

COMPETENCE INVENTORY ASSESSMENT IN IT-CONSULTANCY

Case development

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Thesis
October 2010
Degree program on Management
of Technology Expertise
Tampere university of applied sciences

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Tampere University of Applied Sciences,
Degree program on Management of Technology Expertise
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Thesis

Competence Inventory Assessment in IT consultancy– Case Development

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Helsinki 10/2010

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Työn nimi	Osaamisen hallinta esimerkki IT konsulttiyrityksessä
Sivumäärä	77
Valmistumisaika	10/2010
Työn ohjaaja	Leo Sutinen
Työn tilaaja	HiQ Quality Services, valvojana HR Konsultti Kalle Kautovaara

TIIVISTELMÄ

Konsulttityön suurimpina perushaasteina toimivat osaaminen, osaamisen kehittäminen sekä työnteon mielekkyys. Nykyajan erittäin nopeasti kehittyvällä ITC konsultointialalla uusimman sekä laajimman osaamis pohjan omaaminen luo omat haasteensa sekä yrityksen että yksilöiden menestymiselle. Lähtökohtaisesti konsulttityö perustuu osaaviin yksilöihin joiden kokonaisosaamisen kautta yrityksen osaaminen koostuu. Koska asiakkaat odottavat konsultilta aina uusinta huippuosaamista ovat yksilöiden osaaminen, osaamisen kehittyminen ja kyky adaptoitua tehtävien vaatimuksiin ensiarvoisen tärkeitä ominaisuuksia toimialalla.

Vastatakseen osaamiseen liittyviin haasteisiin yrityksen on yhtäältä kehitettävä omia osaamisen ja tietämyksen hallinnan prosessejaan sekä työkalujaan ja toisaalta tuotava johtamisen mallit sekä toimet vastaamaan ja tukemaan näitä toimintoja. Nämä ominaisuudet vaikuttavat joko välittömästi tai välillisesti myös yrityksen muihin prosesseihin, kuten myyntiin ja resursointiin.

Tutkimusosan tavoitteena oli kartoittaa erilaisia osaamisen hallinnan implementaatioita ja koostaa näistä olennaisimmat organisaation käyttöön. Toisaalta myös tietämyksen hallinnan sekä jakamisen mahdollisuudet oli tarkoituksena ottaa käyttöön mahdollisimman laajasti yrityksen jo olemassa olevan tietotaidon jakamiseksi.

Kehitystyössä lähdettiin ensisijaisesti kehittämään osaamisenhallinnan työkalua sekä siihen suoranaisesti liittyviä prosesseja. Tarkoituksena oli kartoittaa ja tuoda näkyväksi yrityksen olemassa olevat osaamiset sekä mahdollisuudet henkilöstön tietämyksen hallinnalle sekä jakamiselle. Osaamisen hallinnan työkaluja on kehitetty laajalti ympäri maailmaa. Kehittääksemme tätä konseptia eteenpäin integroimme persoonallisuutta analysoivan ominaisuuden työkaluun pehmeiden/sosiaalisten taitojen ja tiimityöskentely potentiaalain kartoittamiseksi.

Writer:	Vaha, Mikko
Thesis:	Competence Inventory Assessment in IT consultancy– Case Development
Pages	77
Graduation time	10/2010
Thesis supervisor	Leo Sutinen
Co-operating company	HiQ Quality Services, supervisor HR consultant Kalle Kautovaara

ABSTRACT

The foundation challenges of consultancy work are competence management, knowledge management and innovativeness and creativeness in everyday work. In nowadays fast paced ITC business sector the renewal and extending of competence creates challenges to the success of individuals and companies. Consultancy work is based on individual employee competencies which then cumulate to overall organizational competence. One of the biggest challenge in consultant type work is also the fact that customer always expect to receive cutting edge expertise on any matter from the consultant. Due to this requirement it is highly important for the company to keep competencies up to date and when preparing for the future and ever creating it.

In order for the company to respond to the challenges around competence management the organization has to develop their competence and knowledge management tools and processes and in other hand develop the management model to respond and support these actions. These functions also have either direct or indirect impact on the other organizational processes such as sales and resourcing.

The research section of this paper focuses on mapping out the different implementations of competence management and gathers the most valuable parts to be taken into use inside the case company. The other section of the research focuses on knowledge management and its possibilities when trying to utilize the already available information inside the company.

The development work focuses on the development of competence management tool and processes relevant to it. Main target was to map out and visualize the existing competencies and the possibilities of managing and sharing them. Competence management tools are widely used throughout the world. In order to develop this concept we integrated an analyzing tool to define individual social skills and team player potential.

Keywords:	Competence Management, Knowledge Management, Process development
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Preface

When changing the professional view inside to outside and transferring to consultancy work the demand and requirements of competence and knowledge raised a level. This along with my personal preferences of self improvement and development opened my eyes to realize the importance of competence and knowledge management.

In today's ITC sector the organizational competence the most important attribute of any company working in the industry. Organizing and developing the management processes of handling the overall competence is highly important not forgetting the knowledge management closely related to it. Despite understanding the value of intellectual capital several organizations tend not to put enough effort and resources in order to even sufficiently survive inside the industry and mostly only rely on outsourced competence.

Taking the challenge with Tampere University of Applied Sciences to graduate as Master of Engineering during one year is my personal competence and knowledge development during the past year. Even though being challenging the mission was much fun and rewarding. In order to manage this ordeal the desire of personal development and great support from home are the most essential things and for those I am very grateful.

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1 INTRODUCTION

This paper was made as a part of internal development project for HiQ Finland, later referred to as the case company. The development project focuses on possibilities of development case company personnel knowledge and competence also viewing the capabilities to emphasize competence management, knowledge management, innovativeness and creativity in everyday work. This chapter will introduce the reader to the research.

1.1 Background and motivation of development work

This development work was motivated by the issues arising from today's industrialized and fast paced IT section and one Consultancy Company working inside that field. The high change and development pace of software development industry defines the baseline for consultancy companies which try to "live long and prosper" within their business field. IT consultancy business is dependent on the people, competencies and their ability to interact and comply with the customer needs. While the rising need for competence is one issue to tackle in order to survive, handling and developing the resources available is also one key factor. These issues also have impact on the sales and resourcing of the company. Finding the right persons to match the right assignments and also creating correct teams to cover all the necessary needs is crucial when performing successful management in consultancy.

Setting for the research is displayed in the figure 1. This research attempts to illuminate the three boxes displayed in the central of the picture, Organizational Management, Competence Information Assessment (CIA) and Individual Resources. The baseline of needed competencies and core competencies are defined in cooperation by Customer needs and Company strategy. This baseline is managed and interacted by company management and sales which interact with individual resources via CIA tool. Generating a process for competence management and developing the ways of handling and taking the processes onwards is the main target of this development work.

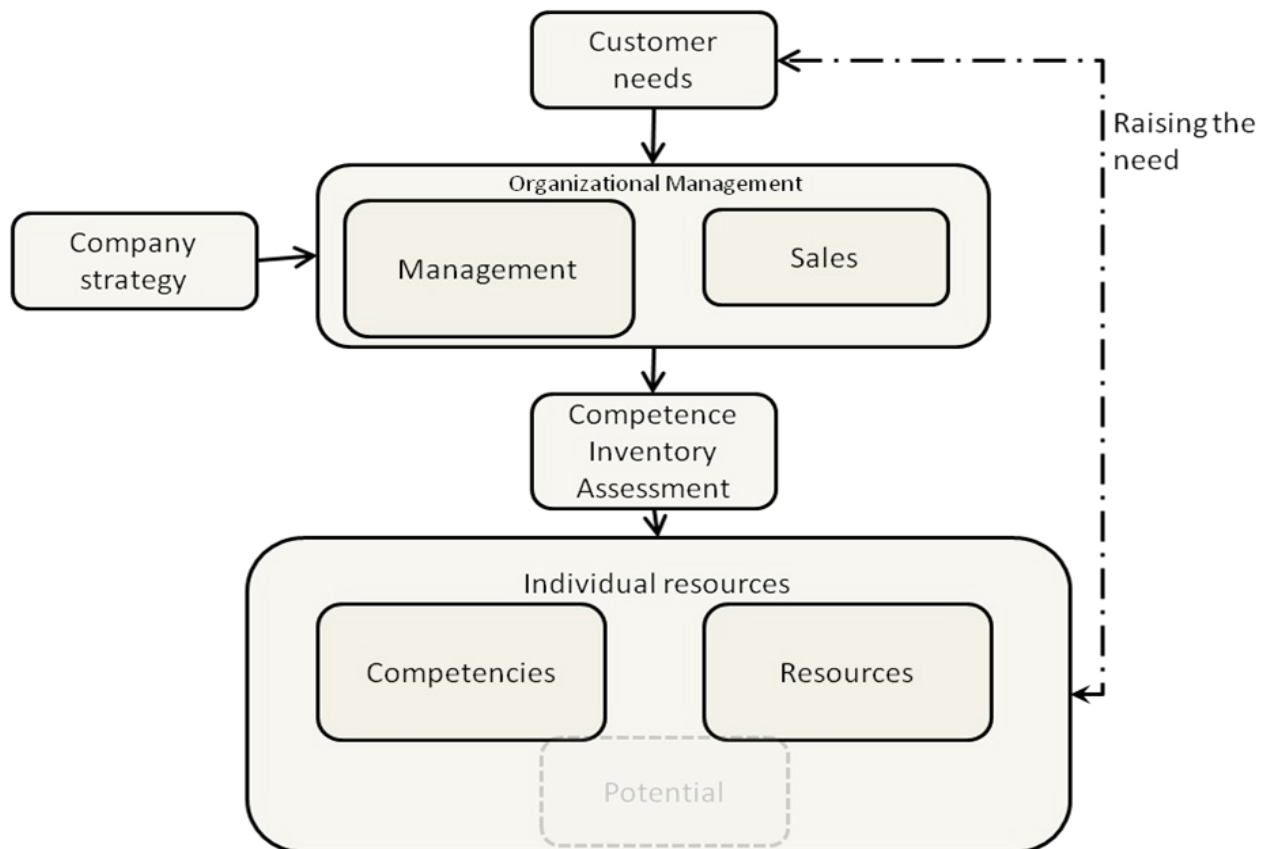


Figure 1: Development work setting

The motivation to this development is to give leverage to the company in order to raise the actual working motivation and commitment to the case company. Due to the turbulence in global financial situation the funds usable for internal, meaning individual knowhow in consultancy, development are quite limited. In order to keep the personnel happy, competent and eager to push the company forward, investments on individual resources must be made. Current competencies and resources must be taken into efficient usage and company must assist personnel to fulfill their professional potential. While working and using their individual resources the personnel is able to scout and influence the customer needs, which in fact is the main influence to the company strategy used when creating mission, vision and values to the organization. When organization has visualized the position it strives for inside the market it is possible and very valuable to assess the competencies available and create a strategy to develop the professional potential inside the company.

Since the case company human resource management department is working with limited resources this kind of tool and assessment has not been done previously. When company was still relatively small in personnel count it was possible for management to remember the main competencies by heart. Now after the migration of Finnish subsidiaries the head count is large enough to require a comprehensive tool for the job.

Biggest challenge in consultant type of work is the fact that customer always expect to receive cutting edge expertise on any matter from the consultant. Due to this requirement it is highly important for the company to keep competencies up to date and when preparing for the future, even creating it.

Main objective for the case company is to take competence management process and tool into usage. Use it to develop personnel and meanwhile create concrete need for the recurring development discussions, target the resources more efficiently and raise the commitment towards the company, by letting the personnel know that their knowhow is appreciated and need for personal development is acknowledged. Life is a long learning process after all.

The theoretical part of this research combines theories about competence management, knowledge management and processes together with resourcing, where the aspect of business strategy also surfaces. The actual work that was done is described in the development phase of this paper.

1.2 Objective

Main objective for this development project is to gain knowledge about competence management and its assessment inside the case company. Competence Inventory Assessment –tool will be planned, built and taken in use to ensure correct competence information about company personnel. Competencies have been gathered widely around in different companies, but in order to take the competence tool to the next level we are integrating personality assessment test to measure social (soft skills) and team player potential. Personality and Preference Inventory (PAPI™) is going to be used to assess the social skills.

This process also contains developing the development discussion baseline and contents in order to gain concrete meaning for the discussions. After gathering the competence information the assessment of development needs can be mapped. While gathering the competences of every single person working for the company, the ways to take advantage of the available competencies is possible with e.g. senior person working as a mentor for the junior. This also opens the possibility to plan the needed trainings and courses to ensure that company has the competencies needed and specified in the company strategy. This part of the development is handled by knowledge management.

When having the CIA tool in efficient use it is possible to create a process to enable the tool to be used to assist other related processes.

1.3 Scope

This development work is concentrated on integrating a tool to assess the company personnel competencies which are to be used as a baseline and information tool in sales, project assignment and personal development as well as knowledge management.

The research was focused on the case company, not taking any subcontractor into account.

1.4 Context of the research and development work

The research context is limited to software quality management and software development consultancy business point of view.

The competence management tool and its process itself are generic and could be used for other similar cases. The tool naturally has to be modified based on the needs and competencies of the case company.

1.5 Research and development approach

Research approach

The research is a constructive and action research which aims to develop processes and methods to the company in case study. It also contains qualitative aspects.

Constructive research

A constructive research involves developing a solution to a practical problem through a construction. Constructive research has been developed in the field of business science but it has also been taken in use in e.g. Information Science, medicine and pedagogy. The construction can be seen as an object with the solution to an explicit practical problem. The construction may be any human made artifact; model, process, figure, plan, organization, machine, etc. Construction is characterized by creating a solution instead of finding it. A relevant part of the constructive research is linking the problem to previous theory and validating the functionality and novelty value of the construction. By creating a construction which differs from anything already existing, the creator is inventing something completely new, and new constructions themselves create new reality. (Lukka 2001)

A constructive research leads to real world action in case company and profound evaluation of its processes. This setting differs greatly to planning of e.g. theoretical model in laboratory environment or interviews. Executing research of this type demands quite close commitment to target organization or field. (Anttila, 2002) Constructive research has common features as researcher working in the field, small size of material and using ethnographic methods (e.g. perception and interviews) in the empiric part of the study with other types of research (case, field and ethnographic study) (Lukka 2001)

The construction developed after the theoretical part in this research will be tested by the qualitative data from the empirical research, where after a new improved construction will be presented. The theoretical novelty value of this research is shown by linking the research results to the theoretical background.

Case study

Describing a phenomenon for building new or testing an existing theory is called a case study. One or more different levels of analysis can be involved in the case study. Typical data collecting methods for a case study are questionnaires, interviews, archives and observations. A case study can be quantitative or qualitative, or a combination of these. (Eisenhardt 1989).

A case study concerns one case, e.g. a person or organization according to Järvenpää and Kosonen (2003). When evaluating one single case and the gathered large amount of data the study itself can be highly reliable. On the other hand subjective conclusions might be an issue when trying to generalize the results. (Järvenpää & Kosonen 2003). This research is a one case study.

Action research

When researcher is working as a researcher and a developer the research is called action research. Information is used for development of the case and also for the scientific research. A thorough understanding of the particular case is one of the main advantages of an action research. Usually an organization or part of it is the target of an action research and therefore it also is a case study. (Järvenpää & Kosonen 2003). The researcher in this case study is part of the organization being studied.

