to talk about it, it usually has to be transformed in explicit knowledge.

Explicit knowledge is then of course the part of the knowledge that is already formulated in words, the codified part of the knowledge (Nonaka & Takeuchi, 1995). It is the kind of knowledge that can easily be acquired through reading books or listening to lectures. Putting explicit knowledge into use is a conscious process and usually requires much more concentration than using tacit knowledge.

3.1.2 Organizational, collective and individual knowledge

Organizational knowledge consists of collective and individual knowledge (Baumard, 1996).

The collective knowledge is stored in the sum of the people that form the organization while individual knowledge is bound to single individuals. Individual knowledge that is shared by all individuals within the organization is also collective knowledge. That means that knowledge can be individual and collective at the same time, in fact all collective knowledge seems to require to be based on individual knowledge.

Theoretically, parts of the organizational knowledge can exist without being part of anyone's individual knowledge. An example of such knowledge is a written procedure (which is organizational knowledge) that no individual within the organization remembers (and which therefore is not individual knowledge). The problem with such knowledge is that the organization cannot use it unless an individual discovers it and makes it part if its individual knowledge again (Baumard, 1996).

Of course, not all individual (and theoretically also collective) knowledge of the members of an organization is organizational knowledge. Only that part of the individual (and also collective) knowledge that is known by and useful for the organization is also organizational knowledge (Baumard, 1996).

This leads to a problem. When a single knowledge-carrying individual leaves the organization, this person's individual knowledge is lost for the organization. The organization can use individual knowledge only as long as the individuals are within the company (then their knowledge is part of the organization's knowledge base). Knowing this, organizations have two possibilities to keep the individual parts of their organizational knowledge. They can either try to make sure that no individuals, that carry important individual knowledge, leave the organization or they can transform the

individual knowledge into collective knowledge, thus making sure no knowledge gets lost if individuals leave.

3.2 Individual learning versus organizational learning

Individual learning has to be separated from organizational learning. Organizational learning requires the involvement of several individuals whereas individual learning is something that each individual can do on his/her own. Organizational learning uses the combined experiences of all participating individuals. It is an interactive process where a shared model of thinking is developed. Usually this model takes into account much more possibilities than each single individual's mental model. This improves decisions that result from organizational learning compared to single individual solutions. Organizational learning creates collective knowledge that is shared by all its participants. This collective knowledge is part of each participant's individual knowledge according to the definition mentioned before (Baumard, 1996).

Whenever organizational learning takes place, one can be sure that the participating individuals also learn on the individual level. This of course creates even more individual knowledge (but only part of it is organizational knowledge).

3.3 Interpretation of the Nokaka/Takeuchi model

The transition from tacit to explicit knowledge is necessary to make knowledge communicable and is therefore important for the transfer of experiences between projects. If experiences are useful for a group of people, a transition between individual knowledge and collective knowledge must happen. My interpretation of the Nokaka/Takeuchi model is a framework that explains how both these transitions take place.

As Figure 1 shows, the model describes the never-ending spiral of tacit and explicit knowledge through four modes of knowledge conversion, i.e. socialization, externalization, combination and internalization.

The following interpretation of the model is an attempt to link it to four possible categories of knowledge, resulting from using both concepts to categorize knowledge that have been introduced above.

Figure 1 The Nonaka/Takeuchi Matrix

	Tacit Knowledge	Explicit Knowledge
Tacit knowledge	Socialization	Externalization
Explicit Knowledge	Internalization	Combination

Source: Nonaka & Takeuchi, 1995

The categories are:

- tacit-individual knowledge,
- explicit-individual knowledge,
- explicit-collective knowledge,
- tacit-collective knowledge.

Knowledge can be transformed between the different categories through the four modes of knowledge conversion, which will be discussed below. The descriptions of the four modes of knowledge conversion are based on Nokaka/Takeuchi.

- Socialization

Going through the Nokaka/Takeuchi circle clockwise, it is advisable to start with tacit-individual knowledge for explanatory reasons, although the process of knowledge conversion can begin at any point in the circle.

The individual's tacit knowledge like mental models or technical skills is also referred to as "procedural knowledge", "automatic knowledge", or "practical knowledge" (Baumard, 1996). This tacit knowledge can be gained from other individuals through a process of watching, imitating, and experience sharing, called socialization. Even very complex knowledge that is hard to express can be shared through socialization. The teaching of craftsmanship skills and on the job training are based on the principle of socialization.

The individual can also create tacit knowledge itself. One way to do this is through conscious practicing. But often this process happens incidentally, when the individual focuses on something else or through unexpected learning experiences (Baumard, 1996). An example of an unexpected learning event is when someone writes a document and incidentally finds some new feature of his word processor while he was concentrating on the contents of his document.

- Externalization

In order to communicate tacit knowledge, it has to be transformed into explicit concepts like metaphors, analogies or models. This is referred to as externalization and forms the most vital step in the transition process.

The explicit-individual knowledge that is created during this externalization is what Baumard calls "known expertise" in contrast to the more unknown expertise of tacit-individual knowledge. Sociologists argue that all the knowledge that one has become aware of having, is explicit-individual knowledge. This description is too abroad, because riding a bike would be explicit knowledge according to this definition just because one knows that one can do it. Knowing that one can do something does not mean that one can

describe this expertise to someone else. This knowledge has not been externalized. In my opinion only knowledge that has been externalized is explicit knowledge.

While one can argue that externalization, which is sometimes also referred to as articulation, requires communication with another person, the vital step in this process is simply putting the tacit knowledge into a representation that can be communicated, e.g. words. This does not require interaction, but can be done by the individual in possession of the knowledge alone.

• Combination

The next mode of knowledge conversion is the combination of the explicit knowledge, where it is communicated to others and combined with their knowledge through discussion. During this process, the knowledge gets systemized and categorized into the knowledge framework of the organization. The result is collective-explicit knowledge. Patents, written rules and procedures, organizational charts, and similar documents are examples of such explicit collective knowledge. This combination mainly serves the purpose of integrating the knowledge into the organization's body of knowledge and distributing it throughout the organization. However, it has to be emphasized that the combination with other knowledge itself can lead to the creation of new knowledge.

• Internalization

The last step when moving the matrix in Figure 1 clockwise is, when the individuals transform the explicit knowledge back into tacit knowledge while they use it. As previously mentioned, tacit knowledge is much easier to use than explicit knowledge, which makes this transformation worth the effort. This process is called internalization. Here the practicing of explicit concepts takes place and the explicit concepts are thereby conversed into tacit knowledge. This happens at the individual level, but as soon as all individuals within the organization share this tacit knowledge (e.g. because it was

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communicated throughout the organization in the combination process), this knowledge becomes tacit-collective knowledge.

3.4 Different levels of learning

A lot of authors have developed different systems to categorize the different levels of learning. Examples include incremental versus second-order learning (Ciborra & Schneider, 1992) and learning I versus learning II (Bateson, 1972). In this paper, I use the classification that Argyris and Schön (1978) developed, namely single-loop learning, double-loop learning, because it is very well thought out and common.

• Single-loop learning

Single-loop learning means that people adapt their actions to changes in the environment, but still keep their old goals. It is mainly concerned with efficiency and effectiveness and can also be described as "process learning how" (Edmondson & Moningeon, 1996) because individuals only change the ways in which (how) they achieve the same old goals.

The term, single-loop learning means procedures are adapted to changes in the environment without changing their aims (see Figure 2)

Figure 2 Single-loop Learning
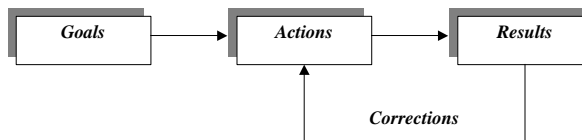
Source: Edmonson & Moingeon, 1996

• Double-loop learning

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Double-loop learning questions the norms and values of the organization. Due to environment changes it is no longer sufficient to adapt one's actions and still keep the old goals, but the goals themselves have to be questioned (see Figure 3).

Figure 3 Double-loop Learning

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  Goals  ───────►  Actions  ───────►  Results
    ▲                 ▲                   │
    │                 │    Corrections    │
    │                 └───────────────────┤
    │       Corrections                   │
    └─────────────────────────────────────┘
```
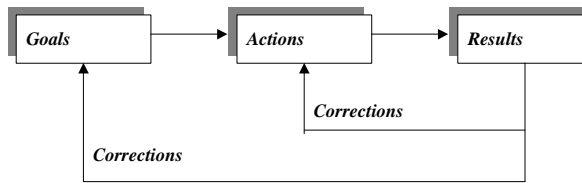
Source: Edmonson & Moingeon, 1996

According to Argyris, new espoused theories are developed and the organizational frame of reference is refined. Edmondson and Moningeon (1996) call this "process learning why", because individuals question their goals (why they do something). New aims are established and new procedures might be necessary.

3.5 A learning framework in a project environment

3.5.1 Plan-Do-Study-Act (PDSA) model

The learning process is important because it is a means to help a project manager accomplish three goals: (1) to deliver a successful project, (2) to deliver a series of successful projects, and (3) to build capabilities. Based on Drucker's (1993) and Nonaka and Takeuchi's (1995) definition of the knowledge-based organization, building the organization's knowledge and capability is one key to long-term survival of organizations. Without having

the right capabilities, the organization cannot deliver a successful project and therefore a series of projects. Three core capabilities of a project environment are the project management, the product (e.g., engineering, design, or construction), and the learning processes. Project managers apply the project management process to the product process to ensure that the product meets the needs of the customers within the requirements and constraints of the project scope.

For the project organization to learn, organizational members must create, share, and apply knowledge (Argyris & Schon, 1978). The organization's members create new knowledge by being engaged in a learning experience. Learning-by-doing occurs when a problem solver associates plans and actions with results to develop procedures to accomplish positive results and avoid negative results (Argyris & Schon,1978). The plan-do-study-act (PDSA) cycle, an easily understood and widely used model from quality management (Juran, 1988), can be used to represent the learning process in a project environment.

In the "plan" step, the project team determines the nature of the problem and constructs a plan. The plan is a set of expectations about the set of steps to be taken and the expected results.

In the "do" step, the project team implements the plan. Implementation produces a set of results about the expected and unexpected actions taken and associated performance such as cost, schedule, or technical performance. These results are used to understand project status and to move the project forward.

In the "study" step, the project team reflects on the associated plans and results to determine the good and bad instances. The output of the "study" step is a lesson learned.

The "act" step is the closing of the loop to show the decision to continue with or abandon the process of improvement.

Figure 4 The PDSA View to Learning and Project Management

Project Plan Development

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                    ┌──────────┐
                    │   Plan   │
                    └──────────┘

  ┌──────────┐                    ┌──────────┐
  │   Act    │      Project       │    Do    │
  └──────────┘                    └──────────┘

"Close the Loop"                      Project Plan Execution,
   Updates and        ┌──────────┐        Performance
Corrective Actions    │  Study   │     Measurement and
                      └──────────┘         Reporting
```

