Proposing an assessment tool for Knowledge Management

A case study at an EMS in South East China

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Acknowledgements

This is the final diploma work that will complete our three years of academic studies in Industrial Management and Logistics at the Faculty of Engineering and Sustainable Development, University of Gävle. The thesis has been carried out in South East China, at the electronics manufacturing company Kaifa Technology Co., Ltd.

The direct stakeholders for this project have been the University of Gävle, Kaifa Technology Co., Ltd., as well as the members of the project group. The University of Gävle and Kaifa Technology Co., Ltd. has expressed their wishes to develop a long-term mutually beneficial relationship, of which the project group members are the pioneers.

The number of parties interested in the project has been extended though, and the ambition has been to promote the cultural as well as knowledge-based exchange between Sweden and China. This ambition is due to the fact that the project has been partly funded by the Minor Field Study (MFS) grant, which is administered by the International Programme Office and financed by the Swedish International Development Cooperation Agency (SIDA).

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Gävle, June 2011

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Abstract

In recent years, terms as “knowledge economy” and “knowledge society” have appeared in contemporary management literature. The rhetoric has been that technology-based advantages alone are transient and that knowledge is the reason companies are able to gain and sustain competitive advantages. This has led to extensive research, and knowledge management has gained the reputation of a legitimate research field.

This thesis aims at proposing a feasible approach and tool for an initial knowledge management assessment, using the case of an electronics manufacturer in South East China. By an extensive literature review and analyzing reasoning, a knowledge management assessment tool has been developed through a combination of a well-known model for knowledge creation and a globally wide-spread set of criteria for knowledge management. A pilot assessment, conducted to evaluate a management process in the case company, proved the assessment tool applicable.

In that pilot assessment, it was shown that all stages of the dynamic knowledge creation process were supported to some extent even though there was a lack of support for some categories in the evaluation criteria. The trial evaluation is however to be viewed as successful since the assessment tool was proven to serve its purpose. The assessed process at the case company was considered to contribute a great deal to the department’s and organization’s knowledge management performance.

Geographic location or maturity of knowledge management is not regarded to have any significant influence and the proposed assessment tool is considered as useful to various organizations, thus enjoying a high external validity.
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**Appendix 1**: X
1 Background

In this part, a short description of the academic area of interest will be presented.

1.1 Knowledge Management

The nature of knowledge is according to Mårtensson (2000) an extremely challenging question to answer and even though the issue has been discussed by philosophers for several hundred years, the search for a formal definition continues. According to Nonaka & Konno (1998), the management of knowledge is something that has been frequently discussed in the management literature. This is a viewpoint that is shared with several other authors, Mårtensson (2000) e.g. states that the importance of knowledge management within our society has been the subject of intensive discussions for many years. “In recent years, knowledge – if nothing else, rhetorically at least – has become the prerequisite of – and the reason why – companies are able to gain and sustain competitive advantages” (Christensen, 2003, p. 2).

A widely adopted viewpoint among management scholars of today is that knowledge and the ability to create and utilize knowledge is the most important source of a firm’s sustainable competitive advantage (Nonaka & Teece, 2001). As organizations are beginning to realize that technology-based competitive advantages alone are transient, and that the only competitive advantage they have are their employees (Mårtensson, 2000), the terms “the knowledge economy” and “the knowledge society” have appeared in contemporary literature (Skyrme, 1999; Dodgson, 2000; Earl, 2001; Christensen, 2003). According to Christensen (2003) the knowledge society is what replaces the traditional industrial society. In the World Bank Report from 1998, it is argued that “…knowledge has become perhaps the most important factor determining the standard of living –more than land, than tools, than labor. Today´s most technologically advanced economies are truly knowledge-based” (Dodgson, 2000, p. 21).

If these views are in concurrence with reality, then knowledge as a concept as well as the management of knowledge ought to be of interest to companies of today. Since the previously mentioned publications saw the light of day several years ago, more recent material might be of interest. A study of published literature in the area of knowledge management from 1998 to 2007 has been carried out by Ma & Yu (2010). They claim that the past decades have seen extensive research on knowledge management and that knowledge management has gained the reputation of a legitimate research field.
Even though much has been written on knowledge management and tools to help organizations do exist, the authors of this thesis believe the situation could improve since any of the currently available tools may be inadequate for sole use. The reasons for this might be that they do not address the preconditions for knowledge management within an organization, or that they do not give much practical guidance on how the organization actually can improve after a carried-out assessment.
2 Purpose

The purpose of this thesis is to propose a feasible approach and tool for an initial knowledge management assessment, using the case of an electronics manufacturer in South East China.

2.1 Scope

The project will mainly focus on knowledge management, thus limiting the involvement of innovation management. However, since knowledge management and innovation management are somewhat related, innovation management might be of some relevance to this project. The focus will be put on providing an approach for the initial mapping of knowledge management practices, i.e. identify which desired practices that might in some way be in place, as well as the guidance on where to find potential weak-points.
3 Methodology and scientific approach

This thesis project was carried out at Kaifa Technology Co., Ltd., in Shenzhen in close co-operation with the Operations Excellence Promotion Office (OEPO) department. Kaifa Technology Co., Ltd. is hereafter referred to as Kaifa.

3.1 Literature review

To establish a greater understanding of the knowledge management concept, various literature related to the subject were identified and studied. The review provided an insight of the research area regarding both theoretical as well as practical implications. The books that were used as reference in the paper were mainly physical books collected from the library at the University of Gävle, though a smaller number of e-books were also acquired online. Some of the books referred to in this paper were presented to the project group by instructors¹ at the University of Gävle, whom possess adequate expertise regarding knowledge management (KM).

Upon arrival at the case company, the books brought as well as the complementary material received were discussed together with the contact person at Kaifa, Shuai Yuan, and further audited in order to sort them according to highest and lowest degree of relevancy to the subject. Books that premiered the area of innovation management were treated as literature with lower relevance due to the assumption that an organization first of all needs to manage its knowledge and knowledge creation in order to be able to manage its innovation capability.

Scientific articles were studied for three purposes; (1) to acquire recently published material, (2) to study targeted subjects in a more concentrated context and (3) to reveal the outcomes and experiences of knowledge management implementation at other organizations. The articles were collected through the website of the University of Gävle by which the authors gained access to scientific databases. Databases used were Emerald, ScienceDirect and Google Scholar.

¹ Lars Bengtsson, Professor at the University of Gävle and Camilla Niss, PhD at the University of Gävle
3.2 Analysis and case application

The acquired theoretical frameworks were put in the context of the case company in order to carry out the analysis. Possible approaches and assessment criteria were compared and considered in order to identify what might be applicable to organizations such as the case company. During the analysis, discussions were frequently held within the project group as well as between the project group and the case company.

In the final part of the methodology chosen by the project group, the proposed tool for assessing knowledge management where applied to a case company in an effort to validate it by gathering empirical results for that purpose. The results from the case company trail run where shown by using graphic illustrations together with written explanations.

3.3 Approach, Reliability, Validity and General applicability

In research theory, Walliman (2005) claim two views can be adopted when interpreting results; positivism and idealism. In positivism, everything can be objectively and neutrally investigated, as well as empirically explained by use of logic and mathematics (Walliman, 2005). Idealism, on the other hand, acknowledges that everything is subjective and that everyone views the world differently – making total objectivity impossible (Walliman, 2005). If a researcher uses a qualitative approach, he/she then holds purely quantitative methods inadequate for creating a true picture of reality, since the study cannot be carried out “from outside of the system” (Walliman, 2005). Rather, the researcher must in some way be a part of the system/situation that is to be studied (Walliman, 2005).

In research and the assessment of academic quality, a trait desired is general applicability (Walliman, 2005). The ambition is to achieve findings that are globally applicable, i.e. true regardless of location (Walliman, 2005). General applicability is sometimes referred to as external validity (Andersén, 1994). According to Merriam (1994) the meaning of the term validity, in a research context, is to what extent carried-out measurements and the result from those measurements captures the reality. In order to achieve high validity, the undertaken study must be carried out in accordance with formulated purpose and nothing else (Merriam, 1994).
Walliman (2005) states that reliability determines the quality of technical equipment as well as the quality of the human carrying out the study, i.e. whether the human mind and perceptive capability can be trusted for e.g. the collection and organizing of data and ideas. If a study can be duplicated with corresponding results, the study enjoys high reliability (Merriam, 1994).

However, since the terms validity and reliability originates from scientific methods that produce quantitative data, both Kvale (1997) and Trost (1997) criticizes those terms being applied to qualitative studies. Instead they propose quality to be discussed in terms of credibility, reliability, and to what extent the results can be confirmed. Trost (1997) stresses the importance of the result being credible and purpose relevant, as well as the data presented being collected in an appropriate manner.

3.4 Discussion of method and scientific approach

Various terms and “measures” can be used when discussing the academic quality and value of a study. Seldom can great quality or value be instantly proven, though a researcher may argue to support such notion by reasoning. Given the fuzziness and “soft” characteristics of management of knowledge as an academic area, the project group holds it as difficult (at best) to uphold an objective and neutral attitude throughout a study of this kind, since it all turns subjective the minute terms and meanings of words and models are discussed. This means that a qualitative and more subjective approach has been inevitable.

Since this study contains a fair amount of subjectivity due to the intangible feature of knowledge management as a concept, the project group has made efforts towards reducing that subjectivity. Definitions have been questioned by the authors and discussions regarding theories presented in the literature have frequently been held among the authors as well as with the contact person at the case company. During these discussions, both of the project group members have always participated. The reason has been to minimize the risk of misunderstandings as well as decrease the influence of language barriers, in order to strengthen the reliability.

By using the terminology of Trost (1997), the project group believes such efforts also add to the credibility of the results. If the term reliability is concerned with the quality of the tools and the humans carrying out a study (Walliman, 2005), as well as to what extent the study can be duplicated with corresponding results as argued by Merriam (1994), then the
The project group deems this thesis project high reliability due to the mentioned measures taken in order to limit misunderstandings and language barrier effects. The project group is aware that even more extensive attempts could have been made in order to minimize mentioned possible negative effects, e.g. through recording and transcribing held discussions. No such actions were however taken.

The proposed tool is a product of two well known and well used elements which increases the validity of the approach. Subjectivity exists in the choice of the theoretical foundation of which the assessment tool relies, as well as in the relation between the combined elements and the direct statements or activity examples for each of the evaluation questions used in the proposed assessment tool. The ideas on which the proposed assessment tool builds are however recognized and accepted by several prominent academics in the field of knowledge management. In relation to Merriam’s (1994) take on validity, that the carried out study captures the reality and is convergent with the formulated purpose, the project group grant this thesis project high validity.

Walliman (2005) and Andersén (1994) describe academic quality in terms of general applicability, or external validity, which tries to indicate to what extent something is “valid throughout the world”, i.e. globally applicable. The concept of knowledge management is not business specific, nor geographically divergent per se. This leads the project group to view the proposed tool, at least in theory, as applicable regardless of location or industry when used as an assessment tool. Should just a healthy degree of critical thinking be applied, then the tool is assumed to be useful regardless of the present state of knowledge management in a firm. The fact that the proposed assessment tool has been applied on a real organization (i.e. the case company) and with desired results, has to be considered in the context of academic quality. The project group conclude that the tool appear to be valid for the case organization and probably applicable to other organizations, thus indicating a desired external validity as well.
4 Theoretical framework

4.1 What knowledge is

This chapter describes the evolution of knowledge and enlightens the differences in epistemology in western and Japanese development. Epistemology translates to “the theory of knowledge” (Nonaka & Teece, 2001).

Several recent authors often try to give a definition or a description of what knowledge actually is, often in the prefaces of their books and articles, e.g. Nonaka & Takeuchi (1995); Ahmed, Lim & Zairi (1999); Takeuchi & Nonaka, (2004); Rhem, (2006); Faucher, Everett & Lawson (2008).

Faucher et al., (2008) has summarized several authors’ views on data, information, knowledge, and wisdom, studied the linguistic history of the words, and also added two levels of knowledge. In their search for consensus, Faucher et al., (2008) found that there is no worldwide definition of the different levels although similarities were identified. These similarities extracted from academics are cited from Faucher et al., (2008, p. 5) below;

- Data are considered to be unprocessed raw representations of reality.
- Information is considered to be data that has been processed in some meaningful ways.
- Knowledge is considered to be information that has been processed in some meaningful ways.
- Wisdom is considered to be knowledge that has been processed in some meaningful ways.