Qualitative research

Quantitative research is based on an analysis of numeric data. Qualitative in the other hand is seen from the researcher's point of view and the researcher is part of the research process. Research is typically either one of these types or a combination of them. When the research data is qualitative the responsibility of data interpretation is on the researcher. Important part of the research is played by information and results received from the previous researches. The empirical study stands for the qualitative research material. Interviews, observations and all kinds of documented material related are typical data collection methods in qualitative research. The research process is flexible and the researcher is open for new influences. The empirical data is analyzed thoroughly and connected to the theory. (Järvenpää & Kosonen 2003)

Interviews were made to scope the rate of successfulness in the tool, usage of the tool and assessment of the tool.

1.6 Structure

This paper is divided into four parts; introduction, theoretical research, results and conclusion. In addition to these chapters, there is a summarizing overview in the beginning. References are presented last.

The first chapter stands for the introduction, where the background and motivation of the development work, and the objective, scope, and context as well as the methods are presented.

The second chapter stands for the theoretical background, which is divided into three major parts; competence management, knowledge management and processes. All parts are very central for the research and related to each other.

The development work is presented in chapter three. Descriptions of the constructive research methods as well as the process for the data collection and analysis of data are gone through.

The last chapter summarizes how the development work was concluded. Chapter includes recommendations, evaluation of the research and further research suggestions as well.

2 THEORETICAL BACKGROUND

The theoretical background is divided into two major interconnected parts which are discussed separately. The separate parts of the theoretical background will be combined in the end, forming the theoretical construction. As the development work is concentrated on the competence management the first phase will handle competences, competence management, knowledge, knowledge management, and performance management which are crucial factors on consultancy based business. The second part will deal with processes in order to get some understanding of how processes work, why they are important, and what processes improvement is about.

2.1 Competence management

This chapter will open the concept of competences, competence management and competence development. This theses concentrates on the whole scale of competences and knowledge employees possess with any value to company and to employee itself. Methodologies and management of competencies is also taken into account. Also the connection with resources, individual competence and organizational competence is addressed with an addition of model to evaluate and determine core competences.

2.1.1 Introduction to knowledge and competencies

Competence is determined to be highly important competitive factor in quickly paced, continually changing and renewing business world. Competence and competence management are critical success factors in private and public sector. Also strong change in age structure and great rotation in employee's raise the companies and bureaus to epic competition after highly talented experts. Development in information society and services demand that organizations develop their employees, working processes, management and way of working to support interaction and personal development. Knowledge and know-how are the factors of production in the future. Competence means possessing the know-how and knowledge and applying it to practical work. Managing competence contains development of organization and personnel as meanwhile systematically evaluating competence and determining long term development based on the needs of company mission, vision and strategy. (VVM 2001)

Competencies within an organization are taken up in wide range of publications, extensive literature and lively discussion around the academic world. Authors tend to classify competencies in different ways. Strategic, distinctive, functional, or individual competences are examples of different types of competence within an organization. (Donk & Riezeboz 2005). Compilation of competences of an individual consists of a wide range of different skills and attributes as seen in figure 2.

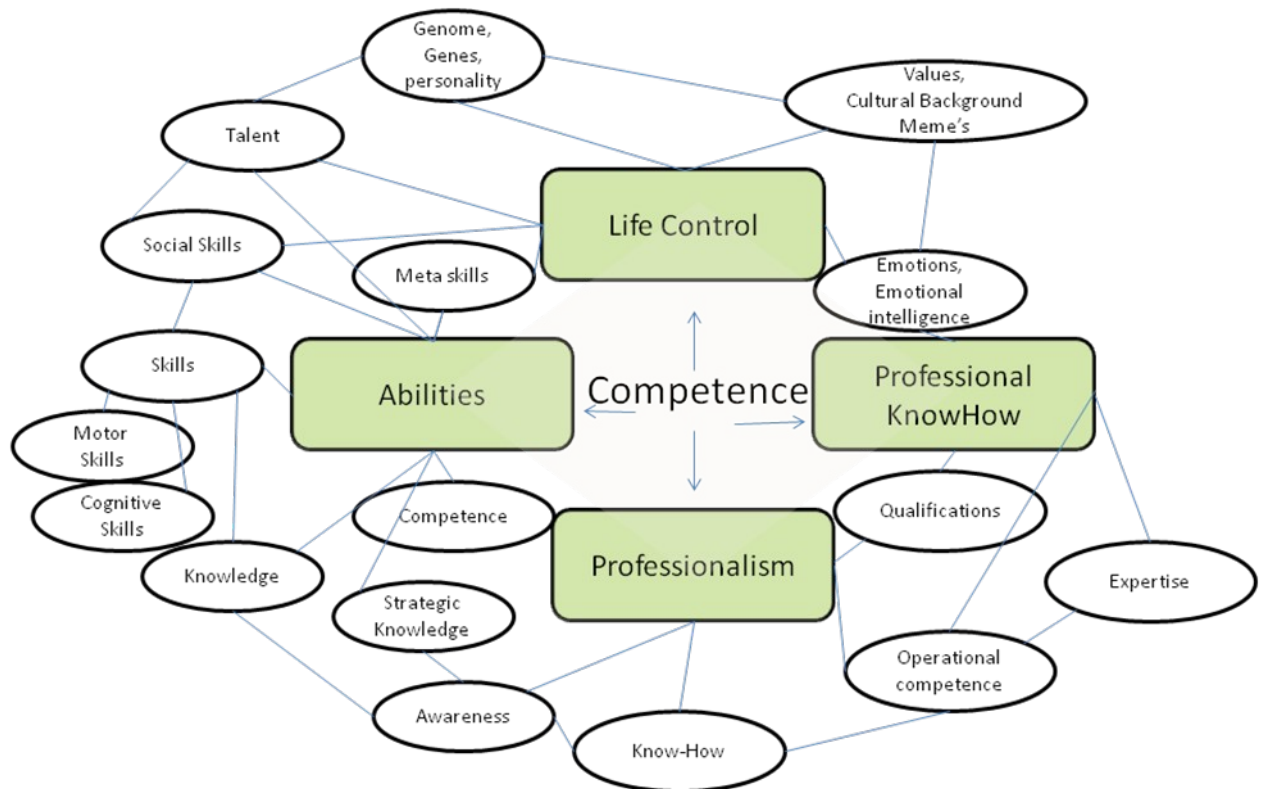


Figure 2: Competences of an individual. (Helakorpi 2004, modified)

In this research the focus will be on competence management and how to manage and develop competences for each individual professional. This first chapter will concentrate on defining what is competence and knowledge.

Contents of knowledge must first be addressed before one can understand what competence is. There are quite a lot of different representations about knowledge throughout literature. Sveiby describes knowledge as tacit, which means that it is very difficult to express in words. Knowledge of an individual person always is more than one can say out loud. New inputs and influences experienced constantly together with old knowledge also cumulate to total knowledge which is action-oriented. Individuals possess a large number of unconscious regulations which determine the way of processing knowledge. An example of these processes is ways of acting in certain activities e.g. brain waves which steer jumping with right leg. When knowledge is put to words it becomes explicit. Since explicit knowledge is constructed in one's mind it therefore is individual. Nevertheless since explicit knowledge spoken/written it contains always less information than tacit knowledge. Explicit knowledge is objective and rational as tacit is subjective and in close contact to job at hand (Nonaka & Takeuchi 1995). Compared to knowledge, competence consists of a combination of the five elements listed below:

- *explicit knowledge* based on facts
- *skills* for knowing how to do things
- *experience* from past mistakes and success
- *value judgments* as perceptions of what is right and wrong
- *social network* consisting of culture and relationships with other people in an environment

According to this definition of competence, people lose part of their competence when moving to a new environment since competence is closely linked to a particular social or physical environment. (Sveiby 1997)

Description by Reinhardt & North, (2003) determines competence as a relation between requirements placed on a person/group or self-created requirements and these persons' skills and potentials to be able to meet these requirements (Reinhardt & North 2003). Competencies are concretized at the moment knowledge is applied and become measurable in the achieved result of the actions. Set of skills and knowledge that an individual needs to execute specified job effectively is defined as individual competence. The individual competence is widely used in human resource management. Individual competences may also be defined as a wide scale of professional knowledge and skills to be utilized in a diversity of situations. (Baker et al. 1997). Hazeed & Essamil describe individual competences as affairs a person has to do, know or have in order to match the standards required for a task (Hazeed & Essamil 2007).

Competence portfolio describes the full scale of abilities and skills an individual possesses towards fulfilling a task. Competence portfolio can be subdivided into social, methodological and professional competence. Employee has his own competence portfolio, where as the company has its competence portfolio which consists of all the portfolios of its employees combined. Competence portfolios are managed and controlled by the employee and company, respectively. (Reinhardt & North 2003)

Competence management has the task of describing employee competencies, making them transparent and guaranteeing the transfer, utilization and development of the competencies in the organizational competence base. Through competence management, control and full deployment of employee skills should be plausible. Competence management should help organization to develop basic conditions and processes better controllable. (Reinhardt & North 2003). Also throughout competence management organizations may receive better comprehension on the needs of competence, identify gaps of competence, source competences, staff projects and the basis of building competence development strategy. (Baladi 1999).

The software business and above all IT-consultancy business differs from many traditional businesses regarding competences. Personal skills and knowledge defines the whole business scale. People, who have needed competences, supersede the machines. Being a vital resource in consultancy business managing knowledge is very challenging. The importance of knowledge and competence management has and is growing in the whole IT-consultancy market. As processes and technologies develop the requirements from individual consultants grow ever larger while offered tasks are more complex. Last but not least, management needs all information about employees at hand since new markets have to be reached despite the hard competition. (Donk & Riezeboz 2005)

2.1.2 Organizational knowledge – strategically meaningful knowledge

Target of organizational knowledge is to turn individual knowledge into organizational intellectual capital. It is often said that an organization's most valuable assets are the people it employs. The ideas, experiences, expertise and knowledge

contained in the mind of an individual may be worth more to an organization than can be quantified with respect to how that knowledge is applied each day to save time, reduce costs, and advance the organization's initiatives.

In the field of social psychology, "a group is defined as a dynamic whole based on interdependence rather than similarity" (Nonaka 1994). When multiple individuals rely on knowledge as truth, share it and understand it the knowledge might be defined as group knowledge. Difference between information which is share "publicly" (i.e. "common knowledge) must be made against group knowledge which is often described as "broadcast of information" (Corrêa da Silva & Cullell, 2003). Even when group knowledge is shared, it still remains contained inside and within community of practice, unit/subunit, or other similar group or team of individuals who have common or related tasks or functions. Also must be noticed that group knowledge is not aggregation or multiplication of individual interpretations, but rather a synthesis of interpretations which lead to group knowledge. (Richter 2000)

Group knowledge can be created and spread out through interaction and social communication. It often is a result of tacit knowledge transforming into explicit knowledge or externalization. When multiple individuals and different groups of people come together and share thoughts the information eventually turns to knowledge and becomes routinized at organization level. This transformation leads into versatile and embodied organizational knowledge. (Richter 2000)

Organizational knowledge is partly created by several groups or units knowledge coming together, combining knowledge into greater entities and creating new knowledge. Organizational learning can be combined from "learning from encoded inferences from history and past actions into routines and guided processes" (Schulz 2002). One possibility of creating new knowledge is taking explicit knowledge and combining it with another already known explicit knowledge. "Organizations continuously create new knowledge by reconstructing existing perspectives, frameworks, or premises on a day-to-day basis." (Nonaka 1994)

Intellectual capital is a term with various definitions in different theories of management and economics. Correspondingly, the definition is continually under debate over economic intangibles. Usually the term contains ambiguous combinations of individual capital, instructional capital and human capital, when it is used to actually refer to a capital asset whose yield is intellectual rights. Therefore due to its economically intangible nature knowledge, regardless of its source, can be considered intellectual capital. Understanding the actual value of knowledge is one challenge, but quantifying its value is something far more challenging. (Stewart 1997)

Socialization, combination, internalization and externalization are the four patterns of interaction which Nonaka (1994) defines as the dynamic theory of organizational knowledge creation. The knowledge itself is created continuously as a dialogue between tacit and explicit knowledge via these patterns. Explicit knowledge is knowledge which is written in systematic, formal language whereas tacit knowledge is based on personal, individual knowledge which is difficult to transfer into coded language whereas being deeply rooted in action, commitment and involvement in context (Polanyi 1962).

Interaction between individuals through mechanisms such as apprenticeships, imitation or observation is represented by socialization. Combining explicit knowledge through conversation and versatile meetings or using information systems is contained in combination. Internalization converts explicit knowledge into tacit knowledge whereas externalization converts tacit knowledge into explicit knowledge (Figure 3). (Nonaka 1994)

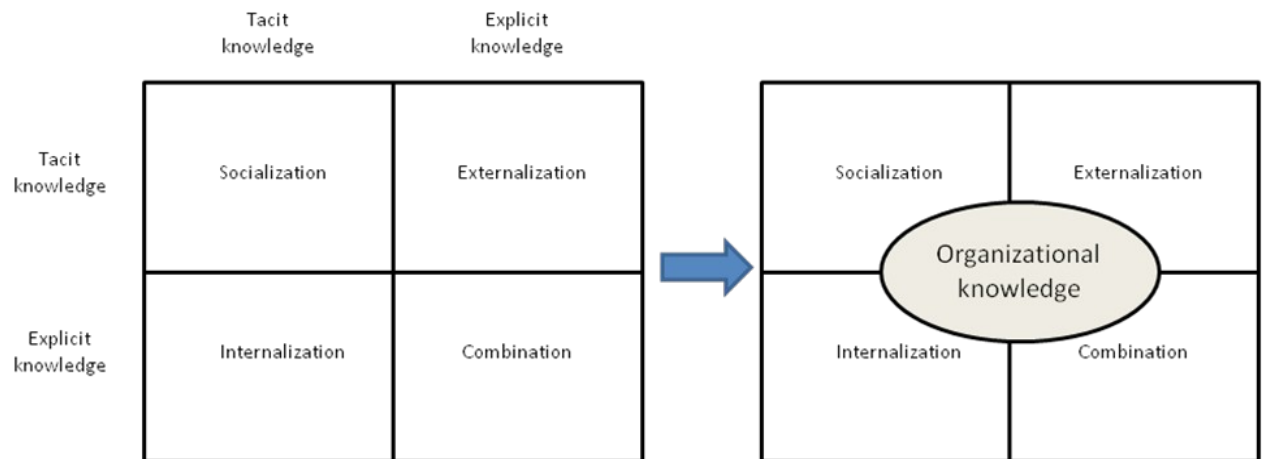


Figure 3: Socialization, Externalization, Combination and Internalization (Nonaka 1994 Modified)

When all four modes of knowledge conversion from continual cycle are triggered the organizational knowledge creation takes place. These modes can be assessed with actions such as documentation, learning by doing, experimentation, coordination, dialogue, interaction etc. The organizational knowledge creation can be seen as an upward spiral (SECI model) process from personal and individual level raising up to the collective group level and thence to organizational level, sometimes to inter organizational level. (Nonaka 1994)

Cook and Brown (1999) state that knowledge and knowing play an important role in organizational knowledge creation, which is highly consistent with Nonaka's dynamic theory of knowledge creation.