Project Control
(Scope, Time, Cost, Quantity, Risk)
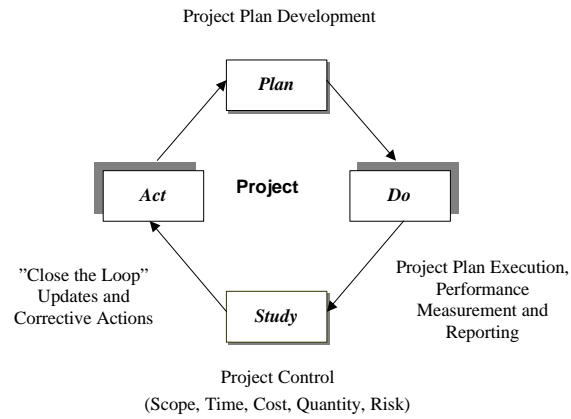
Source: Konour, 1999

Throughout the learning process, support is increased for practices that meet expectations and decreased for less effective practices for a given activity.

The steps of the plan-study-do-act (PDSA) cycle, parallel the project management process steps of the project management body of knowledge, are "planning" is the same, "do" is "executing," and "studying" is "control." The "act" step is the use of the lessons learned on the next project during the planning phases. The use of "study" over "control" emphasizes the learning and improvement nature of the framework. The relationship between the PDSA cycle and the project management process is shown in Figure 4.

3.5.2 **Lessons learned**

A lesson learned is a "catchall phrase describing what has been learned from experience" (Juran, 1988) and is a tool for learning. This definition is in fact very simple, but lacks an appropriate level of detail in order to be useful for this work. Therefore a more detailed definition developed by Dixon and Ungerleider, two researchers at the Ernst & Young Center for Business Innovation, will be used instead. They define lessons learned as

"... Knowledge that has been constructed out of the lived experience of organizational teams and individuals that has been captured in a manner that allows the understanding to be communicated to others" (Dixon and Ungerleider, 1998)

A lesson learned overcomes the barriers of organizational learning and knowledge sharing (Purser, Pasmore, & Tenkasi, 1992) by playing two roles.

First, the process of developing a lesson learned, provides an opportunity for the project team to take reflective time to gain a full understanding of project results. The process of building lessons learned via the PDSA cycle represents the process of identifying actions as bad or good and procedures for overcoming or achieving the actions. The lesson learned should describe the actions to take or avoid on similar projects.

Second, a lesson learned is a mechanism to document the learning to share with others. For example, lessons learned support the planning function in the PDSA cycle by providing information and knowledge gained from one PDSA cycle to another either within the current project or another project.

There are three kinds of lessons learned.

♦ Procedural knowledge

One kind of knowledge that can be learned is a project. Procedures are processes, work instructions, guidelines or tools (Lewis,1998). The knowledge produced is accordingly referred to as procedural knowledge. The experiences

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that are made during a project are all made at a certain point in time while performing a task, using a method, and performing a step of a process. Therefore it should be possible during reflection to track the experience back to the procedure that was used while the experience was made (Lewis,1998).

♦ Technical knowledge

There are lessons that are insights about technologies. When developing high-tech products or parts for those products, systemic knowledge is improved. This means knowledge about how functions and components work together in a system (Bartezzaghi, Corso & Verganto, 1997).

♦ Soft skills

Some lessons are neither possible to include in procedures nor are they insights about products and technologies. They address the so-called soft skills. Lessons about soft skills are sub-divided in lessons about team issues, communication, motivation, leadership, organization and coordination and customers.

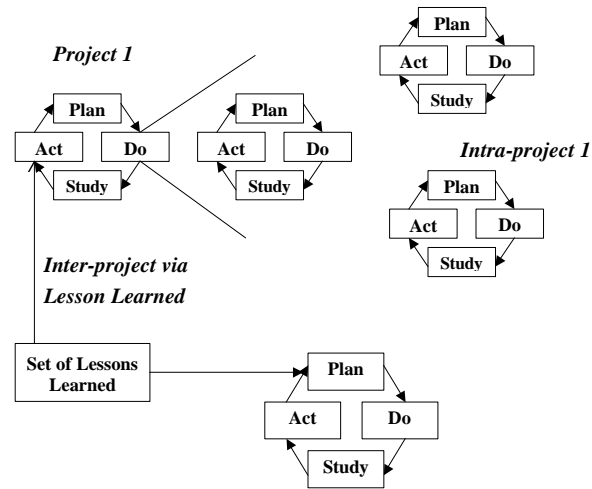### 3.5.3 Intra-project learning and inter-project learning process

Using the PDSA view of a project, learning in a project occurs in two cycles: inter-project and intra-project (Konour, 1999).

♦ *Inter-project Learning Cycle*

The goal of inter-project learning is to deliver a series of successful projects by continuously building an organization's capability to execute the project management, product, and learning processes. Inter-project knowledge learning is the combining and sharing of lessons learned across projects to develop new knowledge. Tools to support inter-project learning include information technology tools and employee groups aimed at sharing knowledge across the organization (Smith, 1994; Shane & Schumacher, 1996). Shane and Schumacher, (1996) provides a detailed example of an

online system for recognizing, documenting, validating, and making available lessons learned for an organization. Van Aken, Monetta, and Sink (1994) describe the use of affinity groups or peer groups to share what they have learned internal and external to the organization.

Figure 5 The Intra-project and Inter-project Learning cycles for Project Management

Source: Konour 1999

♦ *Intra-project Learning Cycle*

Intra-project learning focuses on tasks within a single project and supports the delivery of a successful project by identifying problems and solving them during the project life cycle. Learning takes place when project team members discuss approaches for completing a task or overcoming problems. Project management control tools support intra-project learning by facilitating the plan-versus-actual comparison to determine project status and define corrective actions (Thamhain, 1996). The intra-project learning cycle occurs throughout a project and can be delineated by phase of the project, routine reporting cycle such as weekly or monthly status and review meetings, project deliverables, or major occurrences in the project.

As shown in Figure 5, the intra-learning cycle supports the inter-project learning cycle by providing a routine, ongoing store of data, information, and knowledge that is integrated for inter-project lessons learned. The intra-project learning produces a "living" lessons learned journal for inter-project learning.

3.5.4 Knowledge transfer process

There are certain transfer processes that take place in inter-project learning. These steps are: identification, generalization, storage, distribution and usage.

• Identification

The identification of experiences or lessons learned is done during a review of the project. A structured way of identifying experiences or lessons learned for the purpose of inter-project learning is the analysis of variance between expectations and results. This might be either variances between personal expectations and the results or the variances between project goals and the outcome (Lewis, 1998).

• Generalization

In order to give experiences or lessons learned, a generalization and abstraction of the findings needs to be done. The specific causes that lead to experiences, which are linked to the specific context, have to be separated from general causes, which are rooted in more stable abstract patterns. Criteria have to be established that allow exploiting this knowledge in different contexts. The abstraction and generalization of the feedback from the project can be used to improve the company's meta-models (Bartezzaghi, Corso & Verganti, 1997).

• Storage

Storage of the lessons learned is the next step in the transfer process. The general lessons that have been learned in a project have to be institutionalized, and suggestions have to be implemented. This is especially necessary, as there can be a very long time span between finding a lesson learned and applying this lesson in a future project. The documentation of the lesson in a report is a necessary first step in this process (Bartezzaghi, Corso & Verganti, 1997).

• Distribution

When one part of the organization has learned from a situation, it is critical to share, diffuse, and distribute the knowledge in the organization, so that it can be applied to a new context and also by other people. This means that the changes that have been made to the meta-models have to be communicated and spread throughout the organization (Bartezzaghi, Corso & Verganti, 1997).

• Usage

Knowledge is used when the lessons learned are applied in a new project. The meta-models are concerted to specific models when applying them to a specific context. The critical factor here is to recognize the similarity of the new situation to the generalized experience and the usability of this experience in the new situation. One has to make sure that all relevant experiences that

have been made in the company are used in the new project (Bartezzaghi, Corso & Verganti, 1997).

3.6 Organizational learning mechanisms

Many theorists argue that the organizational learning process needs to be ensured by certain organizational learning mechanisms and they have presented numerous facilitators and enablers to effective organizational learning (Argyris & Schon, 1978; Schein, 1996; Popper & Lipshitz,1998; Lei, Slocum and Pitts, 1999).