To extend this scope of hierarchy, Faucher et al., (2008) adds two levels; existence and enlightenment. Existence is referring to everything we can grasp and thereby collect data from, and enlightenment is referring to the highest level of understanding and insight (Faucher et al., 2008). All levels of knowledge in between existence and enlightenment are different levels of abstraction of existence. Cognitive system of the human mind does not necessarily need to travel through all the levels of existence (Faucher et al., 2008).
According to Ahmed et al., (1999), information is a combination of data, set together in order to serve a meaningful purpose. Knowledge is information which has been processed by an individual and Ahmed et al., (1999) emphasizes the importance of hands on approach rather than an artificial transfer. The European Foundation for Quality Management (EFQM) defines knowledge as information with guidance for action, and information is assumed to be data with context and perspective (EFQM model, v.2.2, 2003). According to Rhem (2006), data consists of random bits and pieces while information is data put together in a logical order which brings meaning to the user and knowledge is seen as interpreted information which enables the user to make decisions or learn something.

4.1.1 Philosophy and Knowledge

The definition of knowledge and how knowledge is obtained has, in the western culture differed distinctively among various philosophers (Nonaka & Takeuchi, 1995). Two main paths can be distinguished from the literature; rationalism and empiricism (Nonaka & Takeuchi, 1995). According to Nonaka & Takeuchi (1995), knowledge can only be deductively obtained through laws, theories and concepts when seen from a rationalistic point of view. Plato tried to justify his rationalistic thoughts by arguing that knowledge of reality is achieved by pure reasoning without subjective disturbance (Nonaka & Takeuchi, 1995). Aristotle, a student of Plato believes that knowledge must be verified through “...clear verification of individual sensory perception”, thereby stressing the empirical path (Nonaka & Takeuchi, 1995, p. 23).

Descartes and Locke were two rivals who each adopted the belief of Plato and Aristotle. Descartes, the rationalist, questioned all knowledge but one; the existence of the questioner when a belief is being questioned (Nonaka & Takeuchi, 1995). From this argument Descartes stated the famous expression “I think, therefore I am” (cogito, ergo sum) (Nonaka & Takeuchi, 1995, p. 23). According to Locke, the perception can be illusory but it is still evident that a thing can be perceived (Nonaka & Takeuchi, 1995). Rationalism is criticized for assuming that the human mind should be furnished from birth (Nonaka & Takeuchi, 1995). Locke argues that ideas only can be provided through experiences in form of sensation - sensory perception – “…the great source of most of our ideas”, and reflection – “…the perception of the operation of our own mind within us” (Nonaka & Takeuchi, 1995, p. 24).
Philosophers like Kant, Hegel and Marx mix the two approaches towards epistemology. Kant for instance, argued that the sensory experiences described by Locke should be adjusted with concepts and tools of rational thinking in order to achieve further understanding, making him more of a rationalist than an empiricist (Nonaka & Takeuchi, 1995). Despite these fundamental differences, both the rationalists and the empiricists of the West agree that knowledge is “justified true belief” (Nonaka & Takeuchi, 1995, p. 21).

The Cartesian dualism, founded by Descartes, refers to the separation between the subject and the object i.e. the knower and the known, mind and body (Nonaka & Teece, 2001). Philosophers, who reject the existence of this split, or dualism, argue that knowledge acquiring does not take place from a spectator’s point of view but through a close relationship between knowledge and action, i.e. through experiences (Nonaka & Takeuchi, 1995). The Cartesian dualism has to some extent fostered the way of managing in the West and thereby emphasized the importance of explicit knowledge. Western philosophy can be described to have a rich epistemological tradition.

Even though the work of Japanese philosophers is not as well documented as Westerners’, three approaches can be distinguished which all erases the idea of the Cartesian dualism. The three traits that, according to Nonaka & Takeuchi (1995), have formed how Japanese view knowledge as well as how their approach toward management practices are the oneness of humanity and nature, the oneness of body and mind, and the oneness of self and other. Basically the Japanese view is not to separate the object and the subject, i.e. the knower and the known (Nonaka & Takeuchi, 1995). The Japanese have a more circular view of time, they are more context specific than time specific, and many Japanese novels do not have fixed time points in their plots (Nonaka & Takeuchi, 1995). A person can be seen as a subject of action, and knowledge is acquired when it is integrated in the person’s personality (Nonaka & Takeuchi, 1995). “While a typical Western individual conceptualizes things from an objective vantage point, a Japanese person does so by relating her- or himself to other things or persons” (Nonaka & Takeuchi, 1995, p. 31). The historical differences between Western- and Japanese philosophy is important in order to gain understanding of how the Western tradition has formed economies, management and organizational theories and thereby, the thinking of knowledge and innovation of today (Nonaka & Takeuchi, 1995).
As mentioned, several authors e.g. Christensen (2003) talks about knowledge as a buzzword in management literature of today. While the importance of knowledge seem somewhat agreed on, the question concerning what it actually is, where it exists, as well as how organizations ought to utilize it, is less clear. As baldly put by Christensen (2003, p. 24): “To engage in knowledge management, you need knowledge about knowledge”.

According to Christensen (2003), the most common perspective on knowledge is the functionalistic one, which is concerned with the by knowledge brought results i.e. the efficiency in the handling of knowledge. However, the processes and players that create and define knowledge are important too (Christensen, 2003). In discussions regarding how to organize and manage knowledge, a functionalistic perspective is used, whilst for the analysis of processes and players, that perspective is epistemological (Christensen, 2003). Furthermore, Christensen (2003) argues that two kinds of epistemological knowledge exist, the perception-based knowledge and the experience-based knowledge.

- **Perception-based knowledge** *(traditional epistemology)* proclaims that a pre-existing reality and truth exists, and that this reality and truth is something that is perceived through the senses, memory and logical deduction (Christensen, 2003). This view separates the object and the subject, the knower and the known (Christensen, 2003).

- **Experience-based knowledge** *(pragmatic epistemology)* however, manifests itself through deeds (a physical interaction between the individual and his surroundings) e.g. a cab driver driving (Christensen, 2003). Deeds of this kind are according to Christensen (2003) often carried out based on tacit knowledge, which might be hard to make explicit (For tacit/explicit knowledge see 4.1.2).

Moreover, in difference to traditional epistemology which seeks an pre-existent truth, pragmatic epistemology is according to Christensen (2003) to be seen as a interactive process that starts with doubt (or problems) and ends with the resolution of this doubt. Neither Christensen (2003) nor Nonaka & Takeuchi (1995) see the perception-based and the experience-based knowledge as an either-or dichotomy, but as mutually complementary.

Where a different kind of knowledge rests or resides can, according to Christensen (2003), be of interest to the company for two reasons. The first is concerned with how great the risk is that competitors imitate the company’s knowledge (Christensen, 2003). The second reason is about who possesses the knowledge and whether knowledge is being adequately shared in the company (Christensen, 2003).
From the management viewpoint in Western history, two types of knowledge management can be distinguished: the scientific approach and the humanistic approach (Nonaka & Takeuchi, 1995). Both of these viewpoints however, are limited by the Cartesian split and thereby invalid according to Nonaka & Takeuchi (1995), who claims that knowledge is more dynamic and can be created by people.

4.1.2 Tacit and Explicit knowledge

Tacit knowledge, which historically is emphasized by Japanese companies, is hard to formalize and specify due to its personal and context-specific property (Nonaka & Takeuchi, 1995). An example of tacit knowledge is the type of knowledge that a craftsman has earned through experience over the years – he knows how to act but he cannot explain all the details explicitly. Nonaka & Takeuchi (1995) refer to Michael Polanyi’s (1966) argument where he stresses the importance of tacit knowledge since the human being is learning by creating and organizing her own experiences. Polanyi once stated that “we know much more than we can tell” due to that tacit knowledge is deeply embedded into the minds of individuals and the operating practices of organizations (Rhem, 2006).

Explicit knowledge on the other hand, can easily be codified and transmitted (Nonaka & Takeuchi, 1995). Rationality tends to lead to knowledge of the explicit kind and can be described as objective and metaphysical compared to the more subjective and personal tacit kind (Nonaka & Takeuchi, 1995). Explicit knowledge can be seen as articulated knowledge that in many cases are captured in literature, manuals, reports, books or articles (Rhem, 2006).

While westerners, according to Nonaka & Takeuchi (1995), assume that organizations function like a machine for information processing, Japanese companies believe that knowledge expressed in words and numbers only represents the tip of an iceberg. For a long time, knowledge has been seen by Western companies only as something formal and systematic which can be stored and shared through databases while Japanese firms use a more cognitive dimension (Nonaka & Takeuchi, 1995). These differences are deeply rooted in how the two cultures developed during the industrial revolution and the post-war period where for the Japanese, the only certainty was uncertainty and companies like IBM and General Motors dominated the business (Nonaka & Takeuchi, 1995).

In the view of Nonaka & Takeuchi (1995), tacit and explicit knowledge are complementary and they interact with each other in different activities. Their dynamic
model for knowledge creation, the SECI model, which is further described below in paragraph 4.1, argues that knowledge is created socially through the interactions of tacit and explicit knowledge.

### 4.2 SECI Model

According to Nonaka & Takeuchi (1995), tacit and explicit knowledge converse in four types of modes, enabling the creation of knowledge in both an epistemological dimension (among the modes) and an ontological dimension (throughout the organization). The interactions between the two types of knowledge expand the knowledge in quality as well as in quantity (Nonaka & Teece, 2001). These interactions take place in a shared context referred to as “Ba”, which roughly translates into “place” or “workplace” (Nonaka & Konno, 1998; Nonaka & Teece, 2001; Christensen, 2003; Takeuchi & Nonaka, 2004).

![Diagram of SECI Model](image)

**Figure 4.1 Adapted from Nonaka & Konno, 1998; Nonaka, Toyama & Konno, 2000**

#### 4.2.1 Conversion modes

**4.2.1.1 Socialization**

In this conversion, experiences and mental models are shared among individuals to transfer and spread the tacit knowledge into the minds of others (Nonaka & Takeuchi,
The property of tacit knowledge being time- and place specific demands tacit knowledge acquiring through shared experiences (Nonaka, Toyama & Konno, 2000).

This applies to an apprentice working with their master and learn craftsmanship not through language but through observation, imitation, and practice (Nonaka & Takeuchi, 1995). In a business setting, Nonaka & Takeuchi (1995) argue that on-the-job training uses the same principle.

4.2.1.2 Externalization

Externalization is about formalizing the tacit knowledge into comprehensible instructions, manuals and forms to be understood by others (Nonaka & Konno, 1998). In order to extract the tacit knowledge which are deeply rooted in the minds of individuals, the use of metaphors and analogies, concepts, hypotheses and models are suggested by Nonaka & Takeuchi (1995). The outcomes of this phase become the basis for new explicit knowledge (Nonaka & Teece, 2001).

4.2.1.3 Combination

After explicit data has been externalized, it is in this conversion mode combined, edited or processed in order to form new knowledge, e.g. a controller at a company collects data and puts it together in a financial report that makes sense to others (Nonaka & Teece, 2001). Information can be shared and combined through media and the reconfiguration can lead to new knowledge (Nonaka & Takeuchi, 1995). Middle management has a significant role to play in this process and their work if often seen when visions, business concepts or product concepts are broken down into operations (Nonaka & Takeuchi, 1995; Nonaka & Teece, 2001).

4.2.1.4 Internalization

In the final step, new explicit knowledge is internalized into individuals’ tacit knowledge bases in the form of shared mental models and technical know-how (Nonaka & Takeuchi, 1995). Internalization is, according to Nonaka et al., (2000), closely related to “learning by doing” and can be exemplified by employees reading training material about the organization, on which the employee reflects upon it, before finally embodying it and acting on in.

4.2.2 Spiral accelerators

Nonaka & Takeuchi (1995) lists five conditions for accelerating the conversion spiral in the epistemological dimension as well as the ontological one. “…The transformation
process within these two knowledge spirals is the key to understanding our theory” (Nonaka & Takeuchi, 1995, p. 90).

The following five conditions promote the knowledge spiral on organizational level and thereby create a spiral in the epistemological dimension where knowledge conversion takes place between tacit and explicit knowledge (Nonaka & Takeuchi, 1995).

- **Intention** - “if not for intention, it would be impossible to judge the value of information or knowledge perceived or created”. Organizational standards and visions can be used to evaluate and justify the created knowledge, i.e. is the knowledge in line with the company’s corporate strategy?

- **Autonomy** – when individuals have permission to act autonomously, the possibility that individuals motivate themselves and function as a part of the holographic structure of a company increases.

- **Fluctuation and creative chaos** - by breaking down routines, habits and cognitive frameworks, employees’ perception develops and “…we begin to question the validity of our basic attitudes toward the world” (p. 79). Creative chaos can be generated through a crisis or utopian goals from the top management.