Explicit, tacit, individual and group knowledge are distinct forms of knowledge, where every form of knowledge represents an individual type of knowledge. If one possesses only explicit knowledge it is insufficient, without explicit knowledge, tacit knowledge conversion becomes a closed loop. While individuals possess part of what is known about a given domain, a body of knowledge is possessed by the organization and is drawn on in its actions, just as knowledge possessed by an individual is drawn on in his or her actions. (Cook & Brown 1999)

Knowing is the epistemic work done as part of process or action, while using knowledge as a tool one can interact with the physical and social world. Knowing is relational, concrete and dynamic. The interaction of knowledge and knowledge can generate new knowledge and new ways of knowing in organizations. (Cook & Brown 1999)

Focusing on the knowledgeability of action connoting action, doing and practice, rather than knowledge connoting things, elements, facts, processes and dispositions,

Orlikowski (2002) suggests that organizational knowing is constituted and reconstituted in practice. People engage in organizational practices, reproduce the knowing generated in those practices and reconstitute knowledgeability over time and across contexts.

This view of knowing in practice suggests a mutual constitution of knowing and practice that is depicted by the metaphor of drawing hands, each drawing the other while being drawn, indicating that knowing is an ongoing social accomplishment that is constituted and reconstituted in everyday practice.

In order for company to define what knowledge and competencies are strategically important it should establish clear vision on which competence is meaningful and clarify their core competence's which is clarified on the next chapter.

2.1.3 Competence – core competence

Prahalad and Hamel are widely referred authors in discussions about an organization's core competences. According to Prahalad and Hamel set of core skills and core technologies that provide organization competitive advantage can be defined as core competencies. (Prahalad & Hamel 1990). Core competencies central characteristics to provide competitive edge are ability to extend to new business applications, high customer value and resistance to imitation. Good core competences also provide possibilities to access several new business regions, provide value to the customer by satisfying needs, is renewable and durable (desired characteristics). (Javidan 1998, Barney 1991, Amit & Shoemaker 1993). Company can be identified by the core competencies it possesses and does with high expertise. Core competences are difficult to identify and measure. (Javidan 1998; Hafeez & Essamail 2007).

According to Hafeez and Essamail, core competences should be at least the following:

1. Allow the organization to access a wide variety of markets.
2. Contribute significantly to customer perception.
3. Difficult for the competitors to imitate.

Core competence is often a combination of tangible assets such as technology but can also be intangible assets such as culture and people knowledge. When individual competences and core competences are linked together, an organization is able to reach the maximum benefits of its objectives. (Hafeez & Essamail 2007)

2.1.4 Competence-based management

Strategic management based on competence within an organization is a relatively new way of understanding how organizations gain high performance within and for a significant period of time. The theory itself was found in the early 1990's, the competence based strategic management's theory represents how organizations can develop competitive advantage in a structural, systematic and sustainable way. The theory itself is an integrative strategy theory which incorporates behavioral, organizational and economic concerns into a context which is holistic, cognitive, systemic and dynamic (Sanchez & Heene 2004). To help an organization to efficiently achieve its goals by using coordinated deployment of competence is assessed in this theory (creating and distributing value to customers and stakeholders).

Strategic point of view has been used by many scientists when studying competences. The environment operated in determines the value of competences and resources. (Mosakowski & McKelvey 1997) A case study by Johan Wallin (1997) presents a view that customer orientation is the main point in competence development. When determining the competence-based strategy customer should be taken aboard as co-produces, since they possess a lot of useful information to the company. According to the study, quality and speed of actions were improved due to customer representation. (Wallin 1997)

Sanchez et al (2004) presented five modes of competence-based management theory, where each competence mode arises from a specific level of activity with an organization as an open system. (Sanchez et al. 2004) Mode of competence as a term contains an important view and way of expressing specific kinds of processes and activities which are used to assess the organizations competences. These competence modes are combined from a distinctive kind of organizational flexibility to respond to diverse and changing environmental conditions, such as technological change, varying conditions of environment, evolving market demands, etc. Each of these mode's can be described throughout the features of flexibility they bring to the strategic portfolio of an organization. (Sanchez et al. 2004)

First competence mode Sanchez defines is cognitive flexibility to imagine alternative strategic logics. It derives from the cognitive flexibility of an organization to conceive of alternative ways of creating value into the market. This mode of competence originates from organizations collective corporate imagination in perceiving feasible market opportunities to create value. Thus it strongly depends on managers of an organization to perceive market needs, identify the specific preferences that organization might serve, determine the features of products and services which can comply those needs and preferences, select correct distribution design for utilizing new products and finally to define product offers which will be viewed by the markets as having potential and giving attractive business value to the customer. (Sanchez et al. 2004)

Second competence mode Sanchez defines is cognitive flexibility to imagine and innovate management processes. Second competence mode derives from the cognitive flexibility of managers to conceive of alternative management processes for implementing strategic logics identified by first competence mode. Competence mode II includes the managerial abilities to realize what kind of resources such as capabilities, competence and knowledge are needed to execute given strategic logic, to innovate designs into the organization which are effective for processes using available resources and to define monitoring processes and incentives to control the processes inserted to carry out the given strategy logic.

Third competence mode Sanchez defines is coordination flexibility to identify, configure and deploy resources. Third competence model contains the flexibility in coordination when assessing tangible and intangible resources needed to carry out the strategic logics of the organization for creating value through its product offers. This derives strongly on the ability of organization's managers, normally the midlevel management to produce or assess, define and deploy the resources for giving the product of the firm an effective leverage on the markets in target.

Fourth competence model Sanchez defines is the resource flexibility to be used in alternative operations. This competence model derives from the outsourcing capabilities and organization's capability of using resource chains in alternative ways. The resource chains of an organization define the different ways of usage and leverage generated to the company.

Fifth competence mode Sanchez defines is the operating flexibility in applying skills and capabilities to available resources. Fifth competence mode differentiates from the fourth outsourced resource to firm specific and firm-addressable resources and how they are effectively and efficiently used over a range of operating conditions. (Sanchez 2004)

In addition to the competence modes Sanchez also defines the four cornerstones of competence-based management theory with some similar treats as follows. (Sanchez et al. 2004)

Adroitness, being able to dynamically respond to the stimuli of external environment and to its own internal processes is the first cornerstone of Sanchez. As defined in Solow's exogenous growth model (Solow 1957) the value of a company consists of resources, competences and technology factor (/change). In order for company to be competitive in all of these areas the need for dynamic responses of external indications is crucial. Without sustainability in the growth factors the result might lead to various forms of organizational entropy, such as a gradual loss of organizational focus, a narrowing and increasing rigidity in the patterns of activity the organization can or does perform, a progressive lowering of organizational expectations for performance and success, and the like. Analogously, in organizations as systems, managers must provide continuous input and attention to maintain or improve the order and structure in an organization's value-creation processes. (Sanchez et al. 2004)

Second cornerstone is the notice that competence must include an ability to manage the systemic nature of organizations and of their interactions with other organizations. This aspect of competence is addressed by requirement of resource coordination, both own organization and important organization-addressable resources that lie beyond the boundaries of the organization. (Sanchez et al. 2004)

As third cornerstone Sanchez mentions the ability to manage the cognitive processes of an organization. This competence management dimension is addressed by deployment of resources - directing organizational resources to specific value-creating activities. This lifts a twofold need for managers in organization. Managers must be able to ascertain and assure that an organization's operations meet at least the minimum **efficiency** requirements needed to carry out the **strategies** of the organization, but they must also be able to define and select strategies that have the potential to create value in targeted markets when they are carried out efficiently. In other words, managers are responsible for both efficient and effective use of an organization's resources. (Sanchez et al 2004)

Managing the holistic nature of an organization is the fourth cornerstone of Sanchez model. This step defines the need of leading an organization in a way it achieves the goals that promise a satisfactory level of goal achievement for all individual and institutional providers of the essential resources the organization needs. This means,

that organizational competence in definition recognizes the existence of multiple stakeholders and the importance of meeting the expectations of all resource providers in sustaining the value-creating processes of an organization. (Sanchez et al. 2004)

While competence-based strategic management requires the fundamentals such as designing, analyzing, sense-making as well as other intellectual activities it basically strives the cognitive processes of managers of organizations in a competition between each others in different organizations. (Sanchez et al. 2004)

As competence is regarded as the key to competitive success in competence-based strategic management (Mahnke & Aadne 2002), the need for renewing and dynamically altering the ways of building, accessing and leveraging competences by e.g. initiating, preparing and building competencies is crucial.

2.1.6 Models for competence management

According to Viitala (2004) knowledge management is one approach to management, which is generated from awareness and active through orientation. Organization can control, support and enable knowledge management and to create and provide training expanding awareness. By offering informational and practical tools for supporting knowledge management approaches can be reinforced.

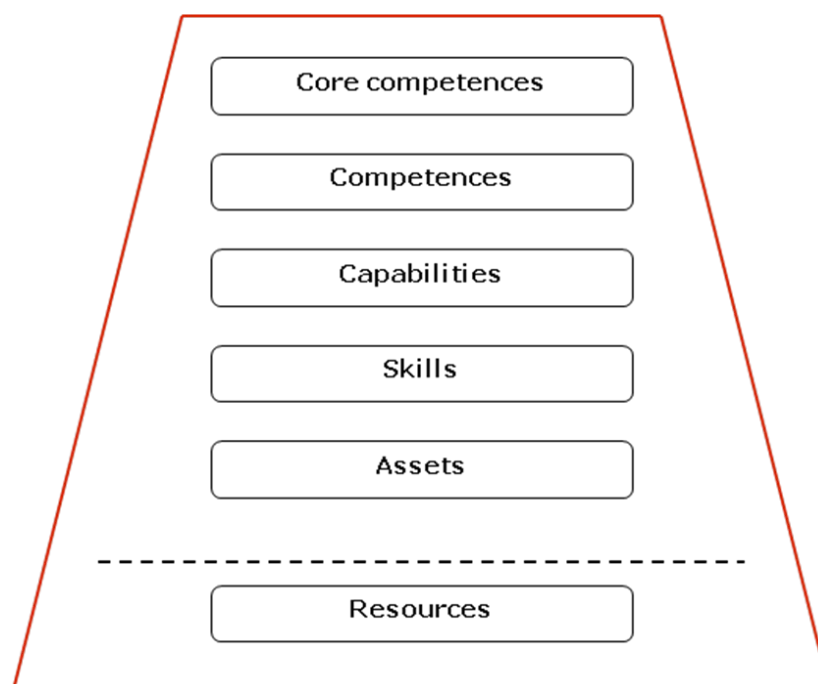


Figure 4: The core competencies derivation model

Javidan (1998) presents a practical model for recognizing the core competences in a company (Figure 4). Starting from the bottom of the hierarchy the building blocks for competence in organization are resources. This case study has employees of the company as resources. Resources have either tangible or intangible assets (figure 5) as seen from the table below.

Tangible assets		Intangible assets		
Physical	Financial	Human	Technological	Reputation
<ul style="list-style-type: none"> ▪ characteristics ▪ production facilities ▪ location ▪ production flexibility ▪ capacity ▪ surpluses ▪ property and equipment 	<ul style="list-style-type: none"> ▪ receivables from clients ▪ cash and cash equivalents ▪ liabilities ▪ equity 	<ul style="list-style-type: none"> ▪ knowledge and expertise ▪ adaptability ▪ loyalty ▪ availability ▪ performance 	<ul style="list-style-type: none"> ▪ patents, copyright, company secrets ▪ R&D facilities ▪ qualifications of employees 	<ul style="list-style-type: none"> ▪ brands ▪ corporate image ▪ corporate identity ▪ relationship with suppliers ▪ customer satisfaction

Figure 5: Tangible and intangible resources

After assets, the hierarchy rises to skills which are special forms of capability, usually embedded in individuals or teams, which are “useful in specialized situations or related to the use of a specialized asset”. Fourth level of competences is *capabilities* which are repeatable patterns of action in the use of assets to create, produce and/or offer products to a market. Capabilities arise from the coordinated activities of groups of people who pool their individual skills in using assets to generate organizational action.

Competence is the ability (being capable of) to apply assets in a coordinated way (interaction and integration of capabilities) in order to reach a certain aim. If this coordinated interaction and integration of capabilities leads to reach a certain aim (e.g. introduce new products successfully) then these capabilities lead to a competence. Furthermore a competence is related to processes and interaction between the assets in an organization and lies generally embedded in certain organizational units, such as sales, marketing, logistics or production

Top level of the competence hierarchy is core competences which are defined as unique combination of knowledge, capabilities, structures, technologies and processes in an organization, which makes it possible to provide products or services which absolutely no other organization can produce in the same way, at the same moment and at the same speed. Core competences and competences add the most value to the realization of the organization goals and objectives. (Javidan 1998)

Company performance is defined with similar terms as Javidan by Warren. According to Warren the company performance can be regarded as a function of all of the resources in the company, which have the feature of accumulating and depleting over time. Skills and assets are built over time and financial resources and refer to the relative ability to build a specific capabilities compared to rivals. Competence can be addressed as the total combination of company capabilities when building the overall strategically important tasks. The overall effectiveness of building the competencies result in organizational learning, which is addressed more carefully in the following chapters. (Warren 2002)

Mallona (2002) sees the way of knowledge-stocks, resources, assets, skills and capabilities relating to competence. He points out that capabilities originate from

resources of the company and mainly how the organizational processes are developed to interact and exploit these resources. If raised to higher perspective or abstraction, companies can be seen as architectures of organizational competences or hierarchies or organizational capabilities. (Mollona 2002)

Hannus (2004) then again gather the contents of capabilities from knowledge, processes and IT-solutions. He also differentiates the capabilities into two categories:

- Functional capabilities like managing customer relations, innovation, product development, operational activities, and partnerships
- Enabling capabilities like operation control, personnel management, and IT management

This division is usually additionally divided to more specific capabilities. Analysis of these capabilities as a part of strategic work may be used to define the gaps in capability. It involves the analysis of the capability level together with its strategic importance and nature to the company as seen in figure 6.