Basically, we can classify these mechanisms into two major facets: structural and cultural. The structural facet focuses on organizational learning mechanisms, which are institutionalized structural and procedural arrangements allowing organizations to systematically collect, analyze, store, disseminate, and use information that is relevant to the performance of the organization (Popper & Lipshitz,1998). The cultural facet focuses on the shared values, without which these mechanisms are likely to be enacted as rituals rather than as means to detect and correct error (Argyris & Schon, 1978).

3.6.1 Structural aspect of organizational learning

3.6.1.1 Reflection and review mechanisms

According to Popper & Lipshitz's (1998) theory, ideal structural aspects of learning mechanism are concrete organizational arrangements that (a) enable individual members to collect and analyze information on their own performances (i.e., to go through Kolb's [1984] experiential learning cycle, in a systematic fashion); (b) enable organizational members to learn from each other's experiences and expertise; (c) enable the organization to disseminate knowledge gained in one part to other parts where it is relevant and to change

its doctrine on the basis of this knowledge (i.e., to go through the dissemination and correction phase of double-loop learning model).

3.6.1.2 Other structural variables that influence knowledge transformation and learning

As we can see from the above section, the reflection and review mechanisms are important tools for knowledge transformation. In line with these mechanisms there must exist a certain organizational structure that is sufficiently permeable to allow projects' knowledge and learning to flow throughout the organization, regardless of where it emanated (Lei, Slocum and Pitts, 1999).

In their view, there are several variables in the structural aspect that really facilitate the effectiveness of knowledge transfer:

♦ *Cross-functional teams*

Firms can reconfigure their internal product development and functional coordination processes to encourage managers and technical specialists from various units to contribute their distinctive insights, talent, and experience. In order to facilitate cross-functional learning, individuals are chosen to coordinate activities across divisions or functions outside their formal responsibility.

♦ *Reward systems*

While division or function-specific reward systems may encourage risk-taking innovation within a unit, they can also create a "tunnel vision" syndrome in which managers are less inclined to transfer their learning, knowledge, and insights to other units that could utilize their skills as well.

One way to provide such an incentive is to base divisional and even functional manager rewards, in part, on overall company performance. The amount received by each individual will then vary with overall corporate priorities and results, but divisional and functional managers will have an incentive to cooperate with other units in order to better support corporate objectives.

♦ *Management development*

The groundwork for creative and retained learning is facilitated when managers have strong personal relationships with individuals in other divisions and functions. Such relationships can be fostered by transferring managers periodically across divisional or functional lines for sustained periods at a time

3.6.2 Cultural aspect of organizational learning

Effective organizational learning is contingent on establishing a culture that promotes inquiry, openness, and trust (Argyris & Schon, 1978; McGill, Slocum, & Lei, 1993). Thus, organizational learning has two facets – a tangible "hardware" facet that consists of learning mechanisms and an intangible "software" facet that consists of shared values and beliefs that ensure that the mechanisms produce actual learning (i.e., new insights and behaviors) and not mere rituals of learning.

Schein (1993) defines organizational culture as a normative system of shared values and beliefs that shape how organization members feel, think, and behave. Values are not observable entities. Rather, their existence is inferred from the rhetoric that culture members use to describe what is appropriate, important, and worthy of sacrifice (espoused values) and from what members actually do that requires sacrifice or some lesser investment of resources and effort (values in use). According to Popper & Lipshitz (1998), productive organizational learning requires a learning culture that includes five

hierarchically arranged values: continuous learning, valid information, transparency, issue orientation, and accountability.

♦ *Continuous learning*

Located at the apex of the hierarchy, continuous learning is valued in learning organizations because it is vital for surviving-let alone prospering-in dynamic and competitive environments (De Geus, 1988; Garvin, 1993; Schein, 1993; Senge, 1990).

♦ *Valid information.*

Argyris and Schon (1978) include valid information as one of the governing variables (values) that inform double-loop learning. Argyris and Schon suggest that organization members are pressured to withhold, distort, or fabricate information to defend themselves and/or others. Individuals who hold valid information as a value are more likely to incur personal losses in order to withstand such pressures.

♦ *Transparency*

Transparency is the willingness to hold oneself (and one's actions) open to inspection in order to receive valid feedback. Holding transparency as a value that guides one's actions serves valid information by decreasing the likelihood of self-deception and by countering pressures to distort or suppress threatening information. The concept of "information environment" (Huber, 1991) clarifies the relationship among transparency, valid information, and organizational learning. It is defined as

the set of symbols, data, and other indicators of the environment that is subject to being sensed by the organization... Information environment can be thought

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of as having characteristics such as completeness, unbiasness, and clarity, that may be important predictors of organizational learning. (Huber, 1991, p. 99)

♦ *Issue orientation*

This is manifested when opinions and assertions are judged according to their merits, divorced from the identity and status of the person pronouncing them. Issue orientation is related to (but is more focused than) democratization, power equalization, and participation. Similar to these values, it opens communication channels, thereby enhancing innovation and learning (Kanter, 1988; McGill et al., 1993).

♦ *Accountability*

Accountability is holding oneself responsible for one's actions and their consequences and for learning from these consequences. Accountability facilitates overcoming obstacles to effective learning in the form of action barriers that prevent the implementation of lessons learned (March & Olsen, 1976; Shaw & Perkins, 1991).

4 Result – Project learning in SCA Hygiene Products AB

4.1 SCA Hygiene Products AB

This thesis was conducted in cooperation with SCA Hygiene Products AB. The company is briefly presented in order to provide the right context for my findings.

SCA is an integrated paper company that produces absorbent hygiene products, corrugated packaging and graphic papers. Based on customer needs, value-added products are developed for private consumers, institutions, industry, and trade. Major business areas include hygiene products, packaging and graphic papers. The Hygiene Products business area is one of Europe's leading manufacturers of tissue and fluff products for personal hygiene and other applications. The tissue products include kitchen towels and toilet paper, handkerchiefs, and napkins. The range also includes tissues for personal hygiene and for wiping and cleaning applications in industry, commercial companies, hotels, restaurants and institutions – known as the Away From Home (AFH) market. The fluff products comprise incontinence products, feminine hygiene products and baby diapers.

SCA Hygiene Products continuously launches new products as a means of strengthening its competitiveness. Most of the projects' goal is to deliver new products. However, the inevitable barrage of changes has pushed company to initiate dozens of change efforts to enhance organizational performance via projects. These projects normally change the organizational structure, improve the way of working and introduce new IT systems, etc. For example, the recent project of Nordic Business Service Center is an initiative of regionalization of financial service with the installment of SAP system.

4.2 PRIME – Project management at SCA

PRIME is the basic concept for managing projects within SCA Hygiene Products. The model does not describe a specific type of project. Instead it is a generic reference applicable for all project types.

Figure 6 The scope of PRIME
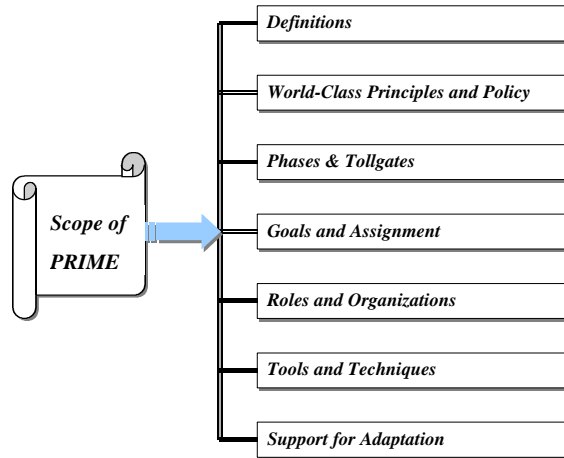
Source: SCA Hygiene Products AB

♦ **Roles & Organization**

The basic project organization principles are that

-- all key resources/competencies are brought together by one Project Manager, running the project with a total task perspective on cost, time and budget with focus on the final end result.

As far as possible the project team should be empowered within the project scope. The project work should be based on team-based working methods.

Characteristics:

1. top-down by vision, empowerment and assistance

2. bottom-up ideas and initiatives from the team members

Figure 7 Project roles
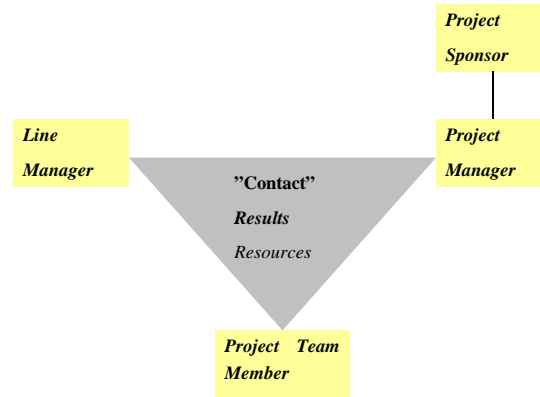
Source: SCA Hygiene Products AB

The responsibilities are:

Management Team: A defined group of people responsible for an organization supplying a product or a service to a customer, internal or external.

Project Sponsor: Has the overall business responsibility for the project. The sponsor has the responsibility for the direction of the project and the authority to drive the required decisions and approval at the tollgates.

Project Manager: Has the responsibility for the project outcome with regard to agreed upon goals. The Project Manager has the authority to manage the project towards the goal as agreed upon in the project plan.

The project manager is responsible for the execution of the project. He has to make sure that the project goals and requirements are fulfilled.

Line Manager: Has the responsibility for supplying a defined outcome, result and the competent resources as agreed upon with the Project Manager.

Steering Group (Optional): A group which is assigned by and supports the Project Sponsor in decision making.

♦ **Phases and Tollgates**

Tollgate is a key definition within PRIME. A tollgate is a defined point at which formal decisions are made by the Project Sponsor about continuation of the project. Examples: choice of alternatives, modification of project goal, termination of project. In principle there are only three possible decisions at a tollgate: "Go", "ReDo", "Stop".