- **Redundancy** - intentional overlapping of information. To share information that is not needed immediately promotes the sharing of tacit knowledge. Extra information helps individuals understand where they stand in the organization, something that functions to control the direction of individual thinking. Redundancy is built by adopting overlapping approach where functional departments are working together in a fuzzy division of labor. Some companies create teams and let them develop different approaches to the same project and then argue over the advantages of the solution. Another way is to implement strategic rotation of personnel, creating multiple perspectives and more “fluid” knowledge.

- **Requisite variety** – in order to maximize variety, Nonaka & Takeuchi (1995) refers to Numagami, Ohta and Nonaka (1989) when stating that “…everyone in the organization should be assured of the fastest access to the broadest variety of necessary information, going through the fewest steps” (p. 82).
The following enablers promote the knowledge spiral in the ontological dimension – the transfer of knowledge within individuals into group and organizational knowledge. The five phase model enhances the organizational knowledge creation process according to Nonaka & Takeuchi (1995):

- **Sharing tacit knowledge**
  - “Corresponds roughly to socialization” (p. 84). The socialization can be enhanced by creating a field where face-to-face dialogues take place. Example of this is the cross-functional team where members work together towards a common goal.

- **Creating concepts**
  - Similar to externalization in the SECI model. A useful tool is abduction which uses metaphors and analogies. Autonomy helps individuals to think freely within the intended framework. Concepts derive from rethinking existing grounds, something that is assisted by the capabilities of requisite variety and the outcome from fluctuation and chaos. Redundancy of information may assist in the interpretation of the metaphors and analogies.

- **Justifying concepts**
  - The concept created needs to be evaluated and considered whether it is worth continuing with. This can be measured through a business perspective, including cost, profit and whether or not the product is expected to contribute to a firm’s growth. Other criteria may be more of the subjective type, e.g.; values are approximated premises such as degree of prestige the product spurt.

- **Building an archetype**
  - In this phase, justified concepts are transformed to archetypes (explicit to explicit) by involving members of several functions and thereby combining diverse expertise from the company. This process is facilitated by requisite variety and redundancy of information.

- **Cross levelling of knowledge**
  - The knowledge is extended to other divisions or even outside constituents. Autonomy of teams and units within the organization is important to enhance the success of this phase where developed knowledge is to be spread across levels and departments. Organizational intention function as a control mechanism to analyze if the knowledge is to be cross-level spread or not.
4.2.3 Ba

The process of creating new knowledge is, according to Nonaka & Teece (2001), in need of a physical context. The Japanese term “Ba”, which roughly translates into “place” or “workplace” (Nonaka & Konno, 1998; Nonaka & Teece, 2001; Christensen, 2003; Takeuchi & Nonaka, 2004) offers such a shared context in which knowledge is shared, created and utilized (Nonaka & Teece, 2001). Being a context or a place, Nonaka & Teece (2001) argue that Ba does not necessarily mean a physical space, but a specific time and space.

Ba as a concept unifies physical space, such as an office space, virtual space, such as e-mail, and mental space, such as shared ideals (Nonaka & Konno, 1998; Nonaka & Teece, 2001). Takeuchi & Nonaka (2004) argues that Ba is an existentia lplace where participants share their contexts and create new meanings through interactions.

According to Nonaka & Konno (1998) there are four different types of Ba that correspond to the four stages of the SECI model. Each Ba is especially suited for each of the four knowledge conversion stages (of the SECI model), supporting that conversion, thus speeding up the knowledge creation process (Nonaka & Konno, 1998).

- **Originating Ba** offers a context for socialization and is a place where individuals interact face-to-face and share experiences, feelings, emotions and mental models (Nonaka et al., 2000). Originating Ba is associated with the conversion and transfer of tacit knowledge (Nonaka & Konno, 1998).

- **Dialoguing Ba (formerly known as Interacting Ba)** gives a context for externalization and is a place where both collective and face-to-face interactions occur (Nonaka et al., 2000). In Dialoguing Ba, tacit knowledge is conversed and transferred into explicit knowledge (Nonaka et al., 2000).

- **Systemizing Ba (formerly known as Cyber Ba)** is where collective and virtual interactions take place as well as where a context for the combination of existing explicit knowledge is given (Nonaka et al., 2000). The conversion is from explicit to explicit knowledge, e.g. through documentation, online networks and databanks (Nonaka et al., 2000).

- **Exercising Ba** is according to Nonaka et al., (2000) defined by individual and virtual interactions. Exercising Ba mainly offers a context for internalization, as individuals adopts virtual explicit media such as written media or simulation programs into tacit knowledge (Nonaka et al., 2000).
4.3 Management of knowledge

Although KM as a field and academic area have gained in reputation and legitimacy in recent years (Ma & Yu, 2010), the understanding of the concept as well as the focus for practicing KM have by tradition not been universal (Nonaka & Teece, 2001). According to Nonaka & Teece (2001), European companies have primarily been concerned with measuring knowledge, while American companies to a larger extent have been focusing on managing knowledge efficiently by using IT, and Japanese companies on creating new knowledge organizationally. Nonaka & Teece (2001) argue that future successful KM is dependent on the ability to build, utilize and capitalize on the European, American and Japanese strengths.

The notion that Americans have developed their take on what KM is may be strengthened by what the US-published book Essentials of Knowledge Management states. “…it should be clear that Knowledge Management is fundamentally about a systematic approach to managing intellectual assets and other information in a way that provides the company with a competitive advantage” (Bergeron, 2003, p. 9). Similarly, one source on how the Japanese view KM is: “Knowledge is manageable only insofar as leaders embrace and foster the dynamism of knowledge creation” (Nonaka & Konno, 1998, p. 53).

Regardless of how one chose to view KM, the issue of which steps, processes or tasks that are to be associated with KM are not entirely agreed upon, although similarities are apparent. Tseng (2008) propose that KM is concerned with three activities: development, utilization and capitalization of knowledge. According to Ahmed et al., (1999), KM is made out of four steps; capturing, sharing, measure and learning. Christensen (2003) talks about the exploitation of existing knowledge, the mobilization and creation of new knowledge, the sharing of knowledge, as well as the retaining of knowledge within the organization.

The authors of the book “Innovation and Entrepreneurship” (John Bessant & Joe Tidd), puts the matter of KM in the following words. “In essence, managing knowledge involves five critical tasks: generation and acquiring new knowledge; identifying and codifying existing knowledge; storing and retrieving knowledge; sharing and distributing knowledge across the organization and; exploiting and embedding knowledge in processes, products and services” (Bessant & Tidd, 2007, p. 186).
Shin, Holden & Schmidt (2001) argues that KM consists of an interaction procedure – or value chain – linking up individual knowledge to create social knowledge. This procedure includes creation, storage, distribution, and application (Shin et al., 2001). Furthermore, Shin et al., (2001) claim that in order to deliver value, this procedure must become a controlled implementation aspect of organizational strategy and vision.

### 4.3.1 Linking KM to Innovation Management

Innovation as described in the dictionary is coming from Latin *in* and *novare* – to make something new, to change (Bessant & Tidd, 2007). Although just making something new does not make up an innovation – it has to be widely spread and adopted, a view supported by the definition brought on by the UK Department of Trade and Industry: “Innovation is the successful exploitation of new ideas” (Bessant & Tidd, 2007, p. 12).

Innovation can take many forms and may change the product, process, position (the context in which products/services are introduced), or paradigm (underlying mental model of what the organization does) (Bessant & Tidd, 2007). When talking about innovation, a distinction can be made about the degree of novelty involved, i.e. if it is a small or big change (Bessant & Tidd, 2007). According to Bessant & Tidd (2007) the scale runs from minor incremental improvements (incremental innovation), to radical fundamental changes (radical innovation).

According to Bessant & Tidd (2007), innovation and entrepreneurship are essentially about knowledge and the creation of new possibilities through the combination of different knowledge sets. Furthermore, these knowledge sets can describe what is considered technically possible, or how particular configurations could meet an articulated or latent need (Bessant & Tidd, 2007). Experience-based knowledge of this kind may already be stored in an individual or in the organization, or it could be obtained through search/research into e.g. technologies, markets, competitor actions (Bessant & Tidd, 2007). “Since the process of combining different knowledge sets into successful new processes or products often take place under highly uncertain conditions (the final outcome is unknown), managing knowledge can in such cases be about committing resources to reduce the uncertainty” (Bessant & Tidd, 2007, p. 199).
The figure above exemplifies how different phases in the innovation process may correspond to generic knowledge routines (Bessant & Tidd, 2007).

4.3.2 Why KM

The positive outcome that KM is capable of may or may not be obvious to all. However the case, Ahmed et al., (1999) lists several possible benefits from KM as a strategy:

- Reduces the loss of intellectual capital from employees who leave;
- Reduces the cost of development of a new product/service;
- Increases the productivity of workers by making knowledge accessible to all employees and;
- Therefore increasing employee satisfaction.

4.3.3 Criticism towards knowledge management

In accordance with previously cited authors and scholars, Nonaka & Teece (2001) too acknowledge that KM offers a compelling promise in terms of the potential for a sustainable competitive advantage. There are however critical voices claiming KM to be a management fad, and a survey conducted in 1998 showed that among all the contemporary management approaches, knowledge management presented the biggest gap between promise and results realized (Nonaka & Teece, 2001).

Whether KM delivers on its promises is according to Nonaka & Teece (2001) dependent on what is considered promised. If KM is pursued on the promise to reach a sustainable competitive advantage as well a fundamental organizational paradigm change, then the
outcome is uncertain (Nonaka & Teece, 2001). This crude reality is illustrated by the results of a study carried out by Lucier & Torsilieri (Nonaka & Teece, 2001). Of the 108 participating companies in that study, of which all had taken on extensive KM programs, no one were able to show improved bottom-line results in comparison to companies lacking such programs (Nonaka & Teece, 2001). The study findings, however somewhat discouraging, are explained by the fact that the approach to KM has been wrong, as well as the real promise of KM being misread (Nonaka & Teece, 2001). “The real promise of KM: achieving significant results with significant effort – calls for knowledge to be integrated into management, and not the other way around” (Nonaka & Teece, 2001, p. 238).

### 4.4 Criteria for KM

#### 4.4.1 Chinese standard model for KM

*The following model, as well as the brief description of it, has been obtained from Kaifa employee Shuai Yuan.*

![Figure 4.3, Knowledge resources](image1)

Figure 4.3, Knowledge resources (Adapted from GB/T 23703.1 – 2009 Knowledge process model)

![Figure 4.4, Process model](image2)

Figure 4.4, Process model (Adapted from GB/T 23703.1 - 2009 Knowledge process model)

China has developed a voluntary national standard for KM for companies and organizations to use. The foundation of the model consists of the three elements of management, culture and technology. The KM process itself is described in the steps creation, acquisition, storage, share, application, and evaluation. The three-dimensional cube shown above describes different types of knowledge as well as where they reside.
4.4.2 KM in accordance with EFQM

The European Foundation for Quality Management was created by fourteen leading European enterprises in 1988 to be the driving force towards sustainable excellence in Europe. By 2003, the organization had over 800 member organizations, reaching from all kinds of businesses, all over Europe (EFQM model v.2.2, 2003).

The EFQM model consists of nine criteria which rely on eight fundamental concepts, describing how excellence is achieved in practice. The nine criteria are divided into five enablers’ criteria and four results’ criteria. It is stated that in the fundamental concept People Development and Involvement that excellent organizations “…recognise the increasing importance of the intellectual capital of their people and use their knowledge for the benefit of the organisation” (EFQM model v.2.2, 2003, p. 8). Further on, in the fundamental concept Continuous Learning, Innovation and Improvement it is stated that excellent organizations “…capture and share the knowledge of their people in order to maximize learning across and within the organisation” (EFQM model v.2.2, 2003, p. 9).

EFQM distinguish a red thread across the borders of the criteria sections (EFQM model, v.2.2, 2003). By process improvements in one criterion, it is likely that related criterions along this thread will be affected (EFQM model, v.2.2, 2003). The matter of “Knowledge” can, according to the EFQM model v.2.2 (2003), be connected to the following criterion parts in the path of the red thread;

- 2b – using knowledge to influence policy and strategy
- 3d – identifying, developing and sustaining peoples individual knowledge
- 4e – managing the organizations knowledge
- 7 – measuring satisfaction with increase in knowledge and people indicators for increasing knowledge
- 9 – using knowledge to improve business

4.4.3 KM in accordance with Baldrige Criteria

The Baldrige Criteria for Performance Excellence has been widely used as an assessment and improvement tool ever since the United States Congress established the Malcolm Baldrige National Quality Award in 1987 (Kartha, 2004). The following questions are used to evaluate businesses performance using the Baldrige Criteria for Performance Excellence, when it comes to the management of information, knowledge and information technology (CPE, Section 4.2, 2011/2012).
(1) **Properties**: How do you manage your organizational data, information, and knowledge to ensure the following properties?
   a. Accuracy
   b. Integrity and reliability
   c. Timeliness
   d. Security and confidentiality

(2) **Data and Information Availability**: How do you make needed data and information available to your workforce, suppliers, partners, collaborators and customers, as appropriate?