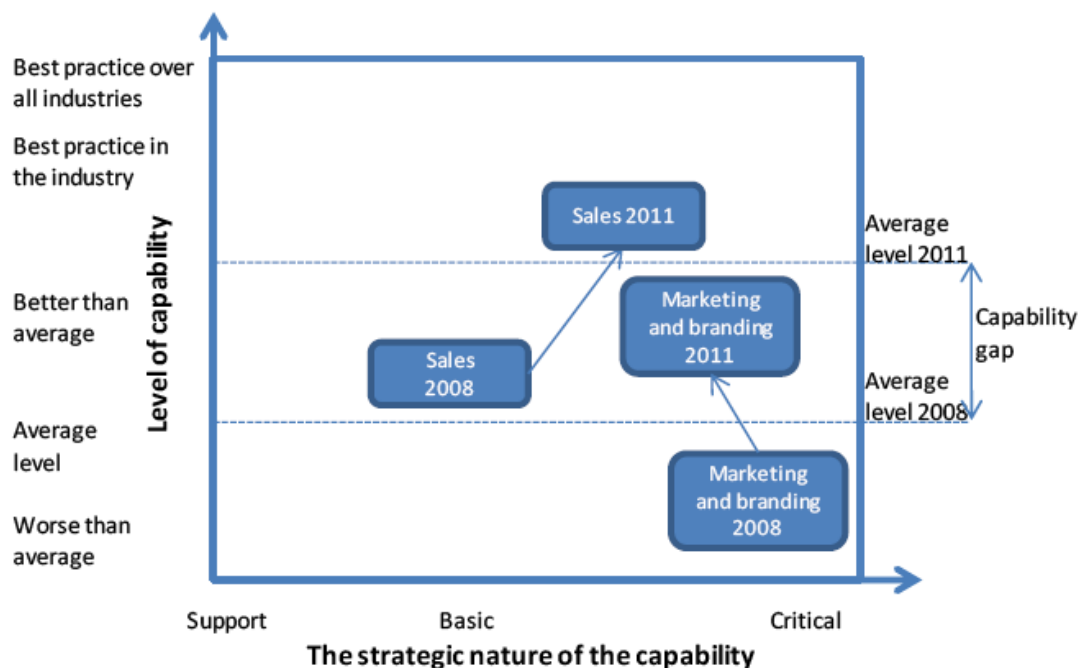


Figure 6: Example of the capability analysis on the area of managing customer relations (Hannus 2004, modified)

When company management is determining the corporate overall strategy, the determination of current and future competences totaling in company competence portfolio should be identified, along with other strategic targets. With this determination company management can identify potential opportunities to leverage resources more effectively and recognize the new businesses that may seem to have potential value but which struggle with the company's competence portfolio. (Javidan 1998)

Systematical analysis of companies resources, capabilities and competencies would be beneficial to any company says Javidan. Before these aspects can be analyzed, a

general agreement and understanding of these concepts is needed, otherwise confusion and misunderstandings are sure to follow. Identifying and defining companies core competencies should be an essential part of overall strategic planning process. (Javidan 1998)

Mollona (2002) sees companies as complex systems of capabilities, resources and social connections. Resource stocks refer to the assets that a company can deploy and they should be recognized and differentiated from the terms of capabilities and competencies, which are broader concepts including also what the company is able to do with those possessed resource-stocks. Modifications to resources need time and therefore the current resource stock is the set of past decisions and actions. Resources are the core items which would remain observable if companies' actions were frozen in time. Mollona's model visions a process oriented view where companies are information-feedback systems that drive the accumulation of resources. The model bases on structure (resource stocks) that defines the strategic decisions, since strategy is based on the information management receives from the resources and as feedback structure follows strategy since decisions accumulates resource stocks. Feedback structure like this can be seen as a guideline for competence evolution. (Mollona 2002)

Competence management is also viewed from scientific point of view by scientists. One of the scientist's perspectives is cognitive science, with sociological and psychological points of view. In another point of view competence management is disciplined to organizational sciences, particularly related to strategic business administration and organizational sciences. Question about the strategic organization is answered by models of organizational science, the aggregation of competences and the distribution of the competences into operational processes. According to this model, the sociological and psychological factors concentrate on developing classifications for competencies and describing collective and individual competence types as well as regulating the processes of learning among individuals. These different views are brought together by few scientists. There are scientists who talk about individual competences and needs, and those who concentrate on the strategic overall business needs. Nevertheless synchronization between individual and organizational competences has been under investigation. A practical model of integrative competence management is presented by scientist Reinhardt and North, who combine these two different views (figure 7). Competence is divided into three main phases by them; identification, validation and transfer. (Reinhardt & North 2003). Also an alternative method for core competence identification model by Javidan (1998, described above) is presented.

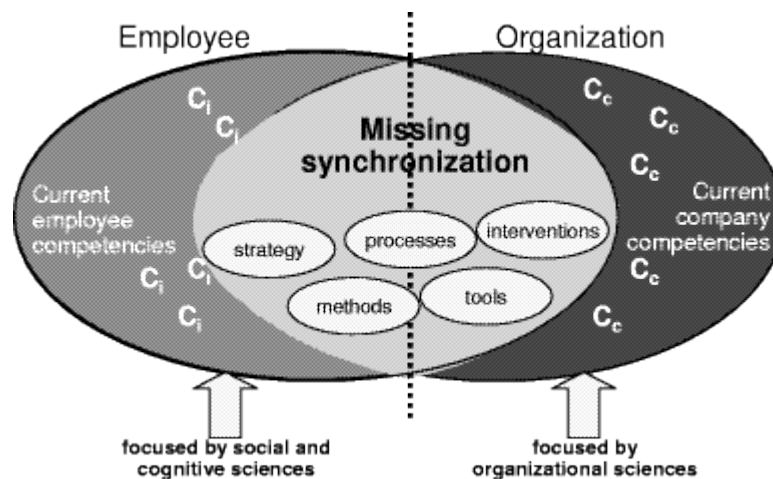


Figure 7: Cognitive and Organizational views on competence (Reinhardt & Norton 2003)

Business must be analyzed in the identification phase in order to identify and define the competences important to the company. The identification is made by investigating processes, products, services, technologies, and projects, and based on these findings, setting up goals with the aim to increase process competence value, project competence value etc. This analysis derives the important individual competencies relevant to business. A set of competence profiles will outcome from this analysis and these profiles will provide a unique set of individual competencies consisting of a combination of sociological, methodological and professional components. A role in the organization is presented by one competence profile. Generally several roles are covered by a person's competence profile, not just one. All profiles with their specific competence components are mapped in a competence catalogue. Job and task-related competence tasks are defined besides these. All these competences together are mapped in a *competence catalog*, which consists of all the core competences in the company. (Reinhardt & North 2003)

The validation phase assesses the competence catalogue which was defined in the identification phase. The competence data is gathered by various methods, such as polls and questionnaires. Every single competence is evaluated on a scale. Reinhardt and North recommend a three stage Initiate-Master-Expert type of solution for this. Validation and verification of unified evaluation for personal competencies is done in e.g. group workshops, personal development discussions with superiors and self-assessments. Different visualization techniques may be used for showing who and where in the company knows what. (Reinhardt & North 2003)

After the competence information is collected the company should actively support different knowledge management methods in order to effectively distribute the competence information. Methods such as competence pools and networking can be used to divide the knowledge inside the company (Reinhardt & North 2003). Knowledge management, its tools and methods are discussed with more precision in the next chapter. Management then again can assess these tools and instruments to improve competence management and develop the knowledge sharing. An additional performance indicator system would make it possible to have ongoing controlling and active development of the competence pool. (Reinhardt & North 2003)

In addition to the work related competencies, an individual competence profile could consist of other relevant information about an individual, such as a resume of basic information, job, project or area of expertise as well as other non-job related competencies. These competence profiles should be published for the whole company in order for the employees to assess and share information amongst colleagues. (Reinhardt & North 2003)

2.1.7 Knowledge management in consultancy business

Knowledge Management is the term given to the process of capture, refinement, aggregation and sharing of data and information between employees, departments, subsidiaries and partner organizations to achieve a position of knowledge-based competitive advantage. (Ovum Ltd, 2009)

Knowledge management (KM) can be described as the activities to organize and improve ways of working in a way for organization to maximize the quality of information through use. Knowledge management calls understanding of the processes and environment where people create and apply knowledge.

Knowledge management is a newly emerging, interdisciplinary business model dealing with all aspects of knowledge within the context of the firm, including knowledge creation, codification, sharing, and how these activities promote learning and innovation. In practice, KM encompasses both technological tools and organizational routines in overlapping parts.

Rudy Ruggles (1996), leading KM thinker/practitioners, has identified the following items as integral components of KM:

- Generating new knowledge
- Accessing valuable knowledge from outside sources
- Using accessible knowledge in decision making
- Embedding knowledge in processes, products, and/or services
- Representing knowledge in documents, databases, and software
- Facilitating knowledge growth through culture and incentives
- Transferring existing knowledge into other parts of the organization
- Measuring the value of knowledge assets and/or impact of knowledge management

According to Davenport and Prusak 200-300 people is the maximum size of the organization where people know each other well enough to understand the collective knowledge of the entire company. If organizations grow larger than mentioned the newer ending wheel of re-inventing the same things over and over again by different people start to accumulate if knowledge is not shared inside the company. Existing knowledge without sharing might be hard or even impossible to locate. With help of current technologies the knowledge sharing is becoming easier in spite of the challenges. (Davenport & Prusak 1998)

According to Ståhle & Grönroos (1999) knowledge, effect relationship and the flow of information in organization are in constant interaction with each other. The flow of information demands working relationships between people and promoting conductive inside an organizational. Without the flow of information from person to

another organizational knowledge cannot expand. For effective knowledge sharing and management it is crucial to know the direction and force of information flow. Often knowledge is held back and sharing of knowledge is limited for some reason, in these cases information cannot flow freely. Organizations may be divided based on their structure and approach to the flow of information into mechanical, organic and dynamic types. Mechanic organization interpreters knowledge strictly based on organizational structure top-down. Information in organic organization is often based on experience or tacit knowledge which flows back and forth in human interaction. Dynamic organization then again possesses a lot of intuitive and innovative information which normally flows in non-planned chaotic paths due to a net like organizational structure. (Stähle & Grönroos 1999,107)

Existing knowledge only becomes effective if and when it is transformed into procedures, processes, manuals or such and is applied when deploying assets such as people or material. (Mollona 2002). One of the critical key factors for successful consultancy company is knowledge. Knowledge is seen as one of the main competitive advantages on an organizational level and as a major factor for obtaining superior performance. Value of knowledge is quite hard object to be measured in project or consultancy based businesses, nevertheless there are few researches that have done such a thing. Van Donk and Riezeboz present their view on how to measure the knowledge inventory in project organizations. Knowledge inventory gathers valuable organizational knowledge from a small number of specialized competencies. When trying to develop individual competencies and allocating them into different projects, measuring their knowledge might turn out to be especially useful. According to Donk and Riezeboz, knowledge management refers to the methods, tools, techniques, and values, through which organizations can develop, measure, acquire, distribute, and provide a return on their intellectual assets. (Donk & Riezeboz 2005)

When gathering and later measuring knowledge and competencies all different types of important personal skills must be identified and most important ones selected as knowledge's for project organizations knowledge inventory. Core knowledge types must be identified and they normally are: technical, managerial and entrepreneurial types of knowledge. In order to create an effective knowledge inventory, at least these three types of skills must be identified, measured and reported. In identification phase employees must be studied and most important markets have to be distinguished. When measuring knowledge a scale must be selected, measurement performed and data validated in order to get convergent and comparable results. The actual report consists of total knowledge's of an employee. It is still unclear, whether this model can be used to improve the long term learning of the organization. (Donk & Riezeboz 2005)

2.1.7 Organizational learning and learning organization

Organizational learning is an area of knowledge within organizational theory that studies models and theories about the way an organization learns and adapts. In organizational development, learning is a characteristic of an adaptive organization, an organization that is able to sense changes in signals from its environment, both internal and external, and adapt accordingly.

There are quite a lot of different models related to organizational learning (Agryris & Schon 1978, Kim 1993, Nonaka & Takeuchi 1995, Bontis et al 2002, Flood 1999, Imants 2003, Common 2004 and Bontis & Serenko 2009) whereas all define organizational learning in slightly different way. However all of them seem to originate the organizational learning from collection of learning individuals and lead their models onwards from there.

”Organization should function like a large church boat; rowing together in the storm towards an united goal. Position might change, but co-operation and reactions to changing situations will take the boat to its destination”-
Pöntinen-Heinonen & Iittiläinen 1999

According to Ruohotie (1998) the traditional learning is not sufficient in innovative organization, which possesses complicated problems and demand constant new solutions in order to survive. Enhancing routine-like functions is not enough, since new innovative ways of thinking and functioning is demanded constantly. Functions have to be observed and validated reflectively, one must be transformative, and thoughts for the future have to be proactive. When actively learning in modern society one must filter and use the information which is essential and serves the strategic goals of the organization. After this experience and intuition is connected to the information and a new competence will be formed. (Ruohotie 1998)

Features of learning organization

Organization is learning when predefined goals have been reached and equivalence between meaning and results is recognized and correcting measures has been done. Avoidance strategies lead to self defense or gradual expansion of error and thus do not lead to the reversibility. Organizational learning is based on values which are related to the data necessary for the production of open interaction and internal commitment. Learning organization is an entity that constantly changes itself and makes learning easier for all of its members. Learning organization encourages individuals and teams for continuous learning and improving working methods. (Ruohotie 1998)

Hätönen (2000) originates the organizational learning from an individual. In learning organization the whole staff develops their knowledge in order to reach the goals set together. Learning organization is a way of functioning. Learning organizational practices and structures to support co-operative learning, abilities are developed to influence their own environment and the future. Learning organization seeks out to retain or adjusting learning. Co-operative group is in the center of development of skills. Learning organization has the ability to create, acquire and transfer knowledge and transform their own behavior based on new knowledge and new perceptions. (Hätönen 2000)

Behind activity underlies strong values and clear vision. Learning organization functions close to customers, responds quickly to changes, learns from others, constantly challenges activities, allows mistakes but learns from them. The starting point for functions is also customers and quality. Organization constantly gathers feedback from its activities and analyzes it. Responsibility and possibility for staff to plan and manage their own work has been endorsed. Organization identifies areas of core competence and organizational structure is low, and levels of different staffing

functions are minimal. All members of the organization have internalized the common vision. Learning organization is characterized by the forward-looking vision, a clear vision of its own mission and a clear implementation plan for the measures supporting these visions. Objectives and strategies are based on the definition of a clearly expressed and commonly accepted values, mission and vision. (Ruohotie 1998)

According to Sarala & Sarala (1997) learning organization is an organizational model, in which the development of the organization is an essential part of the learning process. Organizational learning is a part of the environment which develops itself by learning from other organizations. Organizational learning emphasizes the amendment, changes and innovations, repeated changes in the way of working, involvement and delegating, as well as management methods promoting these features. In learning organizations, strategy, policy, development and evaluation of the learning process is built as learning process. When everyone is involved in decision making alternative perspectives are provide for the basis of decisions. Staff also inputs commitment easier if they are familiar with the decisions and which they themselves have been involved in. At the same time the information is spread evenly and transparently for everyone to use. In learning organization everyone has all the information they need to support their activities. (Sarala & Sarala 1997)

Organizational learning is an organizational vision and an ideal policy to aim for. Learning organization accepts diversity, aims to creativity and willingness to renew functions and also commits, requires participation and the desire to experiment. Learning organizations are distinguished from traditional, authoritarian and controlling organizations by systemic thinking, personality management, thinking patterns, visions and building of both individual and team learning. (Ruohotie 1998)

According to Lähteenmäki (1999) organizational learning enables the development of collaborative knowledge. Organizational learning requires the skill of creating collective level learning from the organization. The organization has to have the ability to take the material learned at the individual level and capture it to an organization's common knowledge capital. This information asset is either individual independent human capital, or cultural memory. In this case, the organization's ability to cope and renew itself and adapt to changes in the environment is not dependent from its individual members. Organizational learning and learning organization concepts in a way examine the same phenomenon but from different sides. Organizational learning is a process that originates from individual's attitude, while learning organization is a set of structures that affect attitudes. Genuinely learning organization enables the penetration of learning practices from individual commitment and contribution to stable learning structures. Essential for the exploitation of knowledge is the individual's desire use their expertise for organization's best interests. Prevailing values of the organization are important areas of expertise. (Lähteenmäki 1999)

Knowledge, competence and their development being explicit and a subject for common debate are typical features for learning organization. Everybody's knowledge is disseminated to be available for anybody. Other incentives beside salary are used to reward employees. Appreciation, acknowledgement, getting more challenging working tasks and tying wage to results of the work are good examples when trying to motivate with rewards. Learning organization develops a structure which allows diverse use of personnel and logics of learning. Self-evaluation is an

important method of self development and general development. Self-assessment is an important part of development and it touches both official and unofficial practices of an organization. Learning organization strives rather from co-operation than competition. (Sarala & Sarala 1997)