The basic concept behind the different tollgates are:

TC1 Decision to start project preparation: the task is describe in such a way that appropriate planning can be done. The decision is to prepare a project plan.

TC2 Decision to start project execution: the decision is to carry out the project and allocate resources and competence as stated in the project plan.

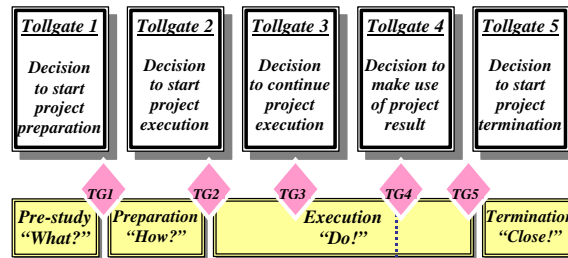**Figure 8 Tollgate decision-making criteria**
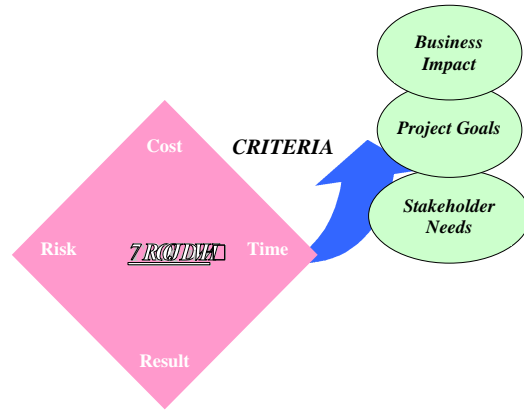
Source: SCA Hygiene Products AB

TC3 Decision to continue project execution: this tollgate is an intermediate tollgate that can be linked to specific results in the project plan. Often this tollgate is linked to the decision to test in an operative environment.

TC4 Decision to make use of project result: together with TC2 this tollgate is the most critical tollgate. The decision is made about "making use" of the project result. After this decision the project work does not "only" affect the project resources but also the daily work of the normal line organization.

TC5 Decision to start project termination: at this point the decision is to terminate the project, i.e. the project should have fulfilled the project plan.

Figure 9 Phases and tollgates

Tollgate 1	Tollgate 2	Tollgate 3	Tollgate 4	Tollgate 5
Decision to start project preparation	Decision to start project execution	Decision to continue project execution	Decision to make use of project result	Decision to start project termination

TG1 TG2 TG3 TG4 TG5

| Pre-study "What?" | Preparation "How?" | Execution "Do!" | | Termination "Close!" |

Source: SCA Hygiene Products AB

4.3 Learning efforts

4.3.1 Project managers' individual learning

♦ Learning consciousness

In answering the aim of project management, project managers focused on:

1. Successfully delivering the new products and services as required by the project goals;

Organize the project team to work smoothly and effectively

(70% of the interviewees have these two goals in mind)

2. Successfully delivering the new products and services as required by the project goals;

Organize the project team to work smoothly and effectively;

To develop myself to be a good leader and to be accepted by the people around me

(10% of the interviewees view these three goals are important)

3. Successfully delivering the new products and services as required by the project goals;

Never have personal goals

(20% of the interviewees express these goals.)

In response to the question: "Do you have some learning goals in mind? "

Typical answers are: "*in the very beginning, I am fully aware that learning from projects should be integrated into the project management process, but honestly saying, I fail to manage to do so because I am always kept into details and obsessed with dealing with any particular events which may come up. So the learning activity becomes subconscious and the ambition of learning fades away*".

♦ *Learning and sharing*

When asked "what is the most valuable lessons learned as a project leader", all the managers interviewed chose "soft skills" which concern team issues, communication, motivation, leadership and coordination, etc. They agreed that most of the time there are certain issues other than product development that will create friction and energy loss inside the project, between projects and the line organization, because projects usually cut across organizations and use resources from different parts of the organization.

 "*Sometimes people fail to share business visions and goals, for example, marketing people are interested in products that will be successful in the short-term, while R&D personnel are interested in more radical breakthrough projects.*"

"*...interpersonal relationships in the team is problematic due to lack of communication among team members and cultural differences, etc.*"

"When the new IT system and the new way of doing certain jobs are introduced people feel threatened. Resistance and rumors arises. At this point I (project manager) have to help people make sense out of this change."

All the interviewed managers told me that *"much time and attention is spent on dealing with these issues"* from which they learned most. However, in response to the question: "what do you do with what you have learned", the answers are as follows:

"Only keep it to myself and use it in my future project if there is something similar happens" – *60%*

"Most of the time keep it to myself and sometimes talk to people (other project managers)"—30%

"Use it in my future project and try to share it within my project and other projects "—10%

Though the interviews with the managers show that there is no sustained periodical transferring across divisional and functional lines, the managers have wide personal networks with individuals in other divisions and functions.

Within the company there are seminars and training sessions three times a year, aiming to educate project managers and improve their skills of dealing with behaviors, such as project members trying to protect their own line organizations. The interviewed managers express their appreciation of these supportive seminars and sessions in which they can openly discuss their leadership profile and share opinions with others.

4.3.2 Intra-project learning

♦ PRIME and PDSA cycle

The interviews indicate that the project managers try to follow a plan-do-study-act cycle which is corresponding to the common language of PRIME. Also the managers agree that without the PRIME model, which provides the

basic guideline for the project management, the project learning will lose supportive foundation.

"We follow the PRIME steps. After planning, that is, after we know what we are going to do and how, we take action. Between phases we have tollgates in which we compare what we have done with what really happens (result of each phases). According to the data and information we ask and answer questions like:

What project tasks met expectations? Why?

What project tasks failed to meet expectations? Why?

How can we improve each of our processes to ensure that we get tasks that meet performance expectations and avoid tasks that do not meet expectations?

Then we keep on doing that which goes well and stop doing the wrong things and try to change (either change the inappropriate plans or change the way we do it)."

♦ Reactive and Proactive mentality

When it comes to soft issues, there are two different ways of solving them.

90% of the interviewed managers claim that it is often project managers that try to recognize these disruptive behaviors, which are not directly related to the product development process and take the initiative to openly discuss with the team members in question or discuss collectively in the teams. The discussion normally concerns:

"Why could this situation occur?"

"What will be the consequences if the situation is not improved or changed?"

"What can we do to improve?"

After such reflections, the teams "*figure out the right way*" and accordingly, take corrective actions and use the experience as a "foresee tool" to safeguard the development of the project. .

I call this "reactive mentality", which means that the unexpected or unplanned events or behaviors are only solved after they have taken shape.

Another different mentality is the "proactive mentality". 10% of the managers confirm that their projects normally start with sharing the goals – "what are we going to achieve?" After that, certain "risk areas" are brainstormed in which soft areas like organization, sponsor group, secrecy and sabotage, etc may be taken into account depending on what the projects are about. The next step is to analyze and determine the possibility of occurrence and consequences according to which action plans are fixed, and certain people responsible to "*keep en eye on the risk areas*" are chosen. The major purpose is to foresee any risk and try to "*direct it into right track before it happens*". In order to minimize and eliminate these risks, projects have to be planned continuously, which provides a baseline to compare actual results with to review past plans and lessons learned, and to apply to the current project.

♦ Reflection arrangements and documentation.

Through the interviews I found that the common reflection arrangement within a project is the regular meetings and tollgate meetings. But the output of these reflection meetings is memos and minutes that are concerned with the problem areas, the specific decisions made and the status of the project, etc. No real learning in the form of lessons learned (especially on the soft issues) is summarized and written down along the project development.

The only structured documentation of learning is the final report which describes the whole process of and the result of the project, meaning that the procedural knowledge is primarily emphasized.

Normally the new technical information of product development can easily be accessed and shared because the knowledge and experience are reflected by specific R & D staffs and formulated into technical lessons learned and put into the intranet under the structured categories of technical knowledge.

In contrast, the reflection of the lessons learned in soft issues is, as several managers claim, "in a state of ad hoc". One can hardly find documentation which focuses on "soft issues".

"That does not necessarily mean that we do not reflect on soft issues. We do reflect. But we seldom write down the experience in this aspect. We are not used to doing that."

There exists in the company an important comprehensive reflection tool called "Project Assessment Tool" in which both soft and hard issues are assessed (See Appendix III). The assessment tool, which is a standard control tool, is recommended (but not forced) to be used by each project at any tollgate. Normally projects conduct the assessment at the end of the project.

However, some project managers just ignore this assessment process, which takes away the only chance for projects to comprehensively reflect on lessons learned. Mangers admit:

"Sometimes the assessment tool should be done in the middle of the project, but few projects do it."

"We (the company) are very technically based concerning evaluation: managers are expected to have something tangible ready at a certain time, and no body will judge you by seeing how the team works. If you do not like he project assessment tools, then simply forget it. "

"No body will reward you because you are serious about the soft issues and try to learn from them. It's up to yourself."

"To be honest, the follow-up stage of the project is our weak point."

"Though in the final stage of the project, some reflections are too late, I think better late than nothing. However, some managers simply do not do it. "

4.3.3 Inter-project learning

As stated before, the intra-project learning produces a "living" lessons learned journal for inter-project learning. That is to say, inter-project learning is primarily based on the learned experiences of a single project.

The information given by the interviewees shows that only 30% of the interviewed project managers said they had reflections on the following questions in the intra-project meeting:

"What can other projects learn from our lessons learned?"

In addition there is a common opinion among the interviewed project managers*: "Today we (the organization) have a tendency to only exhibit success stories, look at the intranet, final reports and other documents, you can not miss success stories. That's good and bad. Good because they encourage people to improve. Bad because they do not show people how to turn from failure to success."*

According to the interview result, those projects that reflect on lessons learned for other projects seldom generalize the lessons learned – explaining when, how and to what extent the lessons learned can be used in different contexts.