(3) **Knowledge Management**: How do you manage organizational knowledge to accomplish the following?
   a. The collection and transfer of workforce knowledge
   b. The transfer of relevant knowledge from and to customers, suppliers, partners, and collaborators
   c. The rapid identification, sharing, and implementation of best practices
   d. The assembly and transfer of relevant knowledge for use in your innovation and strategic planning processes

As the general methodology in the Baldrige Criteria states, improvements are to be conducted in cycles containing the following four stages:

1. Planning, including design of processes, selection or measures, and deployment of requirements (**approach**)
2. Executing plans (**deployment**)
3. Assessing progress and capturing new knowledge, including seeking opportunities for innovation (**learning**)
4. Revising plans based on assessment finding, harmonizing processes and work unit operations, and selecting better measures (**integration**)

### 4.4.4 MAKE

Most Admirable Knowledge Enterprises (MAKE) was founded by Teleos in collaboration with the KNOW Network to identify the leading enterprises in the knowledge economy of the 21-century by using a Delphi methodology, i.e. let experts in the field identify and examine critical factors (Teleos, 2010b). Knowledge driven organizations, regardless of country, are nominated by the experts in an initial selection (Teleos, 2010b).
The same experts then nominate a maximum of three candidates each out of the identified ones to enter the finals (Teleos, 2010b). The enterprises nominated by at least 10% of the experts in this second round enter the final where the remaining enterprises are evaluated against eight performance dimensions (Teleos, 2010b).

Teleos has studied different knowledge management approaches and models developed by various organizations e.g. Theseus Institute, University of Kentucky and the Knowledge Management Consortium International (Teleos, 2010a). By studying these, a framework was developed, consisting of eight knowledge performance dimensions which are presented below (Teleos, 2010a).

- Creating an enterprise knowledge-driven culture
- Developing knowledge workers through senior management leadership
- Delivering knowledge-based products/services/solutions
- Maximizing enterprise intellectual capital
- Creating an environment for collaborative knowledge sharing
- Creating a learning organization
- Delivering value based on stakeholder knowledge
- Transforming enterprise knowledge into stakeholder value

The knowledge performance dimensions rely on dozens of supporting processes and sub-processes (Teleos, 2010a).

4.4.5 KMAT

Designed to help organizations make an initial high-level assessment of how well they manage knowledge, a collaborative and qualitative benchmarking tool was developed; (the) Knowledge Management Assessment Tool (KMAT) (Jager, 1999). Opposed to other quantitative and competitive tools, the KMAT has a qualitative and collaborative approach (Jager, 1999). Developed jointly by the world-wide consultancy firm Arthur Anderson and the American Productivity and Quality Center, KMAT can be used for both internal and external benchmarking (Jager, 1999). KMAT can help organizations to indentify which KM practices they have in place and do well in, but also to find weaker areas where practices might be poor or even lacking (Jager, 1999). To explain KM in an organizational context, the KMAT Model proposes four enablers (leadership, culture, technology and measurement) that can be used to foster the development of organizational knowledge through the knowledge management process (Jager, 1999).
4.5 Barriers and pitfalls

One of the core difficulties when it comes to codifying, storing, retrieving, sharing and distributing knowledge and "best-practices" is according to Bessant & Tidd (2007) due to the fact that systems supporting such activities often are confined to “hard” data/information, rather than more tacit knowledge. To view KM as merely an IT-system is not advocated since it will get companies stuck, with no idea on where to focus or what to do with acquired data (Picker, Ruhnke & Leker, 2009). Therefore, there is a need to integrate the KM system into the processes of the firm (Picker et al., 2009).

According to a survey carried out by the well-known consultancy firm KPMG in 1998, the biggest barrier to organizational knowledge usage is a blocked channel between knowledge provider and knowledge seeker (Shin et al., 2001). Blockages of that kind arise from causes such as temporal limitations, lack of staff motivation and willingness, and lack of incentives (Shin et al., 2001). Riege (2005) too describe the problem of knowledge sharing and transfer. “In brief, knowledge sharing has no real value to individuals and organizations unless those people who are in need of useful knowledge receive it, accept it, and also (re-)apply it” (Riege, 2005, p. 32). Barriers to knowledge sharing can be individual (e.g. age-, gender-, educational level differences), organizational (e.g. inadequate leadership, culture, hierarchy, communication), and technological (e.g. lack of integration of-, technical support for-, and training on IT-systems) (Riege, 2005).
Riege (2005) acknowledge that the creation of a knowledge embracing sharing culture by no means is an effortless and trouble-free undertaking, however, he claim that already-in-place formal and informal sharing networks can be built and expanded without investing large amounts of money.

According to Patton (2001), best practices are the most sought-after form of knowledge of today. He questions however, the meaning of “best practices” which indicate that there are but one best way of working in a world who values diversity and where there are many paths towards the same destination. If adopting best practices, the material should consist of a set of principles and guidelines since specific and prescriptive “best practices” offered without a context represent bad practice of best practice (Patton, 2001).

4.6 **Success factors**

*Authors in the field of KM advocate many (sometimes over-lapping) factors as critical for successful management of knowledge:*

- Link to economic performance/business imperative (Skyrme & Amidon, 1997; Davenport, Long & Beers, 1998; Mårtensson, 2000; Riege, 2005)
- Vision/strategy (Nonaka & Takeuchi, 1995; Skyrme & Amidon, 1997; Davenport *et al.*, 1998; Riege, 2005; Picker *et al.*, 2009)
- Technical and organizational infrastructure (Nonaka & Takeuchi, 1995; Davenport, 1997; Skyrme & Amidon, 1997; Davenport *et al.*, 1998; O’Dell & Grayson, 1998; Cross, Parker, Prusak & Borgatti, 2001; Riege, 2005; Picker *et al.*, 2009)
- Knowledge-friendly and open culture (Nonaka & Takeuchi, 1995; Skyrme & Amidon, 1997; Davenport *et al.*, 1998; O’Dell & Grayson, 1998; Mårtensson, 2000; Cross *et al.*, 2001; Chourides, Longbottom & Murphy, 2003; Riege, 2005; Tseng, 2008)
- Clear purpose, language and methodology for improvement (Davenport *et al.*, 1998; O’Dell & Grayson, 1998; Tseng, 2008)
- Change in motivational practices/incentives (Davenport, 1997; Davenport *et al.*, 1998; O’Dell & Grayson, 1998; Mårtensson, 2000; Riege, 2005; Tseng, 2008; Picker *et al.*, 2009)
- Communication/Multiple channels for knowledge transfer (Nonaka & Takeuchi, 1995; Davenport *et al.*, 1998; Mårtensson, 2000; Cross *et al.*, 2001)
• Senior/Top management support (Davenport et al., 1998; O’Dell & Grayson, 1998; Mårtensson, 2000; Chourides et al., 2003; Tseng, 2008; Picker et al., 2009)

• Continuous learning/Process improvement (Skyrme & Amidon, 1997; O’Dell & Grayson, 1998; Picker et al., 2009)

• Knowledge leadership/Knowledge officers (Davenport, 1997; Skyrme & Amidon, 1997; O’Dell & Grayson, 1998; Chourides et al., 2003; Riege, 2005; Picker et al., 2009)

• Effective teamwork (Nonaka & Takeuchi, 1995; O’Dell & Grayson, 1998)

• Evaluation/Measurement (O’Dell & Grayson, 1998; Ahmed et al., 1999; Mårtensson, 2000; Tseng, 2008; Picker et al., 2009)

• Time (Nonaka & Takeuchi, 1995; Davenport, 1997; Mårtensson, 2000)

Tobin & Snyman (2004) discusses KM related to Quality Management and the quest for “world-class” practice, which they claim has been the goal for companies for several decades. In their scientific article, Tobin & Snyman (2004) provides a number of perspectives on the issue of what can be used to measure, improve and sustain world-class performance. The different elements of a proposed framework for world-class performance were then applied to the field of KM – recommendations are as follows (Tobin & Snyman, 2004, pp. 12-13):

• There is no single measure or model which can be used to determine world-class performance, particularly in the field of KM.

• The measures and models that make up the proposed framework should be treated as elements of a KM journey, and not a single, one-time destination.

• The selection of which elements of the proposed framework (and the relative importance of those elements) to apply will depend on the context of the organization which seeks to reach and sustain world-class performance in KM.

Basically Tobin & Snyman (2004) stress the importance of each organization making up their approach to world-class overall and KM performance, whilst keeping in mind that this approach is to be considered dynamic and subject to frequent updates and evaluation.
4.7 Examples of KM in organizations

General KM stories as well as examples of processes supporting the SECI model are given to exemplify activities and make the somewhat abstract theory of knowledge management more tangible.

In 1999, Arup, an international engineering consultancy firm established a number of KM initiatives to encourage sharing of know-how and experience across projects (Bessant & Tidd, 2007). Efforts implemented at Arup range from organizational processes and mechanisms, such as cross-functional communications meetings and skills networks, to technology-based approaches such as the “Ovebase” database and intranet (Bessant & Tidd, 2007). Learning’s from this case, according to Bessant & Tidd (2007), were that the organizational processes and mechanism were rated as twice as valuable (than databases) by the engineers in an internal survey. Mainly two reasons for this were given. First, the difficulty associated with codifying, storing and retrieving tacit knowledge (Bessant & Tidd, 2007). Second, the complex engineering context put limitations on the reuse of standardized knowledge and experience (Bessant & Tidd, 2007).

To investigate KM from an IT perspective, Chourides et al., (2003) studied a leading international consulting company in the business of providing information and knowledge services. Initially, the organization introduced a complex communication system with an “open” approach, i.e. employees were encouraged to share skills and best practices freely. This resulted in a large amount of data, but with little value. To overcome this, the knowledge contributions were to be submitted as a paper to be evaluated by experts before being uploaded to the knowledge database (Chourides et al., 2003). Similar knowledge sharing approach is used by Advanced Semiconductor Engineering, Inc. (ASE) where employees are required to create teaching materials which after expert approval was uploaded to the knowledge management platform (Yeh, Lai & Ho, 2006). Sieloff (1999) describes the IT – system at HP as a two edged sword, which on one hand is able to share information easily, but which also easily can share too much information for the receiver to interpret.

ASE uses three types of training; classroom education away from the workplace, on the job training led by each department manager and self-learning activities called “Self-Development” (Yeh et al., 2006). VIA Technologies, Inc. (VIA), also studied by Yeh et al., (2006), categorized their training effort in the following types; general training, professional field training and in-house training within each department.
The general type is held by the HR department who educates employees in information techniques and patent sanctions etc. and the professional field training are held by R&D personnel. The training courses are filmed and stored in the IT – system (Yeh et al., 2006). A different training approach is used by the UK-based company Expert Consulting Ltd. who expects and requires the employees themselves to identify education relevant for their own professional development (Robertson & Hammersley, 2000). According to Robertson & Hammersley (2000), this approach emphasizes knowledge redundancy since the courses they chose and the conferences they attended etc. seldom had any direct relevance to the day to day project work carried out by the employees.

Hellström, Kemlin & Malmquist (2000) describes how Ericsson handles their knowledge in different KM initiatives. The web-based communication tools used at Ericsson reaches from a somewhat informal network, developed to let employees get familiar with IT - system in general, to Business Intelligence Centers (BIC) focusing on one way communication (Hellström et al., 2000). Zopps, the informal system served as a playground with discussion forums for non-specific subjects while BIC handled information from within or from outside Ericsson which was distributed through the organization in forms of personal news bulletins (Hellström et al, 2000). The “Knack system” was used for educational purposes and competence development as well as serving as a discussion forum handling specific topics and problem solving (Hellström et al, 2000).

Apart from the web-based tools, Ericsson also used face-to-face interactions such as the Project Management Institute where project leaders got together to develop their skills through education and seminars led by employees whose only task was to improve the project work at Ericsson (Hellström et al, 2000). To pinpoint innovative ideas, Ericsson developed a special unit whose task was to match people and their ideas in a competence network where the idea could be further developed (Hellström et al., 2000). Once an idea had been approved for its possible profit generating capabilities, a cross-functional team is put together, consisting of 5 – 15 people. To develop inexperienced managers in fast growing business units, project management teams were put together consisting of two inexperienced and one experienced project manager (Hellström et al., 2000). During the project, the management teams were encouraged to trust their own competence rather than to contact the “mother organization”. This resulted in an informal “go getting mentality” and informal coaching including tacit knowledge transfer (Hellström et al., 2000).
At Astra Zeneca, an initiative to ease and increase the knowledge sharing was conducted. Due to the increasing pace among the clinical research, the clinical testing time needed to be reduced which led to little time for knowledge sharing (Roth, 2003). The case study by Roth (2003) used two “knowledge facilitators” with great experience from the R&D department and with an extensive personal network. In the first step of the process, the facilitators interviewed the project leader to get familiar with the project and to help the project leader to articulate what he/she already might have known. The interview was documented and the facilitators also functioned as support, giving the project leader feedback from lessons learned in other projects. The second phase consisted of brainstorming meetings led by the facilitators with the project group and the third phase was about sharing the outcome in an interactive seminar (Roth, 2003).