In Engeström (1995) point of view the focus of learning in the workplace is to the whole personnel. We are aware of the relationship between an individual employee to the social system of a workplace in which there are unique division of labor and rules. The developmental work research is based on the expansive learning, which means that learning is the subject of the entire workplace: tools, division of labor, the prevailing practices in the organization and the rules and their qualitative change in the functioning of both the target and result. This leads to the fact that learning is collective in nature. Changes in work are the results of interactions in the workplace. Community means and contains self-regulating working teams, open flow of information and guaranteed versatile professional skills to all employees. Each and every one of the employees is responsible from the operations as a whole. Good result arises from mutual assistance within the groups and between them. These aspects are visualized in the figure 8. (Engeström 1995)

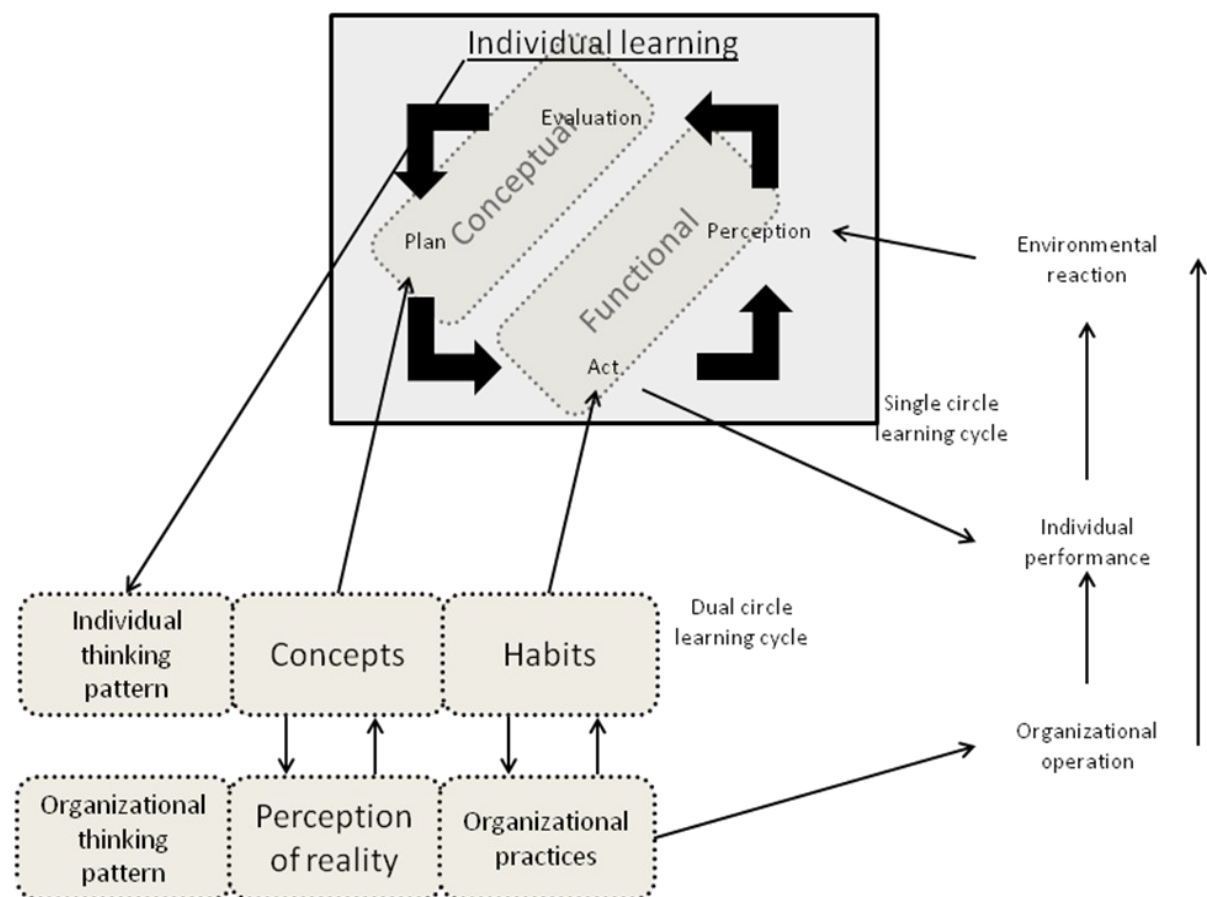


Figure 8: Organizational learning cycle (Kim, modified 1993)

Engeström also considers important that the hidden patterns of thought are taken into the common scrutiny. He has reservations about the fact that the individuals evaluated and classified according to their knowledge, skills or cognitive characteristics basis. Since the work activity is communal in nature and tasks are divided, problems in work processes are not due to poor individuals - personal attitudes can change rapidly according to changing situation. A high level of learning in workplaces constitutes on

placing separate latent in thinking and practices into a deliberate review, dialogue and joint assessment. Willingness to use knowledge and competence and develop it according to the organization's objectives is not in human characteristic, but the operating environment and the human relationship. Therefore an environment where using possessed competence is possible is needed. (Engeström 1995)

Vesalainen & Strömmer (1999) wants to lift a concept of team in the center of learning. Team learning opens quite a lot of new points of view comparing to individual learning. Especially important is the process of integrating the thinking patterns of individuals with the organization of general practices, so that commonly accepted measures may be implemented. Team or a group working near to the employee is the nearest learning environment, and its role in learning support, changing new knowledge to concrete actions and continuous development of processes are crucial. Continuously Learning Group measures, evaluates and seeks feedback on its activities and based on that feedback it will change and develop its activities. Evaluation and development are a constant part of its activities. Individual learning also occurs as the sum of group learning. On the other hand a group of individuals will generate a forum for learning. However, there is always the possibility that development will only rise to tinkering level. Only when development projects reach the fundamental values and culture of the entire organization real learning is approached. Assessment supporting organizational learning contains evaluation orientated organizational culture. (Vesalainen & Strömmer 1999)

These views are enforced by several other researchers (Hall 1997, Griffiths & Moles 1997) as seen in the figure 9 below. The figure describes how knowledge inside an organization is either written down or not (coded vs. un-coded) and generally spread or limited. Also the figure displays the ways how the information develops as a cycle within socially learning organization.

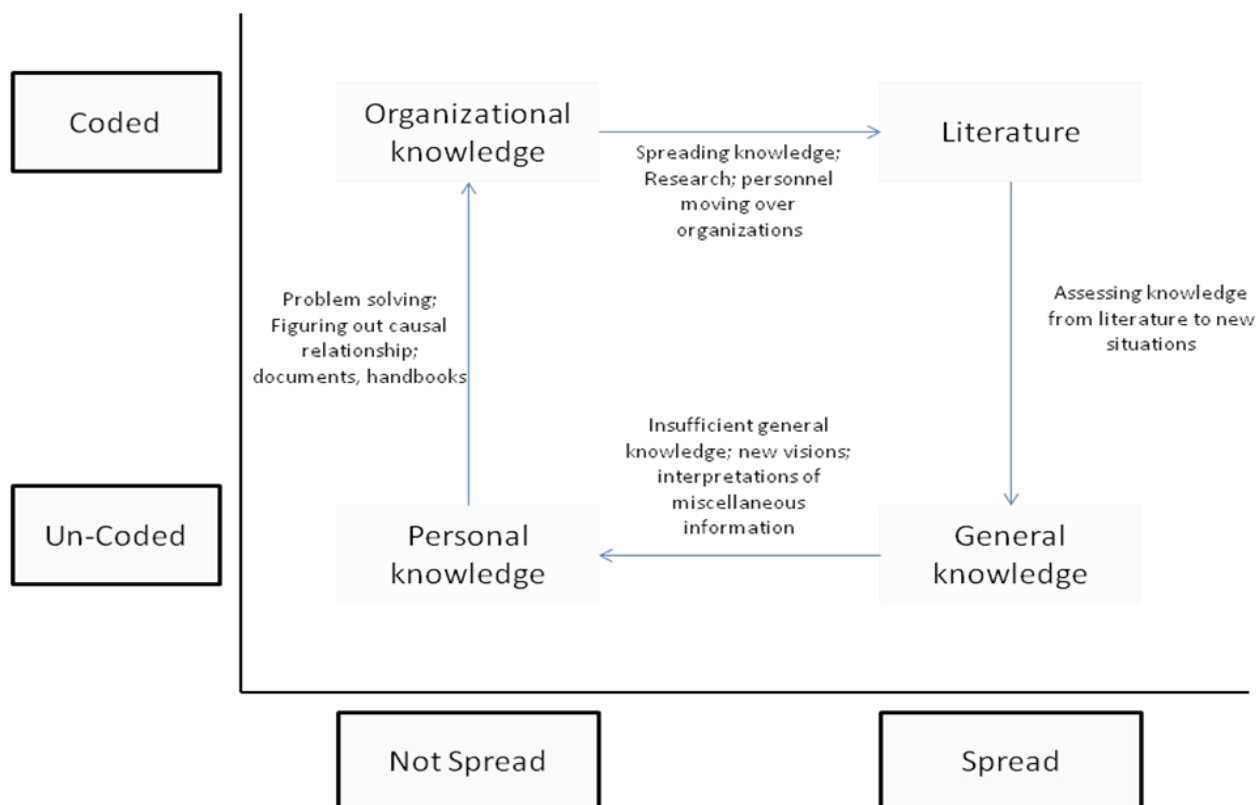


Figure 9: Cycle of social learning (Hall 1997 – Boisot Griffiths & Moles 1997)

Learning is most effective when it happens through individuals own experiences and tests, and when it is followed by further assessment and development. In group level learning is a collective and it is enforced by joint planning, implementation and evaluation. Different levels of vision serve as a development adjuster: visions of individuals, group visions, visions of organization and vision of networks are best when they are conscious and coherent. (Vesalainen & Strömmer 1999)

Ruohotie (1998) assesses how individual development happens as a part of an organization. In his point of view an individual must be able to respond to new challenges, embrace new knowledge and apply it in new ways. People have to get used to the idea that knowledge has an expiry date if it is not renewed and eternal working relationships no longer exist. Organizations requirement for more and more professionals and experts is growing as well as need for networking and teamwork abilities. The professional competence consists of several different areas, thus organizations will need people who have wide-range of talents as well as people who are specialists in certain narrow fields of profession.

Goal-oriented learning is a meta-skill, whereas self-reflection or self-assessment is an important factor. Reflection focuses on content of the problem and tries to map out solutions and strategies to tackle these problems. Learning and new knowledge generation is firmly connected to the cultural norms of prevailing civilization. Learning new things means a change and giving up old and acquainted things which causes anxiety. According to the constructive view learning originates from the actions of the learner himself. The vision of the learning process affects the actions and learning, i.e. does the learner consider himself being responsible for learning activities or does he expects others to guide him. Constructivist learning theory emphasizes the role of transferring knowledge and skills. In addition, social

interactions play a key role in learning. While being involved with an interaction process, it is possible for an individual to evaluate you own ideas, both with yourself and with others. Constructive perception is also compounded by the idea of information relativity and change. (Ruohotie 1998)

Furthermore Ruohotie (1998) continues with individual learning and strategies connected to it. Learner who strives to apply effective strategies seeks to understand and identify the larger entities. Self-reflective abilities are essential for all goal-oriented learning. The self-esteem of an individual highly affects the extent to which he is willing to try new approaches and strategies. Learning capacity is regulated by different personality factors, such as the learner's view to the world and the ability to self-assess their activities more generally. Learning new things does not precisely mean replacing old knowledge with new, but a new way to look at familiar things. People tend to examine the reality and environment around them from different perspectives. In the process of knowledge creation those individuals and organizations have competitive edge, which have healthy and clear understanding of its own possibilities and limitations. An organization in which individuals feel insecure about their status, do not generally achieve good learning results. Creating new knowledge can be achieved in largest success in cultures in which questioning is the default way of thinking and possesses the skills to find alternative perspectives on the environment while supporting personal responsibility and exploratory learning. (Ruohotie 1998, 80-81.)

Sarala & Sarala (1996) see the self development motivator for companies arise from the need to diminish costs and/or increase sales and profit. Reduction of the costs has been made mostly by reducing staff but not taking into account any other means of competition, such as reliability and quality of products and services. The organization key to success is its ability to transform its actions based on the needs of the market. When employees are responsible and adaptive they most likely are able to develop their working environment to meet the requirements even on fast pace (Sarala & Sarala, 1996). Developing the staff aims to increase the operational readiness and performance of the personnel. In addition to training also e.g. guidance, orientation, rotation, acting as principal, group work, study tours and hands-on-in-job learning could be used to raise the knowledge level. The development is an everlasting ongoing event, which should be supported and accelerated with different planned activities. The development of a learning organization is supported by creating an infrastructure for learning. Learning while working and in working environment is more effective than separately organized training events. However, reaching results requires an effective support system.

An organization which appreciates experiments and encourages risk-taking, signals to the staff, that new ideas are greeted with a warm welcome. Trying out and experimenting new ideas and innovations therefore contribute in the development to become a learning organization. In a traditional organization knowledge is imagined to possess authority and dividing it diminishes the authority. Learning organization in turn urges the freedom of information and its sharing amongst all teams and its members and at the same time authorizes them to use and take advantage of existing knowledge. A clear and common vision should inspire all to commit and work with vigor. It is the management's task to bind the people to work on behalf of a common vision while managing the uncertainty and excitement of the staff and still at the same

time acting as a role model for other members of the organization. Manager who is continuously developing himself is an irresistible example. (Nakari & Valtee 1995)

Nakari and Valtee (1995) continues on this by explaining that the basis for a learning organization is people's collective learning, where people learn through interaction. Prerequisite for development is to learn how to learn. Cooperative actions are related to develop dialogue practices. When and if dialogue is used as a learning strategy it helps people to find out new thoughts which they would not have founded by themselves. Another essential feature of team work is to develop reflective skills. One should develop the skill of reflection and use it to critically evaluate own experiments and processes. By reflection people become aware of the motives of their own behavior. Nowadays employees are recruited to the organization on the basis of what they can learn and how fast, not just on the basis on what they already know.

Therefore change management is becoming increasingly important, because people are expected to learn and adapt the change to new roles and at the same time accepting challenges which are related to changes and adopt to them.

Learning organization uses different development methods and problem solving techniques in its actions. Great deal of organizational learning is the results of precise analyze and evaluation of successes and failures and before all learning from mistakes. In addition it is possible for an organization to gather information from other organizations strengths and learn from their successes. Transferring knowledge fast and efficiently to other parts of organization requires the ability to communicate new knowledge and competence. When new ideas are widely known they have the most value, than compared to knowledge being known only by few. (Nakari & Valtee 1995)

The concept of learning organization contains a lot of definitions and gathering the big picture is challenged by the fact that learning means a lot of different things. Unified thing for different definitions is that they all highlight the connection between learning and change, changing and innovation and also process and change of processes, delegation and similar management enhancing things. According to Nakari and Valtee (1995) the essential features of learning organization are unified view of organization's mission and vision, open and active interaction, low hierarchy and divided decision making processes and also people trusting atmosphere with combination of planning and development. By involving management when the personnel is involved in decision making and they are given wide possibilities to affect activities and encouraged to changes and innovations it leads to the confidence of being able to control problems and possibilities.

2.1.8 Performance management

Performance management is the systematic process by which an agency involves its employees, as individuals and members of a group, in improving organizational effectiveness in the accomplishment of company mission and goals. (U.S. office of personal management 2010).