As six project manager express, "*people may find it hard to understand certain experiences because people may be in a different situation and accordingly difficult to use them."*

Another important information given by the interviewees shows that lessons learned concerning technical and project procedural issues are easily accessed through documentation, personal contact and some other ways.

For example, there is a special database in the intranet called "repool" which is established and updated by R&D people with documented and classified technical knowledge. If one wants to find out some information about a specific technology, one can simply go into the intranet and check "repool".

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However there is no well-defined approach to facilitate inter-project learning on "soft issues".

There is a common voice among the interviewed managers – *"compared with 3 years ago, situations are changing"*. For example, in the consumer division, some informal meetings began among the project leaders. They also invited other divisions to participate in such meetings. The participation was voluntarily, which is very important, as the desired experience exchange can only happen voluntarily. Also in the Incontinence Division, 7 project managers have biweekly meetings to *"update each other on the status of project and also bring up problem areas"*. As they claim, *"we try to share actual learning from the project process rather than different parts of it"*. *"We do not have structured reporting systems we can use to formulate our learning in order to share it. But we are on the way of improvement."*

5 Analysis – Learning enough from projects?

SCA Hygiene Products AB is a knowledge-based organization. The introduction of new products and technology are normally initiated by projects. So sharing knowledge and experience between individuals and projects is very important. That means that learning activities have to be an integrated part of project management.

As the interviews with ten project managers (with ten years of project work experiences in average) show, at SCA Hygiene Products AB, people have been aware of the need to learn from projects. According to the PRIME model, collecting experiences from the project is part of the tollgate requirements of the project management process. But there was never a really structured approach with clear and easy-to-follow descriptions to achieve this learning goal. It was always up to the project managers to figure out how to learn from their projects. Accordingly, their efforts to derive lessons learned leave plenty of room for improvement.

In the following section I try to use the relevant theories in the areas of knowledge transformation and organizational learning to figure out some problem areas in project learning and organizational learning in the company based on the interview result. Then I will analyze the possible reasons for the current status. Finally some improvement areas are suggested.

5.1 Problem areas

♦ Learning awareness

Looking at the interview result (shown in 4.3.1), I may say that most of the project managers viewed producing lessons learned, as a valuable and important exercise. However, they felt that they did not have time to complete a formal lesson-learned process, thus viewing learning as a separate activity.

Naturally, they focus very much on delivering the product within all specifications. They are very task-oriented partly due to "*the pressure of time and cost*", which gives learning a lower priority in their work.

This is a problem area since as the learning framework indicates, the opportunity for learning is an inherent part of the project management process. That is to say, the project management process should parallel the learning process. The steps in the process provide the foundation for learning. Every step in the project management process, if viewed from the learning perspective, can serve as the basis for producing and sharing knowledge for the project team. So the major concern is how to make the learning as an inseparable and conscious activity by firstly changing the traditional criteria for project managers' contribution to a project.

♦ Incomplete intra-project learning

As I explained the PDSA learning cycle during the interviews, the project manages said their projects tried to and could follow this cycle. Generally they think that this cycle is line with the PRIME models according to which they plan, execute the projects and learn from them.

Based on their description (shown in 4.3.2), the learning can be classified as double-loop learning because they think about "*why*" things are done in the first place. As Argyris (1978) argues, this kind of learning can produce a new understanding of our work, the know-why aspect, which gives the possibility to articulate a conceptual understanding of an experience.

So, the articulation of the knowledge is based on the reflection on the "why" aspect. However, the formulation of the experience and knowledge may be inhibited by several tricky points, if one keeps in mind the connection between the learning and knowledge transformation. As Kolb (1984) claims, new learning is created through the transformation of experiences, but the learning is not leveraged before the understanding of the experience and task is established.

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Tricky point 1: "How can I know what I think till I see what I say"

"How can I know what I think till I see what I say" is a sentence which creates a thoughtful perspective on what Weick (1995) calls sense-making. As Weick puts it, through reflection individuals open up the possibility to render the tacit subjectivity in to something more tangible, sense-making is to consider reality as an ongoing accomplishment, that takes form when people make retrospective sense of situations in which they find themselves and their creation.

According to the result, 60% of the managers deals with their learned experiences by "only keeping it to myself and use it in my future project if there is something similar happens" while only 10% of the managers "Use it in my future project and try to share it within my project and other projects".

Based on this result and referring back to the knowledge transformation model in the previous section, I find that the managers are inclined to maintain the soft aspects of lessons learned as "individual tacit knowledge".

Even though there is an informal "mouth-to-mouth" pattern of sharing such experiences, the knowledge transformation within the whole organization is exposed at risk, because the externalization of the knowledge is missing. As one manager worries, "*if people leave the company, we may lose their experiences*".

So the major concern here is the transformation of these experiences from individual tacit knowledge to collective explicit knowledge. Some interviewees point out that one way to transfer such experiences is to "*write down the experiences*".

Some others argue that "*it's difficult for people to read hundreds of pages of documents with regards to these issues, so we have to find out some compromising solutions*".

"Actually we (project managers) have read some books and journals about team-building, leadership and project organizational behaviors more or less. It would be valuable for managers learning if there is a data base in the company where people (each project) can summarize their key learning related to the soft issues within 3-4 pages ".

Tricky point 2: Timing of reflection

As Nokaka/Takeuchi Model visualizes, individuals transform the explicit knowledge back into tacit knowledge while they use it. As previously mentioned, tacit knowledge is much easier to use than explicit knowledge, which makes this transformation worth the effort. This process is called internalization. Here, the practicing of explicit concepts takes place and the explicit concepts are thereby, conversed into tacit knowledge.

This is one manager's concern, *"If we constantly reflect on what we have learned and make it explicit during the project, people know what to look for and will use the knowledge to solve the oncoming problem and thus reinforce the experience learned. That's learning-by-doing. But if we only reflect learning at the end of project, that's less meaningful because the project is over and all the lessons learned are only useful for future projects."*

If we see the above comment from the knowledge transformation and learning perspective, the timing of reflection might be a problem because it may influence the internalization of knowledge. As shown in Appendix III, there exists a comprehensive reflection tool called "Project Assessment Tool". Though the assessment is recommended to be used at any stage of a project, 100% of the interviewed managers told me that they conduct the assessment only at the end of the projects. I do not mean that the timing of using the assessment tool is the only factor that hindered the internalization of the knowledge. If I did say so, it would be too black and white. Besides, there are no quantitative criteria that can tell the difference between the effects of

different timing of the reflection and assessment. That is one reason why I call the timing a tricky issue.

In addition, as the PDSA cycle implies, the use of lessons learned can be conducted throughout a project life cycle, not just at the end of the project. Using the intra-project learning cycle, lessons learned can be produced for each cycle in a project to carry on learning to the next cycle and to the next project. An obvious problem with producing lessons learned at the end of the project is that our biases influence what we create as a lesson learned. For example, we could create a lesson learned about the most recent event or the event that caused the most trouble. However, earlier events could have been the necessary steps for success or many positive events may have occurred that other projects should follow.

Viewing these two tricky points from the perspective of the endless spiral of knowledge transformation in the Nokaka/Takeuchi Model, I pinpoint the influence of these tricky points on the learning process. Namely, the externalization and internalization of knowledge are put at stake if these two tricky points really "play tricks". However the other aspects of the knowledge transformation process, namely socialization and combination, are not isolated from the externalization and internalization. The failures or problems in each one of the four processes will definitely jeopardize the ongoing transformation process during which organizational learning takes place.

Tricky point 3: Continuous and complete learning or not?

The different mentalities of dealing with "soft issues" which was presented in 4.3.2 , as I see it, are not only different ways of handling soft issues. They also reflect different intra-project learning processes. Compared with reactive mentality, proactive mentality provides more learning opportunities in the sense that instead of producing just one complete PDSA cycle, it generates

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continuous cycles within a project, which is in line with the ideal processes illustrated in Figure 5.

In addition, the proactive mentality puts the "soft issue" at a higher priority when it comes to project planning, which means that soft dimensions of lessons learned, are considered at the very beginning of the project. This provides a better possibility to produce lessons learned in soft issues.

However the tricky point is the extent to which the proactive way of learning has been conducted among the projects. As the result shows, only 10% of the interviewed project managers use this method. That means the majority of the project managers need to change their mentality towards a continuous and complete project learning, which takes time.

♦ Incomplete inter-project learning

The inter-project knowledge learning is the combining and sharing of lessons learned across projects to develop new knowledge. Looking back to the relationship between intra-project learning and inter-project learning in Figure 5, we see that the intra-learning cycle supports the inter-project learning cycle by providing a routine, ongoing store of data, information, and knowledge that are integrated for inter-project lessons to be learned.

So in my opinion, the quality of inter-project learning is, to a great extent, influenced by that of intra-project learning. After collecting and reflecting on the information and comments from the interviews, I also found some tricky points that might turn out to be obstacles to effective intra-project learning, which will in turn, directly or indirectly, impair inter-project learning.

Tricky point 1: "What can other projects learn from our lessons learned? "
The information given by the interviewees shows that only 30% of the

interviewed project managers said they have reflections on the following questions in the intra-project meeting:

"What can other projects learn from our lessons learned?"

The problem here is that inter-project learning can fail by not identifying lessons learned among projects.

What is more serious is those projects that reflect on lessons learned for other projects seldom generalize the lessons learned, so *"people may find it hard to understand certain experiences because people may be in a different situation and accordingly difficult to use them"*

If one bears in mind the five knowledge transfer steps, namely identification, generalization, storage, distribution and usage, and compares the theory with what the projects really do, one may find that the lessons learned in one project need to be generalized and abstracted by separating the specific context from general patterns.

So, the failure of giving lessons learned a general value for the organization can easily hinder the complete knowledge transfer process and the learning.