4.8 Summary of theoretical framework

Please note that this summary consists of examples and conclusions made by the authors in order to easily explain the somewhat fuzzy theories above.

Knowledge is regarded as a more and more important asset to organizations and the knowledge worker is highly valued. KM is beginning to grow and take its place in quality standards and excellence models, but without consistency in requirements or approaches. The management of knowledge is about being able to handle the knowledge path by enhancing conditions for knowledge creation, capturing, sharing and usage. An example of tacit knowledge is the knowledge of how to ride a bicycle; one is not able to articulate with enough accuracy how to keep the balance to teach others through explicit instructions. Instead, the knowledge has to be taught by experience and practice. A project leader will probably not be able to write down in detail what he/she is doing to motivate team members to perform well and keep deadlines – it is a quality possessed by the individual that is transferred by inheritance or adoption of leader characteristics through close collaboration or studying. While the tacit knowledge has been valued by the Japanese, Westerns has emphasized on explicit knowledge throughout history and organizational development. Nonaka & Takeuchi (1995) however, believe that knowledge can be transferred between the knowledge modes found in the SECI model by conversion of knowledge in each of the corresponding Ba (shared context). The SECI model developed by Nonaka & Takeuchi (1995), function as an important foundation for this thesis. The knowledge conversions are triggered by the epistemological (types of knowledge e.g. tacit, explicit) conditions and the spread of best knowledge is accelerated by ontological (from individual to group to organization) triggers.
Knowledge creation and the combination of knowledge in different sets are according to Bessant & Tidd (2007), strongly related to innovation and entrepreneurship. Further positive outcomes from KM is, according to Ahmed et al., (1999), reduction of new product development cost, increased employee productivity, reduced loss of intellectual capital and increased employee satisfaction. While knowledge and KM by nature are fuzzy and inherently hard to measure and quantify, some tools have been made to facilitate such efforts. Some guidance in these matters may be found in existing standards such as EFQM and CPE. The Knowledge Management Assessment Tool (KMAT) is however a set of statements that has been developed for the sole purpose of evaluating and assessing an organization’s performance regarding KM.

4.9 Approach and assessment tool suggested

KMAT provides organizations with an initial high-level assessment of how well they manage knowledge through a set of evaluation questions (Jager, 1999). Nonaka & Takeuchi (1995) is somewhat critical to the term knowledge management, but advocates the SECI model for dynamic knowledge creation to be used for understanding how knowledge influence the performance of organizations.

The proposed tool and approach uses the criterions in KMAT, connecting examples of activities required to fulfill those criterions to the corresponding Ba in the SECI model. In figure 4.6 below, the correspondence is shown and the criterions are given activities to enhance the probability for criterion fulfillment. The boxes left in white indicate that the authors find the connection between criterion and Ba nonexistent or very weak. Not all statements in the KMAT criteria were considered to be related to neither any specific activity nor any particular Ba why these were high-lightened in red as presented in figure 4.6. The statements were however not deleted from the tool but kept for the management to consider if the statements were true or not, preserving the KMAT criteria in its completeness. By answering “yes” to the red questions, named “general management questions”, support is assumed to be more or less given to all Ba’s why an equal amount of score is given if the statement is found true. At the scope of this thesis, the management was not participating in the evaluation why these questions have not been answered and thereby lowering the overall Ba percentage in the pilot test.
To evaluate the state of KM in an organization, KMAT is by the authors seen as an appropriate measurement tool due to its extensiveness and its focus on KM solely. By answering yes or no to questions regarding “hard” facts such as whether or not the organization has mapped its business processes or not, as well as “soft” facts regarding for example the opinion of the employee, an organization is able to measure the present state of KM. However, the evaluation reveals little of why the gap between desired KM measurement result and actual measurement result exists and what could be done to fill that gap. It is therefore suggested to first of all create adequate preconditions for KM. Using the KMAT criteria, the authors has attempted to define the underlying activities (processes) needed to fulfill the KMAT criteria.

By being aware of the gap between existing preconditions and preconditions distinguished from KMAT criteria, the organization is able to determine what activities they lack of. Furthermore, the activities broken out of the criteria are related to each Ba in the SECI model to visualize areas of improvement and to see a possible bottleneck in the knowledge spiral. The assessment tool can be applied to evaluate organizations at process level, department level or organizational level depending on the required amount of detail. The authors suggest a more detailed measurement at this conditional level to ensure that these activities are widely supported throughout the organization.
5 Assessment tool for Knowledge Management

In this section, the results from the test run of our approach will be presented. The case company used for validation will also enjoy a brief presentation.

5.1 Kaifa Technology Co., Ltd.

The following information, data and company description were provided by Shuai Yuan (of the OEPO department), though the combination of verbal communication and document exchange.

Kaifa is a Chinese manufacturing company founded in 1985. Kaifa, with head quarters in Shenzhen (China), employs over 10,000 people distributed over the two plants in Shenzhen, one plant in Suzhou, an administrative function in Hong Kong, as well as customer service functions in Milan (Italy), Singapore (Singapore), Sydney (Australia) and San José (USA). With a customer-base including companies such as Kingston, Western Digital, IBM, Samsung and ZTE, Kaifa is foremost an electronics manufacturing service/original equipment manufacturer (EMS/OEM), but also an original design manufacturer (ODM). Product fields within EMS/OEM are e.g. consumer electronics, computing & storage, and medical equipment. As for the ODM, such fields are e.g. memory related products, digital home products, and meter & metering systems.

Since operations first started 25 years ago, Kaifa has acquired several certificates e.g. ISO 9000 in 1994, ISO 14000 in 1999, TL 9000 in 2001, ISO 13485 in 2007, as well as taken on a series of management approaches for continuous improvements e.g. Six Sigma in 2002, Business Process Reengineering (BPR) in 2004 and Criteria for Performance Excellence (CPE) in 2007. As the company has grown, it has become more and more difficult to manage knowledge and keep the uniformity between subsidiaries – thus the need for knowledge management has become apparent in order to, among other things, reduce repeated knowledge creation as well as promote the transfer of best practices. Kaifa has previously attempted some kind of KM approach which basically consisted in some changes being made to the IT system. This approach however had little effect on the sharing of knowledge and even less effect on the creation of knowledge.
5.2 Approach and assessment tool applied

The approach and assessment tool has been tested on one of the larger processes owned by the OEPO department of Kaifa. The process “scored” was the KCA process, KCA being an abbreviation for *knowledge centered activity* in Kaifa internal terminology. The activities derived by the authors from the KMAT criteria were entered into an excel spreadsheet. The respondent was shown the original KMAT criteria connected to the by the project group suggested activities required to fulfill such criterion. The scoring, as well as the relation to the different Ba’s however, was not displayed since it was summarized in “hidden sheets”. The score was a product of actual amount of activities fulfilled divided by the number of possible activities in each Ba, thereby presenting a percentage of total fulfillments. In the Originating Ba for example, support for one of 29 possible activities was found in the process tested, thereby given the score of 3 %. While the activities were connected to the different Ba’s by the authors, the relation to the KMAT categories were left unchanged, e.g. the activities belonging to the first fifteen statements supported the category *leadership*. Out of a possible fifteen activities, the tested process supported three of them, representing 20 %. The number of possible connections for the different Ba’s, as well as the different categories can be studied in appendix 1. A sample of the constructed evaluation form is presented in figure 5.1.

![Sample evaluation form](image)

Figure 5.1, Sample of evaluation form

The evaluation form was sent to Shuai Yuan who, by studying the written process description, checked the boxes containing activities corresponding to the existing process steps. The process was chosen partly due to its size and content, but also due to the fact that Shuai Yuan was an employee of the process owning department, OEPO, thereby being familiar with the process. After the form was completed, it was sent back to the authors, the sheets were unlocked and unhidden to reveal the results which are displayed below.
Figure 5.2, Results in numbers

<table>
<thead>
<tr>
<th>General management</th>
<th>Leadership</th>
<th>Culture</th>
<th>Technology</th>
<th>Measurement</th>
<th>Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>20%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Figure 5.3, Result from test – fulfillment of Ba (bar chart)

Figure 5.4, Result from test – fulfillment of KMAT (bar chart)
Although a general picture can be instantly given, some interpretation might be needed to fully comprehend what is being shown. Important to keep in mind is that the result is only collected from one single process being “scored”. The KCA process is proven to lend some support to each of the four Ba found in Nonaka’s SECI model. When considering the fulfillment of each category derived from the original KMAT assessment tool, support is given to leadership, culture and process, though the categories of technology and measurement score zero.
As for the general management questions, they were not responded to, even though they were a part of the questionnaire. One might doubt that these are applicable to a single process, but are assumed to be more suitable on department level assessment, which is why they have been left out thus “scoring” zero as well. If the questions not related to any Ba would have been excluded at this process level evaluation the score would have been as follow; Originating Ba – 8 %, Dialoguing Ba – 10 %, Systemizing Ba – 14 %, Exercising Ba – 9 %. The changes would not have affected the fulfillment of KMAT since the red managerial questions are placed in a category of their own.
6 Discussion

6.1 Theory

Knowledge appear to have been subject to a philosophical debate for quite some time, yet a formal definition or agreed upon way to describe it is still pending. Previously in this thesis report, several views regarding knowledge were presented showing both differences and similarities. While it is up to the reader to decide whether to sympathize with the Westerners or Japanese, to deem the Cartesian duality valid or not, the project group choose to side with authors such as Nonaka & Takeuchi (1995) and Christensen (2003) in their claim that differences are good for understanding the concept better and that they can actually complement each other. Since acclaimed by academics (e.g. Patton, 2001; Tobin & Snyman, 2004) that universal best practice or approach for KM may not exist, it seems appropriate that each company form their own strategy according to their situation.

When deciding how to approach KM, several sources may be used for reference. Picker et al., (2009) stresses the importance of not viewing KM as merely an IT - system since implementing solely that will accomplish nothing. Even if an effective system is in place, by using the logic of Shin et al., (2001), it is not certain that knowledge will travel from provider to seeker. Blockages between these parties are, according to Shin et al., (2001), common and might arise from e.g. lack of staff motivation and willingness or lack of incentives. The issue of barriers is further explained by Riege (2005) who argue that even if knowledge reaches the desired receiver, the value of that is limited unless the knowledge is accepted and (re-) applied.

Using a different approach to the potential difficulties with KM, one might focus on good practices or desired elements instead. By trying this, it immediately becomes obvious that the factors that are to consort are many. Top management support, appropriate leadership such as knowledge officers, and a clear strategy of how to move towards a set vision is advocated (Chourides et al., 2003; Nonaka & Takeuchi, 1995; Skyrme & Amidon, 1997; Davenport et al., 1998; O’Dell & Grayson, 1998; Mårtensson, 2000; Riege, 2005; Tseng, 2008; Picker et al., 2009). Appropriate allocation of time appears to be held crucial to the success of any KM initiative (Nonaka & Takeuchi, 1995; Davenport, 1997; Mårtensson, 2000).
Factors facilitating KM in an organization, both “soft” and “hard”, are e.g. technical and organizational infrastructure providing multiple channels for communication and knowledge transfer, but also the shift towards an open knowledge-friendly culture supported by better suited motivational practices and incentives (Nonaka & Takeuchi, 1995; Davenport, 1997; Chourides et al., 2003; Skyrme & Amidon, 1997; Davenport et al., 1998; O’Dell & Grayson, 1998; Mårtensson, 2000; Cross et al., 2001; Riege, 2005; Tseng, 2008; Picker et al., 2009). When KM is in place and being practiced in an organization, it is important that effective teamwork help continuous learning and process improvements to be carried out with a clear purpose, and that made progress are measured with a clear linkage to economic performance (Nonaka & Takeuchi, 1995; Skyrme & Amidon, 1997; Davenport et al., 1998; O’Dell & Grayson, 1998; Ahmed et al., 1999; Mårtensson, 2000; Riege, 2005; Tseng, 2008; Picker et al., 2009).

A crucial precondition for analyzing knowledge in a company, as stressed by Christensen (2003), is to evaluate the current condition and map the processes and players involved. This leads up to the proposed approach, which the project group believes has the ability to serve as a part of that initial assessment and mapping advocated by Christensen (2003).