Figure 10: Performance management circle (USOOPM 2010)

US office of personal management determines the performance management of an employee as displayed in figure 10 containing:

- Work planning
- Setting expectations
- Monitoring performance continually
- Developing performance capacity
- Rating performance periodically in a summary fashion
- Rewarding good performance

Planning work is done in advance in an effective organization. Work planning contains *setting the performance expectations* and goals for individuals and groups to aid the organization to meet its objectives. In order for the employees to understand the dimensions of work requirements and goals of the organization it is advice to involve the employees to the planning process. Creating performance appraisal plans, elements and standards for them are included in the requirements of planning employees' performance. All the performance elements measured should be achievable, equitable, verifiable, and understandable. When the measured elements are set and explained, the employees can be set accountable as individuals for their work assignments and responsibilities. However flexibility and dynamism is needed from the performance plans in order for them to be reviewed and adjusted when work requirements or program objectives change. When the plans are used and set into use effectively they are beneficial guidelines for both the employee and employer to follow. (US 2010)

Monitoring is used for projects and assignments in an effective organization. In order to receive constant and accurate feedback from the teams and individuals trying to reach goals which are set to them, measuring is highly important. Setting standards and elements to be measured the performance can be reviewed with the employee together to see how well the predetermined standards are met and make necessary changes. Also when monitored continually any supporting methods to help the struggling employees can be utilized immediately rather than waiting until some period and tolerance ends. (US 2010)

Developing needs are evaluated and addressed in an effective organization. When addressing development in performance management the development of an individuals' capacity to perform is assessed. This process can be activated through training, challenging new tasks, work process improvement, or other methods. When employees are developing their skills in co-operation with the company it encourages good performance, increases job-related skills and competencies, raises knowledge and helps to keep up with the uprising demands of the work. Development needs are

identified quite well if an effective performance management process is set in place and functioning and these features can be addressed in the monitoring and planning phases. (US 2010)

According to US office of personal management (2010) **rating** the employees' performance has turned out quite useful in several organizations. With comparable rating system over the organization the evaluating of employees is made plausible. This helps the organization to realize who their best performers are. When performing performance appraisal the elements and standards are set as baseline for evaluating group or individual performance. The rating of record is assigned according to procedures included in the organization's appraisal program. It is based on work performed during an entire appraisal period. The rating of an employee helps the organization also to compare the performance to the requirements of incentives and pay-grade. (US 2010)

Rewarding is used well in an effective organization. Contribution of good performance by team or individual to the company's mission is rewarded to display recognition. All behavior is controlled by its consequences is a basic principle of an effective management strategy. Those consequences should be both informal and formal and also negative or positive. Good performance should be recognized and it should be made part of ongoing, natural part of day-to-day experience. Lot of good performance rewards such as praises does not need any specific regulatory authority. Also should be remembered, that award regulations provide a wide range of different rewarding possibilities such as cash, time off, and many nonmonetary items. The varieties of rewarding possibilities vary from suggestions to group accomplishments. (US 2010)

2.1.9 Summary: competence, knowledge, and performance management

Competence is a combination of explicit knowledge, value judgements, experience, skills and social relationships whereas knowledge is tacit, individual, action-oriented and only become explicit when expressed out loud, with words or literature. Since software business is highly dependent on people's individual skills, knowledge and competence it differs from many traditional areas of business. Company's competitive knowledge's and things it does very well, better than others, is described as core competences. Competencies are also viewed from a strategic point of view, mainly by managers, where competence management is categorized as a part of company strategy. In order for an organization to effectively develop and allocate the right people to correct projects and in the same time manage the overall competencies, a measurement of the possessed knowledge's is very meaningful.

Models to be used for different purposes in competence management have been developed by various scientists. An organization or a company can be seen as a complex system of resources and capabilities. These resource stocks should be managed and assessed based on the strategic business needs in order to handle the accumulation of resource stocks. Core competencies may be recognized by various methods e.g. the model presented previously by Javidan (1998) as described earlier. It strives from systematic understanding and analyzes of resources, knowledge, capabilities and competences. Useful part of the strategy work may be a deeper analysis in capabilities, skills and assets. Integrative competence management model

by Reinhardt and North (2003) may be used for indentifying, validating, and transferring competences within the organization. Individual and organizational competences are combined in this model.

Knowledge management, learning organization and organizational learning are highly important features for a successful organization. The specifications of a learning organization are structured from the strategy, mission and vision of the company (Sarala et al. 1996) where the employees are engaged to the process and functions development. Open communication and free working environment atmosphere inspires activity and creativeness which leads to learning new things. The learning process itself works both way; company must set the freedom of personal development and correspondingly an individual must take personal actions to strive for personal development. This in the end accumulates to developing company and creates the possibility for the company to flourish.

Effective performance management requires co-operation from management and employees. When planning work clear goals are set, progress towards those goals is measured and feedback is given to employees. Development and training of personnel is used to reach the high standards set and reaching those standards is rewarded and recognized well. All five components of an effective performance management should be addressed in order to reach optimal results.

2.2 PROCESS MANAGEMENT

This chapter will deal with business process management, starting by an introduction from processes, defining the process concept and describing different types of processes in an organization. The process based view will also be shortly compared to the organizational way of thinking. After the introduction, process improvement will be presented and compared to other more radical approaches like process re-engineering and innovation. Later chapters will deal with the different parts of process improvement, discussing the role of the process owner, modeling and measuring processes, as well as methods for continuous process improvement. Related to process improvement, the capability maturity model is presented last as a tool for evaluating process maturity and support in project improvement.

2.2.1 Introduction to Processes

Business process is defined different ways by various authors. Basically business process aims to deliver measurable business outcome or certain observable such as product or service by assessing a defined set of logically related repetitive tasks. (Davenport 1993; Harrington 1991). A process then again consists of several clearly defined tasks which are connected to beginning and endpoint and possess clearly defined requirements and outcomes. Certain output for customer is required from a process and that is what it is designed for. Process presents a dynamical view of how work is done and value is delivered to the customer while organizational hierarchy presents relationships and responsibilities. A process has two important characteristics; first, they have the customer's point of view and second, they cross organizational boundaries, which mean that they are independent of the formal organizational structure. (Davenport 1993). The concept of customer does not necessarily have to mean external customer, it may just as well be describing an internal customer of the company. Anyhow a business process must be initiated by and must provide results to the customer. (Childe et al, 1994; Hannus 2004). Processes generally aim to provide regular benefits to the customer, such as cost and time reduction, higher quality, lower production costs and higher sales. (Davenport 1993)

Business processes are classified in different ways depending on the author. *Core processes*, also referred as *primary processes* or *operating processes* (Andersen, 1999) have direct relation to the value creating needs of an external customer. These processes are the critical value creating actions done in the entire company. *Management processes* strive from business planning, strategy and control. Support processes then again are not directly creating value to the customer but typically support other processes. For example financial, personnel, and information system related activities categorize as support processes. (Childe et al, 1994). Hannus (2004) describes the core processes as company's strategically important processes and those which are not strategically important are support processes. Anderson (1999) introduces *development processes* which are intended to bring higher performance level to primary and support processes. Laamanen (1994) presents a practical view on processes stating that customer service, product and service development, product and service production as well as business support all have their own processes.

Customer centrality and the big picture management are the basis for process based thinking (Hannus, 2004). Lately many organizations have transferred their routines

from functional to process based thinking. The functional way focuses on personal measures and precise knowledge of particular work. Problems are caused by attitudes, and people are the ones who need to change in order to solve the problems. At the same time since nobody is trusted, all employees are supervised. The process based view is focusing in the people and they see that processes cause problems, not individuals. Processes handle the overall functions as employee knows they own tasks. The process is always under measurement, change and continuous improvement. Knowledge development is important in order to remove obstacles. Figuring out who has made the possible mistakes is not important, but solving them since everyone is working for the same customer value providing goal. And thus creating value to the customer is the focus of the process way of thinking. (Harrington 1991; Laamanen 1993). External challenges determine the needs and means for organizations internal structures to develop in process view which is very important for an organization in a complex and dynamic environment. (Lorino & Tarondeau 2002).

Process itself provides a model for how to act. It can be connected to any repetitive function such as treating customer order from beginning to end. For example the product development process describes the generic model, which is executed by many cases, called product development projects. (Hannus 2004). Laamanen (1993) sees the business processes handling three points of needs; customers', employees', and owners'. Policies and processes are needed in order to be successful, just defining clear objectives is not sufficient. In order to cope with developing environment the processes must be continuously improved. (Laamanen 1993).

Controlling and measuring processes in addition to follow them is an essential part of managing business processes. Business process management includes managing the people doing the actual tasks, letting them know the requirements and procedures of work and how they are related to the bigger overall process. Visualizing the whole process and relations inside the process will motivate people to do their part of the process. Well managed processes have a process owner, process scope, internal interfaces and responsibilities, documented procedures, work tasks, and training requirements. Measurement and feedback controls, customer related targets for measurement, cycle times and formal change procedures are also important features. Process improvement is also a crucial part of process management. Since processes and ways of working can always be improved there is no such thing as a ready process. (Harrington 1991)

2.2.2 Process improvement, innovation, and reengineering

Process development may contain significant benefits, the more challenging the changes are; the greater also is the potential benefits. Process development itself possesses several techniques and tools for improvement. (Hannus 2004).

Process improvement as a context is demonstrated here through process improvement. Some process improvement strategies which are aiming for the benefits explained earlier will be presented below.

Most processes tend to decrease in performance over time unless they are maintained, therefore systematic process development should aim to help out the business not just improve process for its own sake. (SEI 2003). Andersen (1999) highlights that the

question is not whether a company has to improve its processes but rather how much improvement has to be done and how quick. According to Kamensky (2003) strategy is included into an organizational architecture which then contains organizations “mission of life” that is the guideline, foundation and most valued element of an organization which gives the starting point to any other planning. Sydänmaanlakka (2007) defines continuous integration as the “mission of life” for learning organizations. This vision is agreed by Andersen (1999) as he says that when customers are getting more and more demanding and their expectations are high the improvement of actions and processes is crucial. (Andersen 1999)

Process innovation is a radical function which starts from the situation of no process definition and develops the process from there, whereas process improvement takes on an existing process and aims to develop it. (Davenport 1993). Process innovation works top-down and across functional boundaries with high risk while process development goes the other way around, bottom-up. Common reasons for process innovation are a need for time reduction, lower costs, pressure from competitors, customer demands, need to cut expenses in order to improve profitability etc. Process innovation may for example respond to the need for better coordination of manufacturing with marketing and sales, which would help the company make what customers will buy. (Davenport 1993)

Process re-engineering is about questioning the current process situation and renewing them by involving IT. (Hannus 2004). Also Hammer and Champy (1993) think that radical change and fundamental rethinking are essential features in process re-engineering. The purpose of process re-engineering is to achieve dramatic improvements in performance measures such as quality, speed and cost.

Harrington presents a five step model for business process improvement which is displayed in figure 11 and explained here briefly. First step organizes the improvement containing activities as planning the activities, identifying current process, making sure that correct people are doing the right tasks. Defining owner for the phase and training the team are also essential tasks. Measurement systems and boundaries are also set in the first phase. Second phase is to understand the current process, since according to Harrington the better the process is understood the better it can be improved. Several process characteristics have to be understood in order to execute this phase such as flow, effectiveness, efficiency, cycle time and cost. Also the process should display itself the same way to everybody. Streamlining is done in the third phase. It goes through the process in order to simplify it by removing unnecessary activities, reduce error rates, and eliminate bureaucracy, which leads to cost reductions. An important phase of measurement and control is the fourth stage of the process. The fifth and last phase is taking the process to continuous improvement, which is described in later chapters. (Harrington 1991)



Figure 11: The five steps in business process improvement. (Harrington 1991)

Each process should have a process owner. He is the person responsible for the functions, outputs and the development of the process. Process owner has to have full

rights on managing the process, meaning controlling that the process is followed and having credits to act on the process and change it if necessary. The process owner has many responsibilities, concerning measurement, information sharing and organizing, all with the goal to improve the process. (Harrington 1991) The role of the process owner may also be to standardize the process throughout the company. The benefits of standardization are lower costs, which for example come from the existence of only one set of documentation and training material and one information system. (Hammer & Stanton 1999)

2.2.4 Process Modeling

The process model works as a framework for improvement and current actions as it is a structured collection of practices that describe the characteristics of a process that by experience has proven to be effective. (SEI 2003).

Using a generic process for the entire organization is quite rare compared to an organization that follows the main guidelines but modifies the process more suitable for functions locally. (Hannus 2004). Processes can be modeled in different ways. Two different process modeling techniques are presented below.

Modeling technique should be selected based on the process says Hannus (2004). In strict processes where actions are fixed and always follow the same pattern using flow charts is a good way of modeling the process. On the other end when process is more flexible and the order and content of actions may alternate the funnel model is quite usable. Generic product development process is an example of a flexible process modeled with the funnel model, visualized in figure 12. (Hannus 2004)

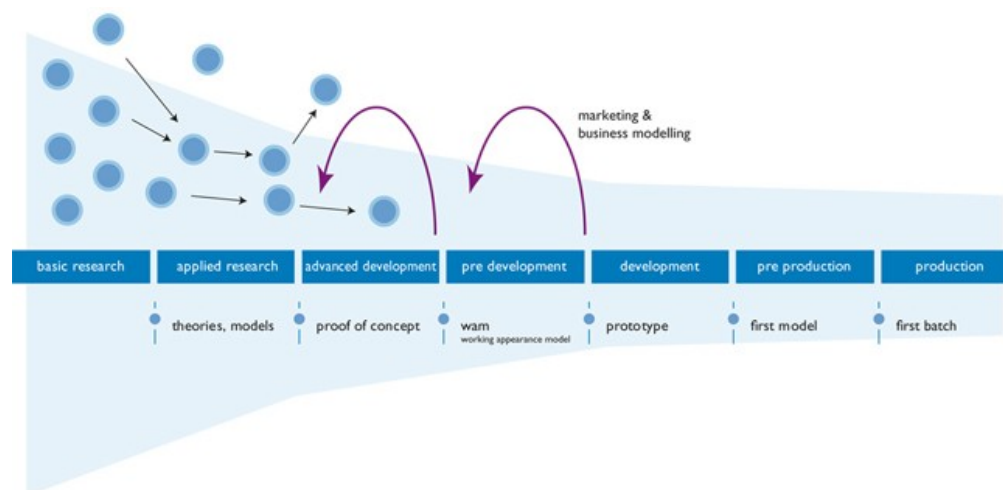


Figure 12, generic development process described with funnel model

Product development process roughly describes the whole process from initial phase of product to taking it into production. First research for the features of the product must be done, and the needed features to be filtered from the huge number of requirements. Development starts with analyzing the product, developing it and preparing it to be ready for commercialization and taking into use by the end customer. The actual functions inside each step of the development process differ by the product and therefore the whole process modeling can be done with the funnel model.

When describing some exact part or clear repetitive action of a process e.g. testing cycle in waterfall type software development a flowchart model may be used as displayed in figure 13.