However, I think generalization is still a tricky question. If one sees produced lessons learned from three dimensions: procedural knowledge, technical knowledge and soft sills, the easy parts for generalization of knowledge are procedural knowledge and technical knowledge because they are more tangible and easier to trace the cause-effect relationship from, before one generalizes the knowledge. On the contrary, the soft skills are more personal and intangible and one can hardly generalize the relevant knowledge since the cause-effect relationship is difficult to judge.

Tricky point 2: Impaired lessons learned

By "impaired lessons learned" I mean less attention is given on lessons learned in "soft" dimension.

As a reminder, 80% of the interviewed managers said that most of the time it was the soft issues that cause the majority of problems. 100% of them claim that it is the soft skills that they learn most from the project.

As a contrast, one can scarcely get access to the lessons learned in soft issues. Even in final reports, it is up to individual project managers to decide whether the project should summarize and document these issues.

It is a company climate that people tend to ignore the soft issue as something that should be identified and shared among projects. The transfer process of this part of knowledge is not structured, which in turn puts this part of learning and sharing knowledge at a high stake.

5.2 Possible facilitators and inhibitors

Comparing the theories described in Section 3.6 with the interview results, I tried to figure out some factors that both enable and inhibit effective organizational learning.

5.2.1 Enablers

♦ Structural aspect

1. PRIME model

It is evident that the project management tools, provided by PRIME, are not only to help the project to be executed as planned but also to support learning by providing a mechanism for planning, communicating expectations, and recognizing the deviations or successes of a project.

In the planning stage, PRIME provides the original baseline from which actual results are compared. It also facilitates learning-by-doing by providing the explicit definition of the goals and expectations or understanding of the project.

In the study stage, the management control tools provide the data and information for comparison to the planning data/information from which the determination of good and bad instances can be made.

2. Cross-functional teams

As mentioned before, in SCA Hygiene Products, a majority of the projects are cross-functional. This can be seen as a great advantage for cross-functional learning knowledge transformation among projects since people from various units contribute their talent and experience to a specific project and, in the meantime, they gain knowledge from the projects they participate in. When they come back to their line organizations they will contribute to the learning in the line organizations. Next time, when the same specialists are chosen to accomplish another project, they may bring their experience to that project. So, in this endless process with the specialists coming back and forth, the knowledge transformation and project learning keep going extensively and endlessly.

♦ Cultural aspect

1. Transparency

When asked about the transparency issue, most of the interviewed managers thought that they were willing to receive valid feedback. Concerning the legitimization of making mistakes, a common opinion is:

"*We are all in the same boat; everybody makes mistakes"*

The importance of transparency becomes immediately apparent once we realize that an information environment is mostly produced by people rather than being given by nature.

I think that at SCA Hygiene, transparency is encouraged by allowing people to make inevitable mistakes, that is *"it is acceptable that you make mistakes, as long as you try your best"*, and thus creating an information environment

favorable to learning-by-doing. At least this environment provides a psychological safety for learning and innovation.

2. Valid information

As the interview result shows, in SCA Hygiene, it is not a common behavior for the project members to withhold or fabricate information. I think this can be viewed as an enabler to double-loop learning.

5.2.2 Barriers

♦ Structural aspect

1. Reflection and review mechanisms

If we refer to the ideal structural aspects of learning mechanism described in 3.6.1 and compare them with the actual structural arrangements in the company, we may find that the structural arrangement is not supportive enough for producing and transforming complete lessons learned. Consequently the project learning is largely jeopardized.

2. Reward systems

As the interviewed managers said, project managers are expected to deal with "hard" things such as money, data, production and structure. "Soft" things such as people and relationships or learning are often only said to be important, but nothing is done about them.

Most interviewed managers agree that employing quantitative criteria to evaluate managers is generally insufficient to promote learning and risk-taking behaviors.

3. Management development

As the interview result indicates, though there is no systematic rotation for project managers across functions and divisions, the project managers interviewed claimed that they had a wide connection and close personal

relationships with individuals in other divisions and functions. There seems to be no problem in this respect. But I think it as a potential barrier because this ad-hoc network building can prohibit a wide range of knowledge transformation, which is a necessity for the effectiveness of organizational learning.

So it will be rewarding for the company to transfer managers periodically across divisional or functional lines.

♦ Cultural barriers to learning

When I asked the interviewed managers about the major hindrance for them to share their experience in dealing with soft issues with others, they said:

"sometimes the problem is connected with a particular member in the team, I can not spread the incident, sometimes I am reluctant to share the experience because I myself make mistakes. Another tricky point is sometimes I do not see certain incidents as big things but to other people, these events are worth noticing and sharing experiences."

The above quotation tells us that there is a lack of openness and trust in the corporate culture. Cultural barriers might be:

1. Issue orientation

70% of the interviewees pointed out that opinions and assertions are always judged partly according to their merits and partly based on the identity and status of the person saying them.

I think it is a barrier because the decision-making process will be infected as long as power and politics are involved in the projects. Democratization and free communication will be reduced.

2. Accountability

Half of the interviewed managers claimed that there was a relatively low sense of mutual accountability in the projects. People blame others for mistakes and

distance themselves from responsibility. The "not-invented-here" syndrome is quite normal.

As I see it, mutual accountability in the project teams is a primary factor that can ensure effective learning. Lack of accountability again hinders free communication and learning from each other.

5.3 Improvement areas

I think there are several aspects of the organizational environment that can encourage knowledge transfer and organizational learning, but the company does not handle them appropriately. These aspects can be improved, enhanced or fine-tuned to support organizational learning.

♦ Culture

Probably, company culture is not the first thing that comes to mind when thinking about internal knowledge transfer, but it really counts. In fact, it can be assumed that improvements in the way that a company creates, transfers, and applies knowledge can rarely succeed without simultaneously changing the company culture to support new behaviors.

As explained in the previous section, shared mental models are the basis for organizational learning. Also, the formation of shared mental models determines psychological conditions for organizational learning which in turn impacts behaviors related to knowledge use. So, it is very rewarding to first look at the psychological conditions for learning. According to Schein (1996) the following aspects have to be ensured.

Providing psychological safety. An organization has to make sure that people do not think they lose their competence when they learn new things. The employees' learning efforts have to be encouraged and supported.

Providing a vision of a better future. People should not be threatened with scenarios for disaster, but shown that putting in some effort, taking some risks and tolerating some pain will lead to substantial improvements.

Providing a practice field. People have to be given a chance to make mistakes and to learn from them. They have to be given time to learn and they need a place to play around, practice, and experiment.

Providing direction. People need some guidance and advice on how and where to start learning.

Starting the learning process in groups. In a difficult situation people naturally look for support and guidance from others. If people are not alone in a situation that makes them unsure and perhaps feel they lack competence, it is easier for them. This is one good reason why lessons learned are usually asked for in group meetings. Reaching some consensus about a suggestion and having the competent support of the others facilitates the identification of lessons learned.

Providing good coaching. People have to be given help. This means communicating the basics about learning and providing feedback.

Rewarding even the smallest steps towards learning. Learners get discouraged when they are not rewarded. People easily get discouraged and think that the company does not care anyway. Rewarding correct steps is far more effective than punishing mistakes. People need feedback on their contributions. When a good suggestion is implemented, the contribution of the people who made the suggestion should be acknowledged. A suggestion of the month web page or an employee of the month who has been chosen for his ability to contribute and share knowledge could be a good idea.

♦ Involvement of top management

The interviews strongly suggest that the central organizational feature, that captures the benefits of the short-term operational projects, is a system-wide

focus on developing knowledge-based structures that create new communications paths and encourage learning-oriented behaviors.

This new type of knowledge-based organization design presents a difficult task that requires two special sets of managerial competencies.

First, senior management must take a leading role to orchestrate internal change to promote learning. As learning and change agents, they need to adjust key aspects of their management processes to create an internal environment favorable to continuous organizational learning. Attaining this careful balance of efforts of learning and recognition of the importance of learning, requires a managerial perspective that focuses on learning and open communications, that is trying to create "top-down structured" learning systems rather than solely depending on "bottom-up ad hoc" learning patterns.

Second, senior management needs to build an internally consistent organization design that closely aligns learning and open communications with strategy, organizational structure, reward systems, and culture to create and share new forms of knowledge throughout the firm.

The first task that I think should be done is that lessons learned should be developed so that both the project management system and people can be improved. These lessons can be incorporated both in a rather extended version in the final project evaluation report and in an abbreviated version that is circulated widely within the company.

Care must be exercised when deciding which lessons should be shared and at what level of detail for various people. The goal is to give concise ideas to people who are likely to read and consider them, but not burden anyone with large volumes that they are unlikely to read.

From a company-wide perspective, according to Koestenbaum (1991**),** some other perspectives have to be considered by management teams.

Trying initiatives to the company's vision

Isolated initiatives are much more likely to fail than those initiatives that are an integrated part of the company's mission and vision. By embedding learning in the company's vision, top management gives those activities much more weight and demonstrates that they are valuable for the company and its future.

Having success stories told at meetings

Once management has become committed to the concept of organizational learning, it has to be made sure that this commitment does not die silently. Managers have to be reminded of the ongoing efforts, they have to be kept updated so that they always know what is going on and what they (should) support.

Removal of barriers to progress

Obviously, leaders have to attack everything that keeps people from reaching the desired goal of learning. A typical barrier to learning is for example the not-invented-here syndrome. Learning can only flourish when those barriers are successfully mastered.

Reinforcing and rewarding positive behavior and promoting the right people

People have to see that learning and sharing knowledge really pays for them. Feedback is a prerequisite for that. When someone supports organizational learning, he should be rewarded for doing so or his efforts have, at least, to be recognized. One possible way to reward such employees is taking learning activities into account when choosing an employee of the month. Contribution to organizational learning should also be a criterion when deciding upon whom to promote.