### 6.2 Examples of KM in organizations related to the SECI model

In this section, case studies are discussed and connected to the knowledge cycle, the types of conversion in the SECI model as well as the different kinds of Ba.

The approach for knowledge contribution, in the case of ASE described by Yeh et al., (2006) and in the case of the leading international consulting company described by Chourides et al., (2003), where material is reviewed by experts before being uploaded to the IT – system justifies the knowledge before it is being shared. Thereby the knowledge can be seen as more trustworthy and reliable. It can also be necessary to sift the material in order to decrease the amount of superfluous information that IT – systems enables, as described by Sieloff (1999). The knowledge contributions from employees of ASE however, seem to consist of individual reports which might limit the externalization part.

The various types of training at ASE and VIA are assumed to stimulate the knowledge transfer in different conversions; classroom education away from the workplace and on the job training stresses the combination mode while the self learning activities are believed to emphasize the internalization of knowledge. At VIA, the training is filmed and stored in the IT – system (Systemizing Ba) but it is not revealed if, and how this
material is used. At Expert Consulting Ltd., where employees choose the courses they find necessary, more freedom and trust is given and it is mentioned that a lot of knowledge redundancy is taken place, something that Nonaka & Takeuchi (1995) find important for the knowledge creation.

At Ericsson, the different web-based tools have different purposes and supports different Ba’s; the informal network system which allowed employees to get familiar with internet technology as a communication tool in a “learning by doing” manner can be categorized in the Exercising Ba while BIC, used for one way communication, can be put in the Systemizing Ba where information is put together in a logical context. Knack were used for problem solving discussions in specific matters, somewhat emphasizing the Dialoguing Ba as well as an information portal for knowledge seekers in the Systemizing Ba.

The innovation cells of Ericsson clearly contain knowledge exchange when cross-functional groups are put together in pursuit of a possible innovation and it is assumed that several Ba’s are supported throughout the process. The actual work flow is however not described in enough detail by Hellström et al., (2000) for the project group to draw any specific conclusions. When less experienced managers were put to work together with senior managers for educational purposes it is explicitly mentioned by Hellström et al., (2000) that transfer of tacit knowledge was taken place, thereby covering the Originating Ba.

The facilitators used in the study of Astra Zeneca enhanced the extraction of knowledge from both the project leader and the project members so that the knowledge could be documented and later shared both verbally in seminars and also explicitly in written documents. This example supports the Dialoguing- and the Systemizing Ba.

6.3 Approach and assessment tool suggested

Two popular and well-known paths for continuous improvements are the ones of EFQM Excellence Model and the Criteria for Performance Excellence (CPE) associated with the Malcolm Baldrige National Quality Award. These approaches are similar, and together with the Deming (Prize) Model, they represent the most widely used models for Total Quality Management (TQM) (Corredor & Goñi, 2010). The strength of EFQM and CPE lay in them being globally wide-spread and holistic.
However, they provide very little in-detail advice and guidance on the matter of KM, and no direct criteria or questions for evaluation is available. Both CPE and EFQM annually appoint an award for excellent organizations. The MAKE award is somewhat similar, but instead of the goal being to excel in TQM, MAKE is solely concerned with KM. While MAKE provides a framework for enterprises to use in their self-evaluation, specific questions are however not provided.

KMAT is a self-assessment tool developed specifically for KM, which provides both a process model and specific (assessment) questions for companies to use (Jager, 1999). Other from providing assessment questions and extensive examples of those questions, KMAT seem appropriate due to it being easily understood and related to. The KMAT process model also enjoys similarities with the Chinese standardized model for KM (see figure 4.4 and 4.5). Relations between KMAT, MAKE and EFQM can also be noted since they care for the category leadership and KMAT and MAKE push for a knowledge driven culture.

The works of Ikujiro Nonaka (see e.g. Nonaka & Takeuchi, 1995), particularly the theories of knowledge creation supporting the SECI model, may need no further description or arguing for. Apart from the project group deeming the theories valid and applicable; a study by Ma & Yu (2010) revealed that Nonaka & Takeuchi (1995) were by far the most cited publication in the field of KM during the period of 1998 to 2007, with a total of 247 citations. Including other works such as scientific articles, Ikujiro Nonaka enjoyed a total of 482 citations during the same period (Ma & Yu, 2010).

The evaluation tool can as mentioned be used to evaluate an organization at different levels such as process level, where each process is tested for its KM capabilities, or with more holistic scope, such as department- or functional level to see if desired KM activities are in place somewhere in the organization. Considering the evaluation criterions’ connection to each Ba, it is suggested by the authors that efforts are being made to ensure that the knowledge spiral is at least complete at department level.

The case company being a manufacturer might not need the same intensity in knowledge creation and sharing in every department as a more knowledge intense company, e.g. a consultancy firm. It might therefore be interesting to take the different functions into account since some departments are doing operative assembly according to strict instructions and others are doing research and development for new products. Some
organizations might strive for more overall stability with higher degree of KM in selected
departments, something that would lower the average score.
A measurement and analysis are therefore recommended to evaluate the departments’
performance. No matter the desired level of KM, it is assumed the organization would
still profit from having the awareness of present state and evolving trends. The
assessment tool can also be used when creating new processes at department- or
organizational level, ensuring the elements of KM and defining the amount of
preconditions supporting KM.

6.4 **Approach and assessment tool applied**

The results presented in chapter 5.2 did not surprise the authors since it was suspected
that the explicitly written processes for socialization would be few just as the
combination mode, or systemizing Ba, would be the most supported one. The
combination mode is assumed to be the easiest one to achieve and also the easiest one to
describe in a written process. The fulfilment of the different categories in the KMAT
criteria is explained by realizing that the case company does not have any measurements
for KM why the measurement category is 0 percent. The support of leadership category is
explained with that KCA is a process owned by a management department and that the
general management questions were not answered in this pilot run. One surprise was that
no support was given to the technology category, which was found a bit odd since that
was assumed to be much related to the systemizing Ba.

The results from the process assessment at the case company have been presented and are
by the project group regarded as an indicator that the proposed assessment tool works and
is applicable. What has to be pointed out however is that only the questions suitable for
process evaluation (shown in green in appendix 1) were applied, to just one single
process. This is due to the fact that the questions marked in red in appendix 1, are to be
seen as more general managerial questions, hence their exclusion. As previously
mentioned, in order to obtain more useful results and a more holistic “picture” of the
preconditions for KM, a set of processes e.g. within a departmental is recommended to be
tested.

Efforts were made by the project group to test several processes but it was proven that the
explicitly written processes stored in the internal system were not in enough detail to be
evaluated by the authors. One thing that was noted however was that most of the (few)
identified activities would have been mapped on the right half of the SECI model, in the
dialoguing and/or the systemizing Ba. It is suggested that the respondent of the evaluation is a person with great understanding of the process and its steps, such as the process owner, constructor or leader. The tested process was by the respondent considered to be a larger management process and was therefore assumed to contain more knowledge management activities than other processes might.

In a future department evaluation where all the processes within a department are evaluated and considered to complement each other, it should be suitable to judge whether or not the statements and activities proposed in this paper are covered in any process. By measuring KM at departmental level in this manner, a picture showing the level of completeness of the knowledge spiral as well as the KMAT performance within the department is revealed.

6.5 Future research

The small scale pilot test conducted in this thesis is strongly suggested to be conducted in a larger extent in the case organization as well as other organizations for validation. Feedback from users in such assessment would further refine the questions in the tool and also evaluate it regarding level to acquire enough detail.

The authors believe that it is impossible to track organizational improvements to one isolated and single initiative in a multi dynamic organization. However, to investigate what effect an improvement of assessment tool results have on the overall KM performance is seen as a natural step if an organization chooses to adopt and try to achieve suggested activities. Research regarding the effect on KM would to some extent justify the tool or detect that improvements are needed.

Once a foundation for KM is built, the criteria can be connected and related to the knowledge spiral accelerators described in 4.2.2. It is assumed that creating preconditions for acceleration at epistemological and ontological level will gain the organization as described in 4.2.2 but that organizations first need to build a stable KM foundation and KM awareness.
7 Conclusion

Much has been written on knowledge management, and theories as well as, concepts and advice on how organizations can excel in this field are easily found by whoever seeks it. The project group can simply acknowledge that, like for many other management ideas, there seems to be no universal holistic remedy available. Although this might be true, the assessment tool proposed is by the authors believed to be useful in various types of organizations.

The project group has developed an assessment tool suitable for identification of the present state of knowledge management in an organization by the combination of a well-known knowledge creation model and a globally wide-spread set of measurement criteria. The evaluation questions were given activities that can function as preconditions in order to establish a foundation for knowledge management. Furthermore, the activities were related to the knowledge conversion modes. Organizations are thereby also able to detect areas where improvements are needed in order to complete and balance the knowledge creation spiral. The assessment tool investigates the existing perquisites for knowledge management evaluation and knowledge creation.

While the assessment tool has proven applicable, it provides room for further refinement, development and possibly adaption to, and by the organization that wishes to apply it.
8 Final words

As mentioned as an ambition, the project group considers the cultural as well as the knowledge-based exchange (between Sweden and China) as fulfilled through the conduction of this thesis. Since an ambition to accomplish such a thing is impossible to consider an explicit single task to be completed, the project group has instead kept it close in mind throughout the thesis and tried to act in favor of it. Doing so have been realized e.g. through the project group participating in social activities hosted by the company, as well as speaking their mind when differences in opinion have arisen. As expected, several differences in views and opinions have indeed prevailed. The most apparent has been the differences in organizational culture and in leadership – i.e. “how things are done” and where focus is put.

The project group has picked up on what seems to be a general tendency towards explicit instructions, utterly defined work flow, and a strong belief that the vision and desired state would be a workplace where everything is defined and regulated by excellent processes where people do not need to talk to each other. This is backed up by the fact that the case company is a manufacturing company with low profit margins, which would be why they could not afford to make many errors. The employee closest to the thesis project, Shuai Yuan, explained that this view and culture is very common in manufacturing firms in China. Shuai Yuan exemplified by telling us that the somewhat infamous company Foxconn (who assembles for example Apple products) has processes defining how and in which order the operators in the production line shall use each of their fingers to complete a task. Such stories made the project group automatically think of Frederick Taylor (1856 – 1915) and the scientific management methods he applied.

“They can do it and hate it, but they will still do it” might be true in Chinese organizational culture, although the project group feel this might limit the room for creativity. By creating preconditions in the processes that is supported by the proposed assessment tool as well as the employees, the operations might end up containing more redundancy but also, more knowledge would probably be created.
References

References that are made throughout this paper are listed in an alphabetical order with attention to source type.

Literature


**Scientific articles**


**Other**

Shuai Yuan, employee of OEPO department, Kaifa Technology Co., Ltd., interviewed 2011-02-28 – 2011-05-20, Shuiyuan@kaifa.cn


## Appendix 1 – KMAT activities in the SECI model

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Ori. Ba</th>
<th>Dia. Ba</th>
<th>Sys. Ba</th>
<th>Exc. Ba</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Li. Managing organizational knowledge is central to the organization’s strategy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The organization believes there is a strong correlation between knowledge management and improved business performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior executives are evaluated on how well they manage organizational knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A knowledge management position has been created with the authority and resources to promote the development of knowledge relating to the organization's core competencies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day-to-day decision making includes discussions of how well the knowledge elements of products, services, and work processes are being managed</td>
<td>Discussions are informal, unstructured and not managed</td>
<td>Operational interactions and discussions include the knowledge mgmt status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-range planning has prompted the organization to develop joint programs with high schools and colleges, insuring a fixture source of knowledge workers</td>
<td>Such programs include dialogues where knowledge, values, beliefs and culture are exchanged between the organization and students</td>
<td>The material, outcome and lessons learned from the joint program is stored</td>
<td>Material, outcome and lessons learned are used as training material and to further develop the joint program</td>
<td></td>
</tr>
<tr>
<td>L2. The organization understands the revenue-generating potential of its knowledge assets and develops strategies for marketing and selling them</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Information itself, the technology systems in which it is housed, and the framework for accessing information are all treated as potential sources of profit.

The organization increasingly embeds knowledge in its products and services in order to create "smart" products that command a premium in the marketplace.

The organization sells not only traditional products and services but also knowledge of how customers can use those products and services to improve business performance.