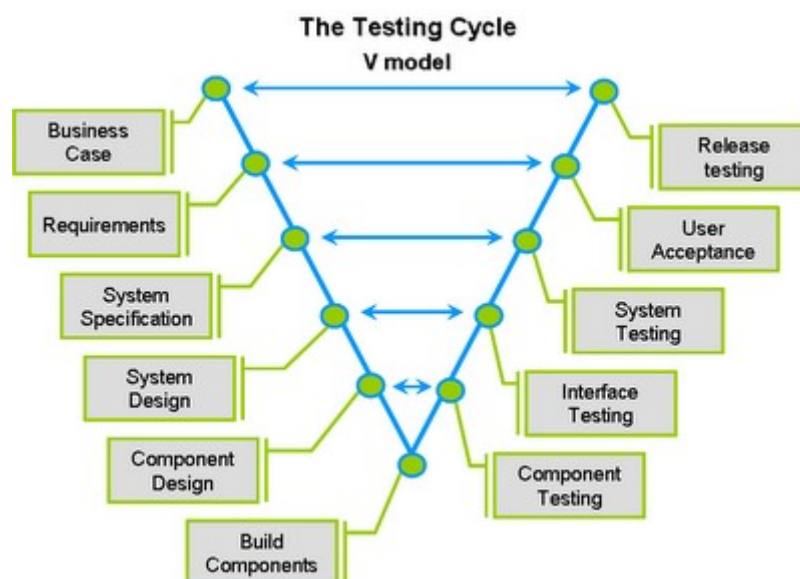


Figure 13: an example of a generic flowchart of a software testing process.

The waterfall model of software development phase is described on the left side of a v-model software testing process. Each building phase is followed by a specific testing phase on the right side. The development process itself progresses in chronological order from left to right following the v-model.

2.2.5 Measuring processes

Measuring processes is important for several reasons. It determines the efficiency of resource use. It also sets a monitor for trends as well as focuses on achieving the organization's mission. (Harrington 1991). According to Rummler and Brache without measurement the performance cannot be managed, therefore allocating resources and evaluating performance is the primary activity for measurement. (Rummler & Brache 1995). When defining the dimensions being measured it helps the staff to understand what is being expected from them. Also employees get the sense of accomplishment when they can measure their performance. (Harrington 1991).

Usually measures are linked to each other somehow. When improving one performance measurement it is possible that several other measures are moving to negative direction. (Rummler & Brache 1995) When an organization desires immediate and meaningful feedback, measurement systems have been proved to be extremely important source of information. Harrington points out that generally people, except for poor performers, want to know how well they are doing and want to be measured. Nevertheless without a feedback system any measuring system is useless, which enables the organization to receive data from processes and correct problems. Harrington emphasizes that direct feedback is the best kind of feedback, no matter whether it is positive or negative. If there is no feedback it indicates lost connection. Feedback systems and measures are the keys for process development. (Harrington 1991)

Harrington also points out that lack of measurement and control in processes makes improvement impossible, therefore companies cannot afford not to measure their processes. Nevertheless companies have to remember that measures have to serve a meaning and the data collected has to be used to control, inform, or improve the process only then it is possible to add value via these functions. (Harrington 1991)

2.2.6 Continuous improvement

The continuous integration process is based on the principles of the Deming wheel, displayed in figure 14 (Deming 1986) and the process model itself was presented by Andersen (1999). The wheel consists of four activities; plan, do, check, and act. Plan phase contains problem analysis and improvement plan. Do-phase initiates the planned actions. Check phase analyses the performed actions against the original problem. And finally action-phase acts according to the results received from the check phase. The overall result of this cycle should cumulate to improved process. (Andersen 1999)

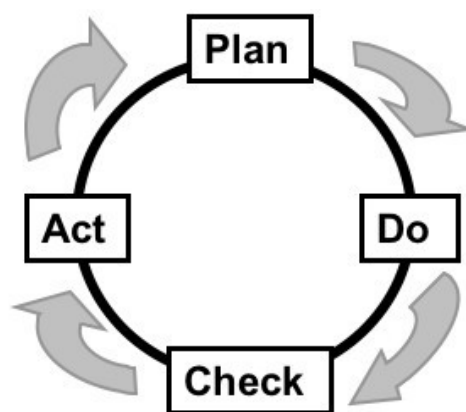


Figure 14: The Deming wheel (Deming 1986)

Continuous improvement can also be assessed by Benchmarking. It is about systematically analyzing the best existing processes, practices, and systems. When using Benchmarking method the competition is studied, learned and best practices adopted and implemented to own processes. (Harrington 1991; Camp 1995).

2.2.7 Process Maturity

The Capability Maturity Model (CMMI) is based on five stages of maturity which attempts to show the maturity level of organizations processes. (Figure 15). CMMI is a process improvement approach that helps organization to improve their performance. CMMI can be used to guide process improvement across a project, a division, or an entire organization. Highest level of maturity lies in the level five which is the level aimed for. Each level consists of the previous level thus skipping a level is not possible. CMMI can be applied in general level to any organizational process despite it was originally developed to support software development processes. (Software Engineering Institute 2006)

CMMI Staged Maturity Levels

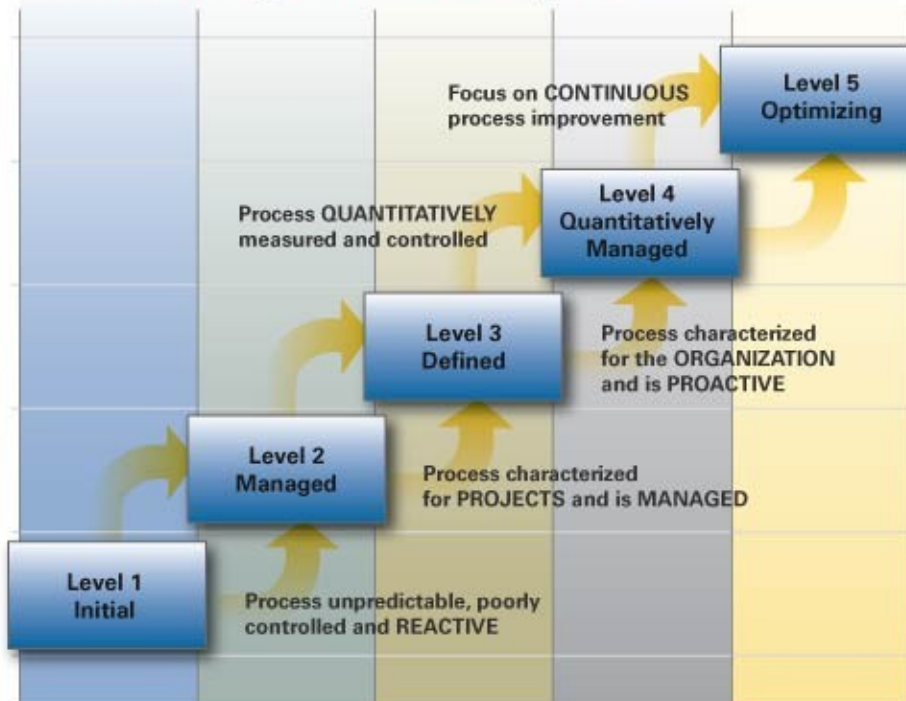


Figure 15: The Capability Maturity Model. (SEI 2006, modified)

Level one process in the CMMI is based on reactive – ad-hoc functions. Cases are handled according to the procedure seen the best at the time. In level two basic principles of project processes are defined and processes are managed. Level three contains proactive actions from the organization while processes are evolved for the company’s purposes. Level four possesses qualitative measures, feedback system, and systematic control. When in the highest level five of the maturity model company has optimized the process and is undertaking continuous improvement cycle. (SEI 2006)

2.2.8 Summary: Process Management

Processes contain certain set of logically connected functions and provide a model for action. The process thinking always focuses on the customer, whether it is internal or external. Process improvement is an essential part of process management and it can be compared to more radical models such as process innovation or reengineering when desiring a broader understanding of the context of business process improvement. Successful process improvement demands modeling and measuring the process, continuous improvement and clear responsibilities and owners to Harrington’s (1991) view. Modeling the process is important for getting a common understanding of how the process works.

Continuous improvement is based on the thought that a ready process does not exist. There are several continuous improvement methods such as Benchmarking and “plan, do, check, and act” wheel of Deming. When an organization is developing its processes e.g. five level capability maturity model may support the improvement.

2.3 Summary of the Theoretical Background: Presentation of Construction

The context of this development research is in the competence management and its conjunction to knowledge and performance. The knowledge's and specific competences are dependent on personnel and their motivation and desires of learning. This view is enforced by organization and its positive feedback on development and learning as an organization whereas this leads to organizational learning. The whole organization itself is characterized by core competencies based on which the company attempts to match the customer needs. The core competences are competences which provide the company with competitive advantage. These competences are collected from the strategic vision of the company and the needs of the customer environment the company is aiming to function in.

Theoretical construction, a framework for the development research, was designed based on the research problem together with a combination of the topics of the theoretical background. The framework was chosen to be built on the model by Javidan (1998) for recognizing company core competences since it combines resources, capabilities, competences, and core competences in one model. This model was still expanded with other elements and theories presented in the theoretical background.

The research questions presented in the introduction were further developed and specified based on the theoretical background. These questions were used as interview themes in the empirical study and as the basis for the actual development work done for the case company.

- How are competences managed and developed at the case company?
- What are the core competences at the case company?
- How is knowledge management assessed in the case company?
- How does the case company support personal career development?
- How does the case company use, develop and maintain available human resources?

3 RESEARCH / DEVELOPMENT WORK

The constructive research & development consists of one case study. This chapter presents the research methods, case and development work.

3.1 Presentation of the case: HIQ Quality Services

The constructive research is made to one case company: HiQ Quality Services (Case Company). The Case Company is an IT consultancy company focusing into quality management and assurance with about 50 employees in Espoo, Finland. HiQ Quality Services is part of the Nordic HiQ group, with more than 1000 employees in total in Finland, Denmark and Sweden. (HiQ 2010)

The company consists mainly from employees executing the actual quality assurance work in customer projects. Consultants are divided into 2 groups whom regulate under project directors called team leaders. Besides this the Case Company possesses small group of managers, HR and sales which are not directly working with customer projects, but responsible for the overall performance of the company. The first group will be referred as Consultants and the latter as Management.

The case company is specialized on specialized, professional level quality management and assurance. Assignments mainly consist of consultancy assignments as part of the customers' projects.

Starting from May 2010 HiQ Finland's departments Quality Services and Softplan merged into one company called HiQ Finland. Since the research was executed with the old organization structure HiQ Finland will not be assessed in this paper.

3.2 Presentation of research & development

Constructive research was used as a method in this development assignment along with the professional competencies possessed by the company and the Consultants. The methods will be presented in more detail in this chapter.

3.2.1 Reviewing processes, methods and material

Already available material from the company was assessed in order to become familiar with the current processes, methods and tools in the company. Also beside the company internal analysis an extensive view of available possibilities was done in order to evaluate the possible tools and methods obtainable.

An application possessed in the subsidiary was evaluated and taken into use. The tool was used to support sales process in the subsidiary company containing information about the employees' competencies.

Interviews were used to evaluate the development done during the research process and to assess the best practices available in the market today. Interviews are good methods for collecting data when a deeper insight in the subject is wanted. To some degree, even timid and tender subjects can be handled in an interview. (Hirsjärvi et al, 2007)

3.3 DATA COLLECTION PROCESS

Data was collected and evaluated continuously during the entire development process. This chapter will describe the process for how the data was collected and conclusions reached.

3.3.1 Reviewing processes, methods and material

Documents and company literature was reviewed besides working with the theoretical background, and finally the interviews were constructed based on the information and knowledge gathered in order to assess the theory and the reviews. Reviewing the company material involved studying the relevant documents and material, as well as getting acquainted with the application described in the previous chapter. The quality management and assurance field itself is very familiar to the researcher for he has been actively working inside the field for over 7-years. Also the professional network the researcher possessed made the assessment of the results effective and rewarding. These features made the firm and goal oriented development possible inside the tight timetable around the research.

3.3.2 Interviews and development discussions in the case company

Interviews were executed on need basis. Firstly in order to get started and aimed to the right direction the company HR and consulting HR specialists were interviewed for the whole context of the research. These HR people were participating actively to the development process during the whole lifespan of the process development.

Software quality professionals were interviewed and their opinions assessed every time the need was identified. The competence list, its evaluation and the overall competence development process were qualified via the experts.

3.4 Analysis of results

In a constructive research, the material is usually collected from a case company and theoretical basis, used and evaluated by the researchers own professional expertise. The collected data can be analyzed in many different ways; there are lots of possibilities but no strict rules. The large amounts of data make the analysis both challenging and interesting. (Hirsjärvi et al. 2007)

The overall combination of these experts involved made the entire process possible to be executed with fast pace and high quality resulting into an effective outcome. The data was analyzed by examining the material gathered during the research process and it was evaluated against the know-how of the researcher, HR and consultants of the case company.

Qualitative aspect was presented via the analysis of the overall competence and knowledge of the company once the information was gathered.

4 RESULTS

This chapter presents the results of the constructive research. Due to the need of finishing the studies in the University of Applied Sciences Tampere, high pressure in the ongoing customer projects and the long lifespan of the development process itself the whole development process was not executed to its end.

The original vision was to research, design, develop, take into use and start the continuous development of the competence management process inside the case company. Due to the challenges in the resourcing and the level the development was started from only the first 4 steps were executed leaving the actual reflection and acting according to the results to be done outside the results of this paper.

The main aim for this research was to emphasize the need of education, learning and competence development in the consultancy business and provide few different perspectives and one solution to the area itself.

4.1 Constructive research and the targets of the development work

The target of this development work was to create a working process for competence management inside the case company. This vision involves the collection of needed competencies and knowledge's for the company and evaluating them between employees and company representative. Along with the process a tool to handle all the needed competencies was required. Competence management is closely related to knowledge management as explained earlier in the theoretical part of this paper. Therefore several methods of knowledge management possibilities are also discussed as for performance management. The evaluation of the usefulness of functioning competence management process for the related processes such as sales and project resourcing is also mentioned.

4.2 Core demands for the development process in case company

Phrases such as

“An organization which loses every technical tool and factory e.g. in a fire, but saves its personnel and competence is quick to rise from the ashes. However an organization which loses its mental capacity will be fed to the competition or shut down” (Becker et al 2001).

and

“Technology and technique are available globally nowadays, but competence and knowledge is limited. Those who posses this kind of abilities should hold on to them tightly” (Becker et al 2001).

are the basis of the motivation for this research.

According to Grönroos (2006) the requirements from every single individual are getting more and more demanding all the time. Therefore three following things have to be remembered:

- Renewing and learning cannot be a project it *has* to be a process
- You cannot swim against the stream

- There are no free riders in the future

These reminders lead to the need of continuous education, “Lifelong learning”. In today’s world one cannot imagine that once you have graduated from the school at 25 you know all that is needed to cope. Lifelong learning is discussed widely even the context of the term seems to be a bit abstract to many. It should mean a process which starts from birth and ends 6-feet under. Therefore it is crucial for an individual to *learn how to learn*. This ultimately means that individual development must strive from the individual itself and cannot be set as someone else’s responsibility. The time to take responsibility is here. *First and foremost the responsibility of learning is on every individual themselves.* (Grönroos 2006)

Competence is based on specific knowledge. Along with flexibility in the job markets the assessment of competences by networking or specially organized companies is getting more and more effective. In an ideal situation everyone would do exactly the task he/she knows the best, using the core competences of that particular individual. In order to reach this ideological situation pro-activeness in working environment has to be top of the line and the competencies and knowledge’s of an individual accessible and open for development.