In part, senior managers should also consider basing rewards partly on subjective judgments (e.g., interdivisional cooperation, global development of key people) of each individual's efforts to help other units. But the use of these

subjective criteria should be transparent to all divisional and functional managers within the firm, so that the link between learning and rewards is clearly understood.

Leading by example and seeking upward feedback on these efforts

A leader of course has to reflect the values, which he wants the employees to respect, in his actions. Only if he himself shows commitment to learning and sharing information, does he have a right to expect the same from his environment. It is not so much his effort that is important, but what the people around him perceive. Therefore, he has to seek their feedback and check of he succeeded in transmitting the right message. The review meeting should provide plenty of opportunities for showing commitment through action. Taking an action and giving feedback on suggestions is necessary to keep people motivated to contribute.

Emphasizing the importance of sharing and using the best practices

As ignorance of the importance of sharing knowledge is still the main barrier to organizational learning, it is advisable to remind people regularly of this importance. Only aware employees, who actively seek good solutions from others or situations where their knowledge could be valuable, make learning successful. In review meetings the participants should reflect about the applicability of their experiences to other projects. This shows clearly that sharing and transferring knowledge is an important part of the work.

Applying knowledge transformation to the whole company

Only by applying the learning efforts to the whole company, can all the benefits be repeated. As soon as these activities face a boundary, because the concept of learning is not applied in a certain part of the company, are all the learning efforts put at stake. If people see that their neighbors do not use the concept, they start to ask themselves why they should do it. This is also true for review meetings. It should be applied to all projects, as a lot of the review results are usable for other projects, the line organization and the processes. If

it is used only in some projects, the managers of these projects will soon ask themselves why only they should devote time to improvement work for the company.

♦ **Technology**

IT has two main functions that it has to fulfil for knowledge transfer. First, it can facilitate communication, and second, it can provide easier access to critical information. With those two main functions IT plays a role mainly in two steps of the knowledge transfer process, namely storage and distribution.

There is a basic infrastructure of information technology that should be in place for effective knowledge sharing and transfer. This includes a company wide computer network that allows people to share documents.

But to what extent the intranet can contribute to the sharing of experience, other than product development and technical issues, is another story.

One project manager has argued that the lessons learned, which have been found in a project, may often be of more use to the people who work in the project than to those who read the lessons in a database. This is so because many of the lessons uncovered describe the way the specific team functioned and are most useful for improving the teamwork of that team.

However, the above stated fact can not be used as an excuse of not establishing such database.

Non-technical experience databases need people who devote a large part of their time to them. Either those people have to maintain the structure and make searches or the documents have to be complied and edited. Also the task of classifying and adding new documents, as well as deleting outdated or low quality documents should not be underestimated.

6 Conclusions

SCA Hygiene Products AB is a knowledge-based organization. The introduction of new products and technology are normally initiated by projects. So sharing knowledge and experience between individuals and projects is very important. That means the learning activities have to be an integrated part of project management.

At SCA Hygiene Products AB, people have been aware of the need to learn from projects, but there was never a really structured approach with clear and easy-to-follow descriptions to achieve this learning goal. It was always up to the project manager to figure out how to learn from his project.

Accordingly, there is an obvious gap between learning efforts and the recognition of learning importance. After doing the empirical study in the company I found that the gap affects the quality of knowledge transformation and organizational learning in the following ways.

Concerning the transformation of the experiences from individual tacit knowledge to collective explicit knowledge, the externalization of the knowledge is missing. Even though there is an informal "mouth-to-mouth" pattern of sharing such experiences, the knowledge transformation within the whole organization is exposed at risk. The timing of reflection is a problem because it may make the internalization of knowledge incomplete.

Other aspects of the knowledge transformation process, namely socialization and combination, are not isolated from externalization and internalization. The failures or problems in each one of the four processes will definitely jeopardize the ongoing transformation process during which organizational learning takes place.

With regards to inter-project learning, the learning process can be ruined due to the fact that lessons learned are not identified among projects. In addition, the failure of giving lessons learned a general value for the organization can easily hinder the complete knowledge transfer process and learning.

When it comes to "soft issues" it is the company climate that people tend to ignore as the soft issue is something that should be identified and shared among projects. The transfer process of this part of knowledge is not structured, which in turn put this part of learning and sharing knowledge at a high stake.

I have found some positive sides of project learning in SCA Hygiene Products AB.

PRIME model provides the project management with tools, which not only help the project to be executed as planned, but also support learning by providing a mechanism for planning, communicating expectations, and recognizing the deviations or successes of a project.

Cross-functional way of working in SCA is a great facilitating factor for cross-functional learning knowledge transformation among projects since people from various units contribute their talent and experience to a specific project and in the meantime they gain knowledge from the projects they participate in.

At SCA Hygiene transparency is encouraged by allowing people to make inevitable mistakes and thus creating an information environment favorable to learning-by-doing.

At SCA Hygiene, it is not a common behavior for the project members to withhold or fabricate information which can be viewed as an enabler to double-loop learning.

Incomplete project learning is hindered by improper organizational design both in the structural aspect and in the cultural aspect.

The structural arrangement in the company is not supportive enough for producing and transforming complete lessons learned.

Using quantitative criteria to evaluate managers is generally insufficient to promote learning and risk-taking behaviors.

Lack of management development is a potential barrier because this ad-hoc network building can prohibit a wide range of knowledge transformation, which is a necessity for the effectiveness of organizational learning. So it will be rewarding for the company to transfer managers periodically across divisional or functional lines.

Lack of issue orientation is a barrier because the decision-making process will be infected as long as power and politics are involved in the projects. Democratization and free communication will be reduced.

Lack of accountability again hinders free communication and learning from each other.

Project managers are responsible to leverage the design of the organization in order to link project learning to organizational learning.

7. Suggestions for future research

As in the case with all research, I did not have the possibility to go deeply into every single one of the areas I examined. There are some aspects that could be studied further.

One aspect that could be interesting to have a further look at is the dilemma of transferring individual tacit knowledge into collective explicit knowledge. As my research indicated, though externalization of knowledge is important, the task of doing so is difficult and in some cases it is impossible to transfer this part of the knowledge.

Another interesting aspect would be the relationship between the choice of the team members and the effectiveness of project learning. One interviewed project manager wondered, why some teams are more successful in project management although all the members are not so intelligent, while some other team, consisting of all specialists, fails to deliver successful projects.

Appendix I Interview questions

Some explanations about the terms that will appear in the survey:

A contingency is defined here as:

A more or less unexpected event which is judged to be important by the individual, and which demands that he takes special measures to deal within his situation. The evaluation of the contingency may be concentrated on different aspects of its origin, the present situation, and actual or expected consequences. The contingency may be either positive or negative.

Here the term "contingency" is interchangeable with the term "critical accident".

A lesson learned is a "catchall phrase describing what has been learned from experience" and is a tool for learning. There are three kinds of lessons learned.

♦ Procedural knowledge

One kind of knowledge that can be learned is a project. Procedures are processes, work instructions, guidelines or tools (Lewis,1998). The knowledge produced is accordingly referred to as procedural knowledge. The experiences that are made during a project are all made at a certain point in time while performing a task, using a method, and performing a step of a process. Therefore it should be possible during reflection to track the experience back to the procedure that was used while the experience was made (Lewis,1998).

♦ Technical knowledge

There are lessons that are insights about technologies. When developing high-tech products or parts for those products, systemic knowledge is improved. This means knowledge about how functions and components work together in a system (Bartezzaghi, Corso & Verganto, 1997).

♦ Soft skills

Some lessons are neither possible to include in procedures nor are they insights about products and technologies. They address the so-called soft skills. Lessons about soft skills are sub-divided in lessons about team issues, communication, motivation, leadership, organization and coordination and customers.

Questions

♦ Learning and sharing

1. When you manage a project, what is your aim(s) or goal(s)?

2. When managing a project, do you meet any "contingencies" or "critical incidents"?

3. If you do, why do you think they are "critical incidents"? Do other project member view them as "critical incidents"?

4. When do you handle these incidents?

5. How do you handle these incidents?

6. What do you learn from these incidents and the way you handle these incidents?

7. What do you do with what you have learned?

8. How do you share what you learn across your project and organization? What are the major obstacles when you share these experiences with others?

9. Have you learned from the past experience of the projects that have been managed by others? If so, where did you get these experiences (formal documentation or personal contact)?

10. What kind of comprehensive reflection arrangement does exist in your project? When is the reflection made (each stage or only at the end)? Does the project make documentation for the reflection?

11. In the reflection does the team reflect on what lessons learned could be used by other projects?

♦ Structural and cultural aspects

12. Is the project rewarded based on their learning efforts?

13. Do you have personal rotation? How does it work?

14. When you manage a project, do you find that organization members are pressured to withhold, distort, or fabricate information to defend themselves and/or others?

15. Are you willing to hold yourself open to inspection in order to receive valid feedback? What about the project members?

16. Within the project, are opinions judged according to their merits, not based on the identity and status of the person pronouncing them? Does each team member have the opportunity to introduce his/her own ideas?

17. In your project is there any behavior such as blaming others and distancing oneself from responsibility? Is there a sense of mutual accountability in the team?

18. Is there a company wide computer network that allows people to share documents?

19. As a project leader, what kinds of lessons do you learn most when managing a project?

Appendix II Interviewees

Björn Ålsnäs, SCA Hygiene Products AB, Interview date: 1999-11-05.

Mikael Svensson, Business Project Manager, SCA Hygiene Products AB, Consumer Division. Interview date: 1999-11-12.

Lars Wekell, SCA Hygiene Products AB, Interview date: 1999-11-15.

Janeric Löfgren, International Project Manager, SCA Hygiene Products AB, Away From Home Tissue. Interview date: 1999-11-15.