<table>
<thead>
<tr>
<th>L3. The organization uses learning to support existing core competencies and create new ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees understand the organization's competitive strengths and can articulate how their work and learning contribute to them.</td>
</tr>
<tr>
<td>Discussions are held with suppliers to identify market and customer trends, quality and to be able to lower the price or deliver more value to the market/customer.</td>
</tr>
<tr>
<td>Identified and extracted knowledge from suppliers is stored.</td>
</tr>
<tr>
<td>Supplier knowledge is taken into account when decisions are made.</td>
</tr>
</tbody>
</table>

This is taught in training and exercised by employees.

<table>
<thead>
<tr>
<th>The organization leverages supplier knowledge to create competitive advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suppliers are invited to participate in the organization's knowledge management efforts; part of their evaluation is based on their contribution to knowledge management is recognized and stored.</td>
</tr>
</tbody>
</table>

Suppliers are invited to participate in the organization's knowledge management efforts; part of their evaluation is based on their contribution to knowledge management is recognized and stored.
<table>
<thead>
<tr>
<th>Contributions to these initiatives.</th>
<th>The organization is able to identify when the basis of competitive advantage has changed and redirects its learning to create new core competencies.</th>
<th>The market and competitors are scanned to identify market trends to be able to create learning material according to new core competencies.</th>
<th>New knowledge gaps are identified, filled and new knowledge competencies are exercised.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L4. Individuals are hired, evaluated, and compensated for their contributions to the development of organizational knowledge.</strong></td>
<td>Management uses promotions, pay increases, bonuses, and other forms of recognition to reward and encourage those who share their knowledge and support their colleagues.</td>
<td>Employees are rewarded by verbal or written recognition, in official or official for their knowledge contribution to the organization. Employees are rewarded financially for their knowledge contribution to the organization.</td>
<td></td>
</tr>
<tr>
<td>Management encourages multiple approaches to achieving goals and promotes strong team players whose efforts expand the organization's knowledge base.</td>
<td>Human resources planning includes jointly setting learning objectives with employees and providing them with the means to meet those objectives.</td>
<td>The employee are given the means in form of material and time to study and practice the necessary steps towards the objective.</td>
<td></td>
</tr>
<tr>
<td><strong>Culture</strong></td>
<td><strong>Individual objectives are discussed with the employees</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
C1. The organization encourages and facilitates knowledge sharing

| Employees routinely share ideas and technology | It is an open minded culture and informal idea discussions are encouraged | Individual and team progress always on the agenda at meetings. | Good ideas are selected, refined, documented and stored in the system |
| Employees participate in cross-functional teams, keeping up with external marketplace changes and soliciting outside perspectives on key projects. | Verbal communication is encouraged and emphasized in the cross-functional teamwork | Discussions are being held when a project is about to be initiated to decide whether or not to use cross-functional teams |
| The organization has learned how to identify projects that should use cross-functional teams | An open minded climate accepts all types of information | Seminar-style meetings are being held where progress and problems are discussed. | Formal documents and policies encourage knowledge sharing |
| Information hoarding is discouraged | Project procedures and methods are discussed and cross-functionally reviewed as the project proceeds and progress are being made. | The explicit outcome and lessons learned is stored in the system | Previous joint projects are studied learnt from to improve future joint projects |
| Divisions, plants, departments, or units often work on joint projects | New approaches to capturing and sharing knowledge about customers, core competencies, and experience are rapidly adopted | New ideas and approaches on how the capturing and sharing of knowledge are to be carried out are discussed | Present approaches are updated and reviewed |
| C2. A climate of openness and trust permeates the organization | Employees share a common way of talking and thinking about issues, allowing information to easily flow up, down, and across the organization | There is a levelled hierarchy at meetings and everyone is asked for opinion | The new updated/new approaches are adopted |

An open minded climate accepts all types of information. Seminar-style meetings are being held where progress and problems are discussed. Formal documents and policies encourage knowledge sharing. Previous joint projects are studied learnt from to improve future joint projects. Present approaches are updated and reviewed. The new updated/new approaches are adopted.
A relatively flat organizational structure further enhances information flow

<table>
<thead>
<tr>
<th>Process/Department strives to flatten the organizational structure to ease information flow</th>
<th>Boss-employee structure is not strict and enforced during day-to-day meetings and such in order to enhance information flow</th>
</tr>
</thead>
</table>

Employees frequently volunteer to help one another, even if they are in different departments or functional areas

<table>
<thead>
<tr>
<th>Could be achieved if dialoguing is achieved</th>
<th>Time and respect is given to everyone involved in discussions. Opinions and suggestions are welcomed</th>
</tr>
</thead>
</table>

The organization has developed a capacity for listening, and members, including management, are able to change their minds without "losing face."

<table>
<thead>
<tr>
<th>Problems or errors are openly discussed and solutions shared</th>
<th>Problems or errors are openly discussed and documented</th>
<th>The accepted solutions are stored in system</th>
</tr>
</thead>
</table>

Informal meetings that are open to all employees are held regularly; status is not important at these meetings

<table>
<thead>
<tr>
<th>Time and respect is given to everyone involved in discussions. Opinions and suggestions are welcomed</th>
<th>Solution are used to solve issues or function as reference to support a certain procedure so that the same mistakes not are being done again</th>
</tr>
</thead>
</table>

Problems or errors are openly discussed and solutions shared

<table>
<thead>
<tr>
<th>Problems or errors are openly discussed and documented</th>
<th>The accepted solutions are stored in system</th>
</tr>
</thead>
</table>

The physical environment is organized in ways that facilitate knowledge transfer (e.g., using shared workspaces or large open-space work areas, or co-location of individuals working on cross-functional projects).

<table>
<thead>
<tr>
<th>Working areas are designed with high visibility in mind, making it impossible not to be influenced by others</th>
</tr>
</thead>
</table>

C3. Customer value creation is acknowledged as a major objective of knowledge management
<table>
<thead>
<tr>
<th>Employees understand how customer value creation impacts the organization's financial results</th>
<th>Document regarding the connection between customer value creation and financial results are stored and available to the employees</th>
<th>Documents regarding the customer value creation is taught and studied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly segmented customer information exists at every level of the enterprise</td>
<td>Authorization is given to employees at every level of the enterprise, making it possible to access customer information</td>
<td></td>
</tr>
<tr>
<td>Management eliminates boundaries that prevent employees from having access to customer information and gives them the authority to respond quickly to customer needs</td>
<td>Authorization is given to employees at every level of the enterprise, making it possible to access customer information needed in order to be able to respond to customer needs</td>
<td></td>
</tr>
<tr>
<td>Employees are rewarded for solving customer problems and sharing those solutions with others.</td>
<td>When solving customer problems, employees are rewarded</td>
<td></td>
</tr>
<tr>
<td>Collaboration with customers to develop and refine new products or address service issues is commonplace</td>
<td>Discussions are being held with customers to create an understanding of expectations of the product or service</td>
<td></td>
</tr>
<tr>
<td>Customers are welcome to visit the organization at any time to discuss their ideas and business needs</td>
<td>Personal visits from customers are welcome at any time</td>
<td>Customers are welcome to discuss business ideas and/or needs</td>
</tr>
</tbody>
</table>

C4. Flexibility and a desire to innovate drive the learning process
<table>
<thead>
<tr>
<th>Risk-taking and experimentation are encouraged</th>
<th>Formal documents are in place to ensure that risk-taking and experimentation is allowed and encouraged</th>
<th>Experimentation in projects and products are being carried out even though the outcome is uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td>The organization tolerates uncertainty and ambiguity</td>
<td>Written policies allows ambiguity to some extent. Failure are recorded and stored.</td>
<td>Learning from previous failures and undesired practices are taught and studied</td>
</tr>
<tr>
<td>Failure is not punished; instead, it is viewed as an opportunity for learning</td>
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<tr>
<td>The organization fosters an &quot;entrepreneurial spirit,&quot; and employees are given the time, resources, and support to pursue new ideas</td>
<td>Employees are given the time, resources and support to pursue new ideas</td>
<td></td>
</tr>
<tr>
<td>The process of relearning and unlearning is considered critical to generating products and services that meet current and future market needs</td>
<td></td>
<td>Training is frequently attended to ensure latest best practice. E.g. Case studies are available</td>
</tr>
<tr>
<td>Both internal and external competition serve as a catalyst for new ideas</td>
<td>Explicit documents are based on internal And external sources</td>
<td>Current docs are taught and internalized</td>
</tr>
<tr>
<td>Successful innovations are celebrated enthusiastically</td>
<td>Successful innovations are recognized and given appreciation</td>
<td></td>
</tr>
<tr>
<td>Creativity-boosting techniques, brainstorming sessions, agenda less meetings, and scenario planning help surface unexpected solutions</td>
<td>Agenda less meetings are a part of business</td>
<td>Brainstorming sessions where everyone is given the freedom of speech without being criticized are in place</td>
</tr>
<tr>
<td>C5. Employees take responsibility for their own learning</td>
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</tr>
<tr>
<td>Management provides employees with the time and resources necessary to achieve learning goals</td>
<td>Not too many tasks are assigned to one employee and training activity is scheduled</td>
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</tr>
<tr>
<td>Training is available on demand, when and where employees need it</td>
<td>Employees is given the opportunity to self-initiate further training</td>
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</tr>
<tr>
<td>Employees actively solicit information and ideas from outside their departments and often from outside the organization</td>
<td>Sources for information, such as recommended websites, are communicated to the employees. Employees are also fed with information regarding important happenings in the organization and market.</td>
<td></td>
</tr>
<tr>
<td>Employees are encouraged to &quot;own&quot; the analysis of information and determine subsequent action steps</td>
<td>It is suggested that employees propose actions based on the information they acquired.</td>
<td></td>
</tr>
<tr>
<td>Management advocates the use of mentors and advisors to help employees tailor their own performance-focused learning initiatives</td>
<td>Individual employees have a say when training and on-the-job training are set up</td>
<td></td>
</tr>
<tr>
<td>Employees decide what they want and need to know, and how and when they want to learn it.</td>
<td>Employees decide what they want and need to know, and how and when they want to learn it</td>
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</tr>
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</table>

**Technology**

<table>
<thead>
<tr>
<th>T1. Technology links all members of the enterprise to one another and to all relevant external publics</th>
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</thead>
<tbody>
<tr>
<td>Technology is seen as a means of enhancing collaborative efforts among members of the enterprise</td>
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<tr>
<td>Technology is used to minimize barriers of geography and time</td>
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<tr>
<td>Technology is available to all employees and all are trained in how to use it.</td>
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<tr>
<td>Senior management sets an example by personally using new technology.</td>
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<tr>
<td>It is possible to make information available upstream and downstream the organization, and also to suppliers and customers.</td>
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</tr>
<tr>
<td>Systems are increasingly linked to external knowledge bases, such as those of academic institutions, emerging commercial networks, and the Internet.</td>
<td></td>
</tr>
<tr>
<td>Systems are increasingly linked to external knowledge bases, such as those of academic institutions, emerging commercial networks, and the Internet.</td>
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</tr>
<tr>
<td>T2. Technology creates an institutional memory that is accessible to the entire enterprise.</td>
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</tr>
<tr>
<td>A formal knowledge capture system exists that enables individuals to learn from the experiences of others and to analyze what they have learned themselves.</td>
<td></td>
</tr>
<tr>
<td>Experiences/Cases/Traits are analysed &amp; stored in documents.</td>
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<tr>
<td>Stored material are spread/used/taught/acted upon.</td>
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</tr>
<tr>
<td>Use of the knowledge repository is well integrated into systems and processes, allowing individuals to spend less time &quot;reinventing the wheel&quot; and more time on innovative problem solving.</td>
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</tr>
<tr>
<td>Knowledge registry/knowledge map is used and updated.</td>
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<tr>
<td>Software is designed to recognize and retain important information and share it across the.</td>
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<tr>
<td>IT-systems is fed with for example refined/accepted meeting minutes.</td>
<td></td>
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</table>

xviii
<table>
<thead>
<tr>
<th>All employees contribute to the content of the knowledge capture system</th>
<th>Employees are authorized to propose improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information capture crosses functional lines, giving employees a “window” into the rest of the organization’s activities</td>
<td>Information are collected from other functional departments</td>
</tr>
</tbody>
</table>

**T3. Technology brings the organization closer to its customers**

<table>
<thead>
<tr>
<th>Communications technology permits the organization to talk directly to customers, and troubleshoot as problems arise</th>
<th>It is accepted that customer problems are solved through IT communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer information is shared across the organization/Group, ensuring that customers’ perspectives are incorporated into all products and services</td>
<td>technology to respond to customers in real time is in place</td>
</tr>
<tr>
<td>Information such as sales data, customer profiles, customer ideas, and customer satisfaction is rapidly fed into knowledge capture systems, thus allowing quick adaptation of products and services to changing market needs</td>
<td>customer problems are solved through IT communication</td>
</tr>
<tr>
<td>Technology allows customers to participate in product development and sample products before they purchase them</td>
<td>Customer information is made explicit, share-friendly and policy enforced</td>
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<tr>
<td></td>
<td>Above mentioned information is rapidly fed into the IT-system.</td>
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</table>

Discussions regarding product development are being held with customers
<table>
<thead>
<tr>
<th><strong>T4. The organization fosters development of 'human-centered' information technology</strong></th>
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<tbody>
<tr>
<td>Information technology is developed with a clear vision of the business problems it is meant to solve.</td>
<td>It is stated that technology is to be developed with the purpose to make employees work more efficiently.</td>
<td>The documents are taken into account while developing/modifying technology.</td>
<td></td>
</tr>
<tr>
<td>Technology is designed to help employees work more efficiently and make better business decisions.</td>
<td>There is a policy that states that systems are regularly updated for user-friendliness.</td>
<td>Feedback on how information is used/exercised/collection is used to further develop the system.</td>
<td></td>
</tr>
<tr>
<td>Systems are flexible and evolve based on how people in the organization actually acquire, share, and use information.</td>
<td>A Policy that defines systems to be user-friendly is in place.</td>
<td>When systems are developed, user-friendliness is prioritized.</td>
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<tr>
<td>User-friendly systems are a priority, and they are designed to be easily mastered without off-line training.</td>
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<tr>
<th><strong>T5. Technology that supports collaboration is rapidly placed in the hands of employees</strong></th>
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<tbody>
<tr>
<td>The organization continually upgrades and replaces collaborative hardware and software.</td>
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<tr>
<td>Sustaining competitive advantage has replaced traditional investment accounting as the criterion for upgrading hardware and software.</td>
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<tr>
<td>Resident specialists who understand both technology options and the organization's business needs select technology that will be rapidly and easily adopted.</td>
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</tbody>
</table>
If a choice exists, the organization will opt for the more rapid approach of buying and customizing software and networks rather than building them from the ground up.