Henrik Breitholtz, Project Manager, SCA Hygiene Products AB, Incontinence Care. Interview date: 1999-11-16.

Lennart Erwast, Business Project Manager, SCA Hygiene Products AB, Baby Feminine Care. Interview date: 1999-11-16.

Christina Steger, Project Manager Asst. Scientist. SCA Hygiene Products AB, Away From Home Tissue. Interview date: 1999-11-18.

Bo Welandeer, International Project Manager, SCA Hygiene Products AB, away From Home. Interview date: 1999-11-18.

Christine Bengtsson, European Media Manager, SCA Hygiene Products AB, Business Support. Interview date: 1999-11-19.

Per Marcusson, Business Project Manager, SCA Hygiene Products AB, Consumer Division. Interview date: 1999-11-29.

Appendix III Assessment tool

Introduction

This assessment is developed to help you to identify strengths and weaknesses in your project. It will support you with the following:

•A well structured questionnaire developed to safeguard "world class" project management principles and PRIME

• Benchmark data

• Proposal for actions in case you feel uncomfortable with the result of the assessment

The assessment can be carried out prior to tollgate 2 and all the way up to tollgate 5. It is developed with the purpose to fit any project.

The questionnaire is divided into five sections

I	Project Goal
II	Managing the Project
III	Management Commitment
IV	Project Roles and Competence
V	Communication

Using the assessment in the team

The assessment can be done individually by each team member or together as a group. In both cases it is important that you carry out the assessment in such a way that open and free communication is possible and encouraged. It is also important that the result is discussed and when needed corrective actions are identified and carried out.

Interpretation

Each project has its own conditions to relate to when interpreting the result of the questionnaire. Still the following is recommended:

• Scoring under 3; Discuss the outcome and identify an action program

• Scoring 3; Scoring 3 is not satisfactory. Discuss to what extent actions could be identified and contribute to the end result of the project. Scoring 3 is not satisfactory

• Scoring 5; Your project is where we all would like to be. You have reasons to "celebrate"!

Actions

For each section you will find a number of proposals that could be used as a base for corrective actions in case you are not happy with the result of the assessment.

Reporting

In order to enable bench marking of your own and other projects you are asked to report your result on the report format.

I Project Goal

This section examines the goals of the project focusing the linkage between the project goal and business strategy. It addresses the commitment of the goal in the organisation and of the project team.

1. I believe that the goals of the project support the business strategy (project purpose)

2. I feel that our goals and plans are in line with other ongoing activities and projects in the organisation

3. The goals and objectives of the project are clear to me

4. I am committed to the goals and objectives of the project

5. The goals are challenging for us as a team

6. We have a total task (1) commitment to the end result of the project

7. I feel that we have included elements of "break through" in goals/plans

II Managing the Project

This section evaluates to what extent the project manages the critical parts of the project plan. It also includes the internal working procedures of the project.

1. There exists a well defined tollgate structure. To each tollgate predefined, relevant and measurable criteria are linked

2. We have a detailed and up-to-date Project Plan including all parts necessary for reaching the project goal

3. We have developed a time schedule with milestones including the critical path

4. All project deliverables are identified and known by each member of the project team

5. We have an established and detailed budget for the project

6. We monitor the project continuously versus time, cost and result. By means of milestones, necessary actions are identified and taken when milestone criteria are not met

7. We continuously analyze risks and necessary actions are identified and carried out

8. Training needs for the project team as well as for the organisation(-s) receiving the result of the project have been evaluated and incorporated in the plan to an extent necessary to reach the goal

1) The assignment of a project team to achieve all aspects of a defined goal

III Management Commitment

This section explores the degree of involvement and commitment of relevant managers, in creating the condition necessary for the project team to accomplish the project successfully.

1. I feel that the management shares the responsibility for ensuring that the project reaches the goals successfully

2. I feel that the sponsor is committed to the project and will support us to reach the goal of the project successfully

3. I feel that the sponsor has time and authority in line with the project needs

4. I am confident that the management will listen and take our views into consideration when making decisions that concerns our project

5. My line manager is aware of and committed to my role in the project

6. I feel that the organisation/s that will use the result of the project is committed to the project and will support and contribute to a successful project outcome

IV Project Roles and Competence

This section evaluate the project organisation/team. The purpose of this section is to examine to what extent the team is aligned with the task of the project and that key resources in the project are well managed.

1. I have a good understanding of my role and responsibility in the project

2. I have a good understanding and accept the other team members roles and responsibilities and how they relate to my own role

3. As a group we have access to the competence necessary to fulfil the project goal

4. As a group we have time available to fulfil our roles in the project

5. As a team we feel empowered [2] in relation to our task and experience

6. I feel that the interest of the end customer/s (3) is well taken care of when forming the project

7. I agree with the sponsor/project manager about my authority and responsibilities in the project

2) Our freedom of action is corresponding to our task and experience

3) The receiver of the product of the project

V Communication

This section evaluates the way the project communicates to the project members as well as to other relevant stakeholders.

1. Norms for what and how the team should communicate have been established and are followed

2. Stakeholders (4) are identified and relevant communication formats have been agreed upon and are followed

3. Plans, decisions and results are well communicated to all relevant people inside and outside the project

4. Before changes are made they are agreed upon with relevant persons and then immediately communicated with a motivation to all stakeholders having an interest in the change

5. As a project team we value and respect all members in the team allowing open and free communication about achievements, benefits and concerns

4) An individual or a group of individuals with a common interest in the performance of the project team and the environment in which it operates

Assessment Scoring Chart

Please filled in by team members. For each question fill in the score in the space below and return the chart to the project manager.(Mark with an "x")

Question	Totally disagree	Disagree	Neither nor	Agree	Totally agree
I Project Goal					
1	[__]	[__]	[__]	[__]	[__]
2	[__]	[__]	[__]	[__]	[__]
3	[__]	[__]	[__]	[__]	[__]
4	[__]	[__]	[__]	[__]	[__]
5	[__]	[__]	[__]	[__]	[__]
6	[__]	[__]	[__]	[__]	[__]
7	[__]	[__]	[__]	[__]	[__]
II Managing the Project					
1	[__]	[__]	[__]	[__]	[__]
2	[__]	[__]	[__]	[__]	[__]
3	[__]	[__]	[__]	[__]	[__]
4	[__]	[__]	[__]	[__]	[__]
5	[__]	[__]	[__]	[__]	[__]
6	[__]	[__]	[__]	[__]	[__]
7	[__]	[__]	[__]	[__]	[__]
8	[__]	[__]	[__]	[__]	[__]
III Management Commitment					
1	[__]	[__]	[__]	[__]	[__]
2	[__]	[__]	[__]	[__]	[__]

3	[_]	[_]	[_]	[_]	[_]
4	[_]	[_]	[_]	[_]	[_]
5	[_]	[_]	[_]	[_]	[_]
6	[_]	[_]	[_]	[_]	[_]
IV Project Roles & Competence					
1	[_]	[_]	[_]	[_]	[_]
2	[_]	[_]	[_]	[_]	[_]
3	[_]	[_]	[_]	[_]	[_]
4	[_]	[_]	[_]	[_]	[_]
5	[_]	[_]	[_]	[_]	[_]
6	[_]	[_]	[_]	[_]	[_]
7	[_]	[_]	[_]	[_]	[_]
V Communication					
1	[_]	[_]	[_]	[_]	[_]
2	[_]	[_]	[_]	[_]	[_]
3	[_]	[_]	[_]	[_]	[_]
4	[_]	[_]	[_]	[_]	[_]
5	[_]	[_]	[_]	[_]	[_]

Project managers report of survey result

Background data

Background data is necessary in order to enable a comparison between data bank and an individual project. The quality of the reference bank will be dependent of reporting of results as well as improvement actions initiated as a result of the assessment.

Note: Information of an individual project will only be available for the project manager from the database.

- **Date of survey** YYMMDD __ __ __ __ __ __

- **Project manager** _____

- **Project name** _____

- **The questionnaire is filled in prior to**

  [ ] TG 2   [ ] TG 3   [ ] TG 4   [ ] TG 5

• Project type	• Business unit
[ ] Product Development - PDP	[ ] Baby products
[ ] Product Launch - PLP	[ ] Feminine products
[ ] Local Product Launch - L PLP	[ ] Heavy Inco
[ ] Market central	[ ] Light Inco
[ ] Market local	[ ] Tissue - Away from home
[ ] Manufacturing Continuous	[ ] Tissue - Consumer Market
[ ] Improvement - CIP	[ ] Other
[ ] Other Manufacturing	
[ ] Information System	
[ ] Organisation	
[ ] Other	

- **The questionnaire have been filled in by the team members** [   ]
  Collectively [   ] Individually

- **Number of members in team** _____

- **Project started (TG1)** YYMM __ __ __

- **Project estimated to end (TG5)** YYMM __ __ __

Assessment Scoring Chart

Please fill in your score for each question in the space below

	I	II	III	IV	V
1	[_,_]	[_,_]	[_,_]	[_,_]	[_,_]
2	[_,_]	[_,_]	[_,_]	[_,_]	[_,_]
3	[_,_]	[_,_]	[_,_]	[_,_]	[_,_]
4	[_,_]	[_,_]	[_,_]	[_,_]	[_,_]
5	[_,_]	[_,_]	[_,_]	[_,_]	[_,_]
6	[_,_]	[_,_]	[_,_]	[_,_]	
7	[_,_]	[_,_]		[_,_]	
8	[_,_]	[_,_]			

Note: *You should report the average score with **one decimal** for each question*

Please state those actions that have been initiated as a result of

the assessment ("one sentence per action").

Please state Section (S) and Question (Q) that have initiated the

action

S: Q:
_____

_____

S: Q:
_____

_____

S: Q:
_____

_____

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