The organization provides employees with time for education about new technologies, allowing them to attend technology fairs and sponsoring such events on site.

Priority is given to technologies that serve as "information bridges" (e.g., E-mail, workflow tracking systems, group authoring, and video conferencing).

**T6. Information systems are real-time, integrated, and "smart."**

Information reaches appropriate decision makers in a timely fashion so it can contribute to business decisions.

Meeting protocols are conducted and forwarded/shared rapidly.

Explicit information is made easily available.

The information is obtained and used for reference by decision-makers.

Information from remote sites enters the system immediately and is automatically analyzed in meaningful ways.

Information entry is carried out and facilitated by IT-systems and documents.

The IT-system can identify variances and unusual trends are highlighted.

The knowledge capture system can spot and flag unusual trends.

A framework is developed so that various types of knowledge are analyzed/condensed and put together and related to each other.

Frameworks are developed to link previously unrelated knowledge capture systems, such as competitive intelligence, market research, benchmarking, and financial systems.

**Measurement**
M1. The organization has invented ways to link knowledge management to financial results

The organization calculates a return on its knowledge investment by tracking the cost of getting information into its processes and products. Policies to track knowledge investments are in place.

The organization’s annual report to shareholders includes an assessment of how knowledge capital has contributed to bottom-line performance. An indicator on knowledge capital are reported to shareholders.

The organization monitors the value of its human capital by tracking the incremental revenues generated when employees modify existing products or services. Modifications of products or services made by employees are being evaluated for the revenue generated. The revenue is then assigned to human capital.

M2. The organization has developed a specific set of indicators to manage knowledge

The set of knowledge management indicators includes measures such as:

Customer Relationships: quality customer retention, growth rates.

Such indicator(s) are documented/used.

Human Resources: quality employee retention, rate of investment in intellectual capital, training expenditures, employees on sabbatical, employee development plans in progress.

Such indicator(s) are documented/used.
### Strategic Alliances:
Value-added from joint ventures, and associations with learning institutions, customers, suppliers, and competitors.

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<td>Such indicator(s) are documented/used</td>
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### Innovation: view products/services launched, exited product/service lines, prototypes iyi test, information value-added to products/services.

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### Process Improvements: best practices imported from elsewhere, best practices exported to others, cycle-time and cost reductions, productivity and quality improvements.

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<td>Such indicator(s) are documented/used</td>
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The set of measures is refined over time to reflect changes in the organization's knowledge management priorities.

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<td>Documented policy ensures measures refinement</td>
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### M3. The organization's set of measures balances hard and soft as well as financial and nonfinancial indicators.

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<tr>
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<td>Such indicator(s) are documented/used</td>
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Soft measures, such as success or war stories, are systematically collected and used as evidence of knowledge development.

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<tbody>
<tr>
<td></td>
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<td>Success or failure stories are told, written down and forwarded</td>
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The organization tracks speed to market and speed to respond to customers as direct manifestations of improved knowledge management.

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<tbody>
<tr>
<td></td>
<td></td>
<td>The link between knowledge management and those indicators are documented and measured</td>
</tr>
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Soft measures, such as success or war stories, are systematically collected and used as evidence of knowledge development.

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<tbody>
<tr>
<td></td>
<td></td>
<td>Stories are refined, sorted and stored</td>
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</table>

The organization tracks speed to market and speed to respond to customers as direct manifestations of improved knowledge management.
The measurement system goes beyond the traditional accounting framework to incorporate measures of intangible assets such as intellectual and customer capital, as well as the knowledge content of its products or services.

<table>
<thead>
<tr>
<th>M4. The organization allocates resources toward efforts that measurably increase its knowledge base</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investments in the knowledge base and its related systems are correlated and long-term financial performance, and everyone understands the linkage.</td>
</tr>
<tr>
<td>Investments in the knowledge base and its related systems are followed up and the financial impact is estimated and stored in formal documents.</td>
</tr>
<tr>
<td>The available formal documents on the linkage between knowledge investments and return are spread and used in training material.</td>
</tr>
</tbody>
</table>

The organization uses economic models to estimate how a lack of investment in organizational knowledge will erode or retard growth through lost revenues to competitors or lowered barriers to entry.

| Efforts are made to estimate the potential losses by lack of knowledge investments. |
| Training material include such examples and estimations to enlighten employees. |

**Industry Classification Codes**

<table>
<thead>
<tr>
<th>P1. Knowledge gaps are systematically identified, and well-defined processes are used to close them</th>
</tr>
</thead>
</table>

Standardized docs are created where measures such as intellectual capital are regulated and recorded.
<table>
<thead>
<tr>
<th>Benchmarking and internal analysis are used to identify opportunities for improvement</th>
<th>Cross-functional meetings and discussions are used to spread good practices and identify areas of improvement potential</th>
<th>Valuable knowledge from meetings and discussions are put in formal documents. Reports from different departments/groups/subsidiaries are analysed, refined and stored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-functional meetings and discussions are used to spread good practices and identify areas of improvement potential</td>
<td>Customers and employees are surveyed frequently to identify knowledge gaps</td>
<td>Surveys are formalized, refined and stored. Surveys can also be distributed through the IT system to include remote people/groups</td>
</tr>
<tr>
<td>The organization creates and updates a map of its knowledge terrain, indicating where information is located and how to access it</td>
<td>Knowledge map/registry is standardized and documented in the system</td>
<td>Knowledge directories exist that list employees' skills, knowledge, location, and how to reach them, directories of other groups aligned with the organization are also disseminated</td>
</tr>
<tr>
<td>Knowledge directories exist that list employees' skills, knowledge, location, and how to reach them, directories of other groups aligned with the organization are also disseminated</td>
<td>Such directory is in some form created, standardized and stored in the system.</td>
<td>Such directory is in some form created, standardized and stored in the system.</td>
</tr>
<tr>
<td>P2. A sophisticated and ethical intelligence-gathering mechanism has been developed</td>
<td>Meetings and discussions are held with customers/suppliers to extract info and capture trends</td>
<td>Information on trends are made into explicit knowledge in documents and, used in strategies, policies and guidelines.</td>
</tr>
<tr>
<td>The organization excels at scanning the environment for information on industry trends, customers, suppliers, and competitors</td>
<td></td>
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</tr>
<tr>
<td>Competitor products and services are routinely scrutinized</td>
<td>Departments and employees discuss/study competitors products/services</td>
<td>Conclusions/learning from studying competitors are formalized and put into documents</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
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<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The organization adheres to a published code of ethics for intelligence-gathering activities, including how it learns from competitors</td>
<td>Such policies and documents are stored in the system and available to all employees</td>
<td>Guiding documents and policies regarding criteria for partnering with other companies are standardized and stored</td>
</tr>
<tr>
<td>Criteria have been established for partnering with other companies, and these are well understood throughout the organization</td>
<td>Guiding documents and policies regarding criteria for partnering with other companies are standardized and stored</td>
<td>The legal and financial interests in intellectual property is protected and regulated by documents in the system.</td>
</tr>
<tr>
<td>The organization knows how to protect its legal and financial interests in intellectual property</td>
<td>The legal and financial interests in intellectual property is protected and regulated by documents in the system.</td>
<td></td>
</tr>
<tr>
<td><strong>P3. All members of the organization are involved in looking for ideas in traditional and nontraditional places</strong></td>
<td><strong>Benchmarking is carried out regularly, and results from these are discussed in department meetings</strong></td>
<td>Results are analyzed, formalized and stored in the system for reference</td>
</tr>
<tr>
<td>The organization benchmarks regularly, to look for best practices</td>
<td>Benchmarking is carried out regularly, and results from these are discussed in department meetings</td>
<td>Results are analyzed, formalized and stored in the system for reference</td>
</tr>
<tr>
<td>The organization taps a wide range of resources for best practice information, including employees, customers, suppliers, library science experts, alliances, joint venture partners, industry peers, and process</td>
<td>No sources of info/knowledge are immediately dismissed and employees are encouraged to share ideas</td>
<td>Potentially valuable ideas/concepts/practices are stored in the system for reference</td>
</tr>
<tr>
<td>The organization routinely looks outside of its major markets and domestic divisions to global arenas</td>
<td>Other sources of explicit knowledge are scanned routinely to identify valuables</td>
<td></td>
</tr>
<tr>
<td>Conference, industry roundtables, and visits to other facilities are used as sources of creative inspiration</td>
<td>Employees are allowed/encouraged to attend conferences, industry roundtables and visits other facilities. Employees discuss and externalize ideas, “hunches” and concepts in meetings as a follow-up from previous mentioned activities</td>
<td></td>
</tr>
<tr>
<td>Everyone, from senior management to support personnel, spends some time visiting and listening to customers</td>
<td>Customer visits/interactions are carried out by employees from all levels. Employees discuss and externalize ideas and concepts from customer visits/interactions in e.g. Meetings</td>
<td></td>
</tr>
<tr>
<td><strong>P4. The organization has formalized the process of transferring best practices including documentation and lessons learned</strong></td>
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<tr>
<td>The organization has mapped its business processes</td>
<td>Business process maps are formalized and stored in the system</td>
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</tr>
<tr>
<td>Databases of root causes and solutions to frequently encountered problems are updated regularly</td>
<td>Policies and documents regulate that databases of root causes to problems are frequently updated and stored in the system</td>
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</tr>
<tr>
<td>Success stories involving new tools or new approaches are widely communicated in the organization</td>
<td>Success stories are communicated in meetings</td>
<td>Success stories are stored and distributed over the IT system</td>
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</tr>
<tr>
<td>Discoveries and solutions are continually leveraged off existing ones</td>
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<tr>
<td>Process knowledge is rapidly diffused through the organization, making it easy to transfer best practices</td>
<td>Best practices and knowledge is fed into the intranet of the organization facilitating rapid spreading of knowledge</td>
<td></td>
</tr>
<tr>
<td>P5. &quot;Tacit&quot; knowledge (what employees know how to do but cannot express) is valued and transferred across the organization</td>
<td>There is a system for rotation of divisional personnel, apprenticeships, site visits, sabbaticals, and mentoring</td>
<td></td>
</tr>
<tr>
<td>The organization has systems for identifying and passing on the internal knowledge of individual employees (e.g., rotation of divisional personnel, apprenticeships, site visits, sabbaticals, and mentoring)</td>
<td>Employees are routinely encouraged to express ideas in ways that can be understood by others. Often after projects are finished</td>
<td>The learning and reflections from e.g. past projects are further refined and stored for reference in the system</td>
</tr>
<tr>
<td>Past know-how is made explicit, making it easy to access, understand, and apply</td>
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<tr>
<td>Employees are receptive to new ideas, and there is much learning by doing</td>
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<tr>
<td>Time for learning by doing is allocated within the process/department</td>
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<tr>
<td>A large percentage of employees' knowledge remains within the organization when they leave</td>
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<tr>
<td>There is a policy or document saying that employees are to be debriefed before leaving the company</td>
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