It is often said that an organization’s most valuable assets are the people it employs. The ideas, experiences, expertise and knowledge contained in the mind of an individual may be worth more to an organization than can be quantified with respect to how that knowledge is applied each day to save time, reduce costs, and advance the organization’s initiatives. How can an organization capitalize on individual knowledge? How do individuals contribute to subunits or groups within the organization to build and perpetuate group knowledge? How does individual and group knowledge become organizational knowledge that can be captured, reused, and applied to achieve measurable positive effects for the organization? When might extra-organizational knowledge be used to further increase or enhance the capabilities of an organization? How can these values be utilized to enhance other related processes such as sales and projecting. These questions and needs were established in the initial phase of the development process. And these are the things which were planned to be tackled during the actual development.

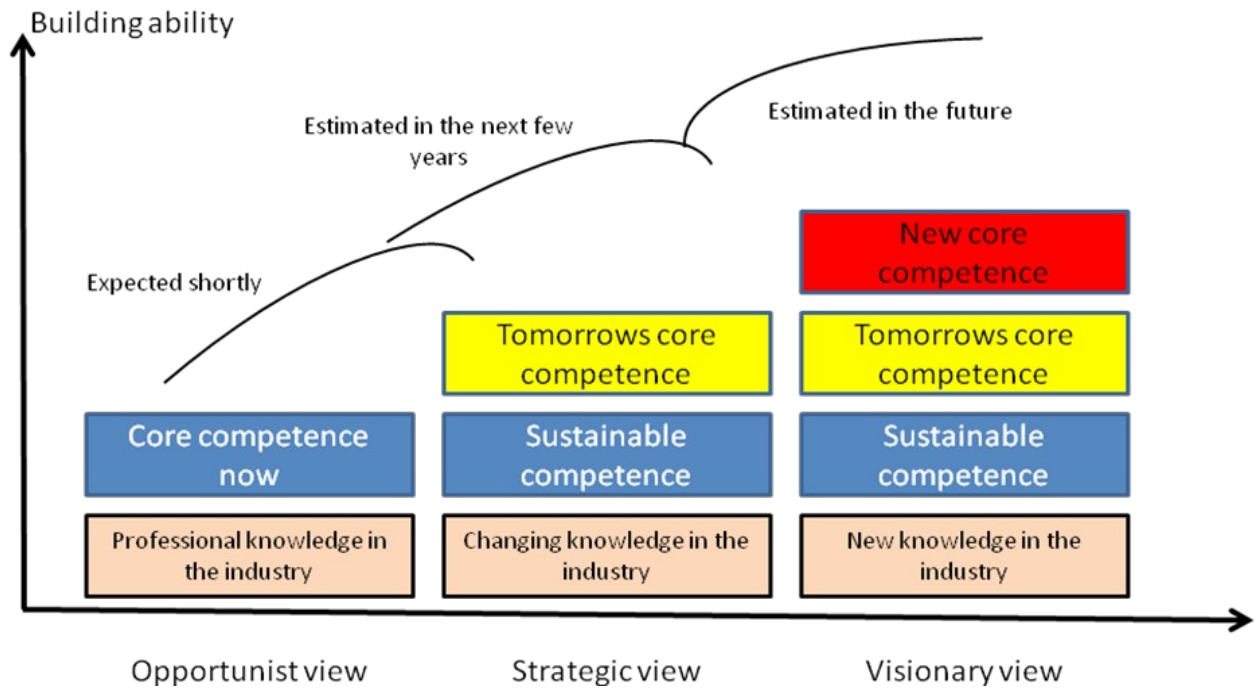


Figure 16: Development of the competences (Wilenius 2004)

In order to set the strategy and visions for a company it is vital to know what you already possess and what the company's core competencies are. Therefore the first phase of the development was to gather and initiate the competence inventory assessment. After this evaluation, definition, planning and openness of competence development process becomes critical features for functional operations. The strategy, mission and vision for the company have to be defined as displayed in the figure 16. (Helakorpi 2004) This part of the competence development was not assessed during this development work and it will be addressed as a part for the future development plans.

4.2 Development of the competence inventory, process and methods

The basis competence inventory tool was based on the integrative competence management process presented by Reinhardt (2003) and in order to take it to the next level and give extra value to technical competences the personality was assessed through PAPI analysis.

The idea and process will be presented first and actual installation of the processes on the latter part of this chapter.

4.2.1 Model of integrative competence management

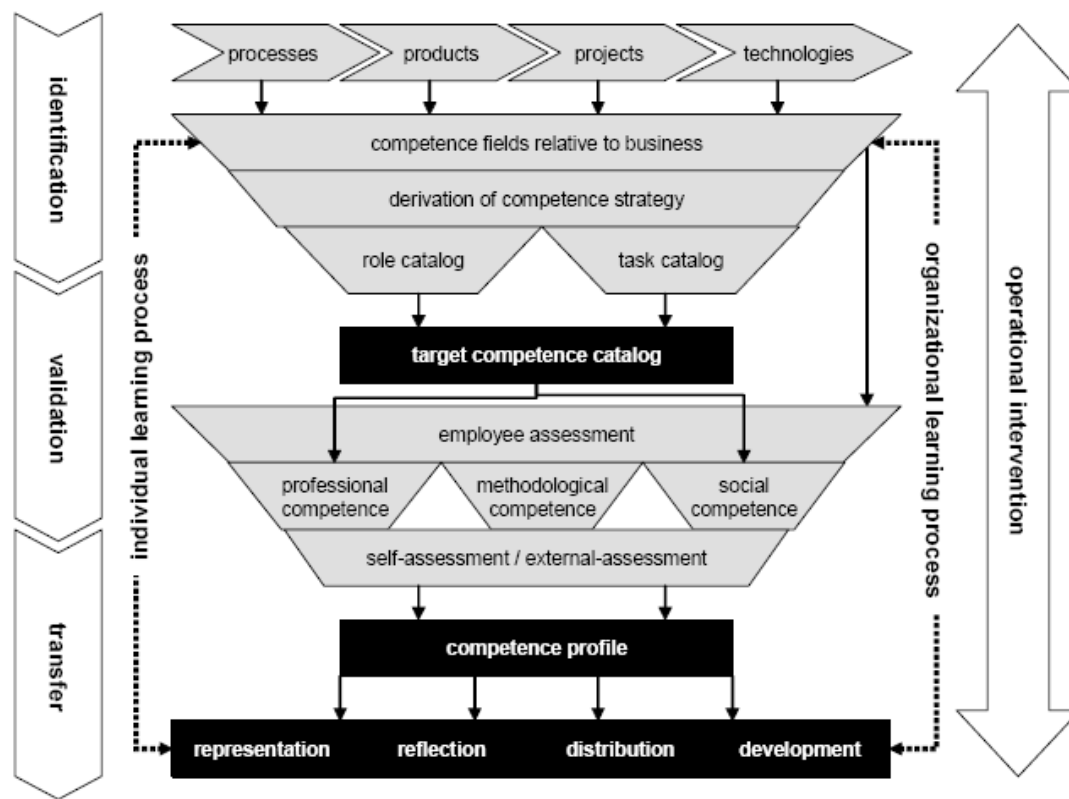


Figure 17: model of integrative competence management (Reinhardt & North 2003)

Model of Integrative Competence Management in the case company.

Phases of the Implementation Model is visualized in the figure 17. The original procedural model has been tested in practice by Reinhardt and North and it was implemented with modifications to the case company. The model originates from the ideology that employees themselves should control, develop and reflect their individual competence portfolios. The company itself can control, adapt and develop its aggregated organizational competence portfolio by influencing to the individual development. The model is divided into three main phases; *identification*, *validation* and *transfer*.

Identification Phase

The identification phase starts off with the *analysis*. The strategically important and otherwise valuable fields of business are studied and identified. The value adding processes are incorporated into the relevance study. The company's strategy and vision are determined on the basis of these investigations by determining the need for corporate competencies re-organization or increasing of product competence value etc. These results are used for the *derivation* of individual competencies relevant for the organization. This leads to a proceeding called "competence drill-down" which describes dividing the competencies into different standard competence profiles, each with unique set of individual competences necessary for an specific role in an company as seen in figure 18.

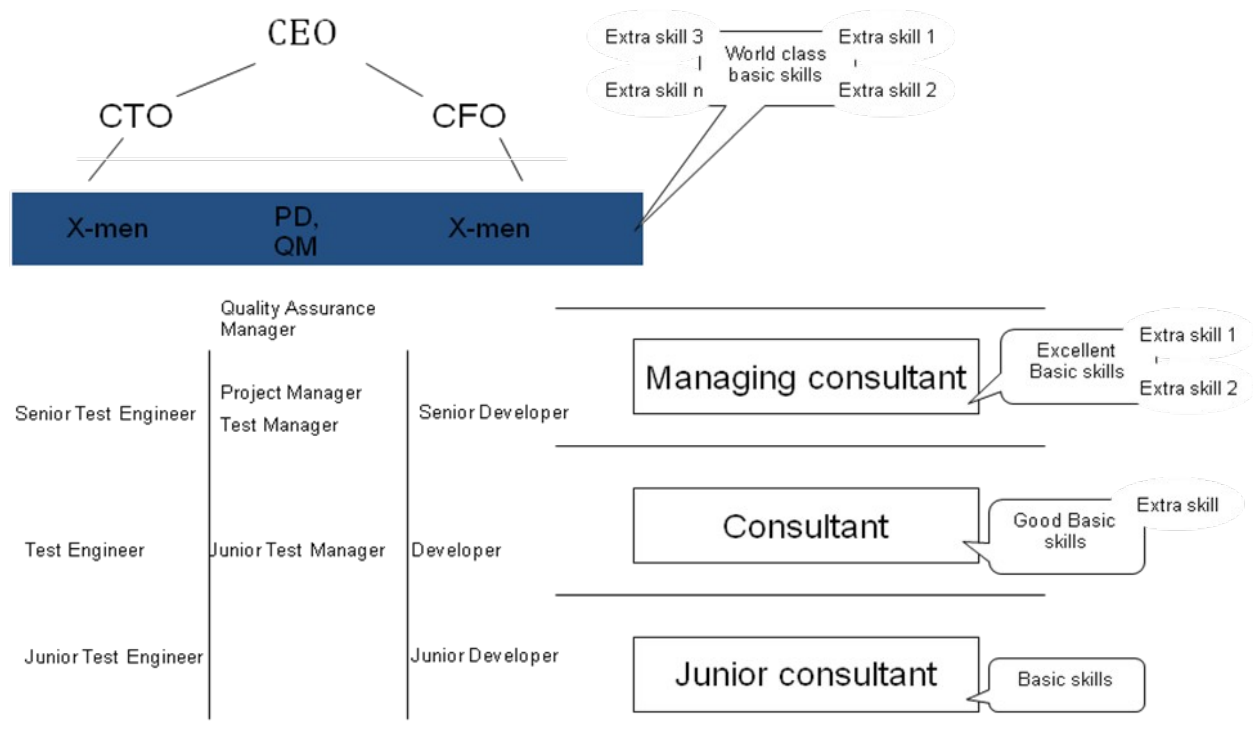


Figure 18: The “competence drill-down”

Every employee is integrated into particular role most suitable for the competence base. Each role requires specific professional, methodological and social competencies in order to be able to fit to the role. All of the roles and its details are pooled into competence inventory. Also a job dependent profiles with particular job related competencies is defined, called “task catalogue”. Task and role related competencies are aggregated and structured in a *competence catalog*, according to the predefined core competences of the company.

Validation Phase

The *validation phase* starts off by ascertaining the actual competencies of the employees using the competence inventory. This is done via competence inventory tool during the development discussion rounds twice a year. The competence is registered on a three way system using time, timeliness and expertise level thus making it *measurable*. Three scale “novice-intermediate-expert” scale is used for the “expertise level” and time in years in “experience” and “last used” dimension. The personality related “soft skills” were determined based on the PAPI model and its 10 scale system. The *validity* of the assessment is confirmed in the development discussions and 360 degrees analysis which totals the individual, company and customer views.

Transfer Phase

After the competencies have been gathered the *competence transfer* between employees can be developed very precisely, depending on demand for and supply of competence in a company. The competence pools are visible throughout the organization and can be *networked*. However technical solutions are needed to support the constant distribution and updating of the competence information. The learning and transfer patterns of an organization can be “tracked” by e.g. investigating the network patterns between employees, or with social network analysis. These

functions enable the management to firmly grasp on the competence management improvements and specific adaptation of the networking concept.

Goals of the Model

Representation and Reflection

Presented model serves to improve *representation* and in addition to this enhance the *reflection potential*. Both management and individual employees have a greater possibility to systematically obtain an overview of the competencies and initiate operative interventions for adaptation. Strengths and weaknesses of the overall competence can be identified as the measures are available. The measures themselves can also be improved. Employees can also use the competence inventory to assess their own level in comparison to other colleagues. This hopefully relieves fears and makes development opportunities better assessable.

Distribution and Development

Once the competences are accessible the *distribution* within the company is possible. This enhances the problem solving process by giving the employees a quick way to establish contact and exchange knowledge with the right people. Know-how networks are produced enabling the development of totally new knowledge in the communities. The model also enables transparent career and development plans as well as strategic personnel development. The overall target result is a model of competence distribution and development throughout the organization, which takes into account and fosters both organizational and individual learning processes.

Operational Interventions

To guarantee ongoing monitoring and upgrading the following operational basic conditions will be adapted:

- *Strategic Interventions*, integration of corporate strategy and competence strategy, management support for personal development
- *Cultural Interventions*, creation of acceptance among employees and management through a communication and motivation concept that runs concomitant to the competence system
- *Interventions in Project Management and Business Processes*, i.e. integration of competence transfer processes in the existing business and value adding processes as well as in project management
- *Spatial Interventions*, i.e. provision of access to and utilization of the competence system at the workplace for all employees
- *Temporal Interventions*, i.e. employees and management must make time resources available for the maintenance, control and updating of the competence system
- *Personnel Prerequisites*, i.e. allocation of clear responsibilities for clarifying questions when rating and maintaining the competence system
- *Technical Prerequisites*, i.e. when implementation throughout a company is taking place, provision of a suitable software solution for storing, distributing, visualizing and evaluating
- *Legal Prerequisites*, i.e. formulation of a company agreement, involvement of the works council and personnel department as well as development of a data protection concept. (Reinhardt & North, 2003)

All of these interventions will be taken into use, implemented, and documented into company competence development strategy.

4.2.2 Structure of the competence inventory

The starting requirement for the competence inventory is a clear competency structure. It describes the common rules for defining needed competencies within the organization. It guides the principles that define the profiles for the entire organization, e.g. core versus unique competencies, format and presentation of the profiles etc. Following criteria are met with the inventory:

- Profile demonstrates the competencies employees have now and sets targets for future improvements
- Career management, individual learning and development is assessed as well as employee performance management and recruitment/staffing.
- Behavioral competencies are defined with PAPI integration
- All profiles are comprehensible by all stakeholders

Practical end uses for the inventory profiles

Career management calls for the management of the organization to be able to compare employees amongst themselves and to the roles in the company. This raises the need to draw comparisons across jobs, roles and levels in the organization. The competency structure should allow all of this to occur easily and effectively.

Individual **employee learning and development** is closely linked to the career management. The processes build around the development of competencies and knowledge's is to be supported in order to an individual to perform in the current role but also to advance in one's career. Also, the competency structure supports goals for continuous organizational improvement and ongoing knowledge management and enhancement consistent with the organization's strategy and vision.

Leadership development and succession planning determines the HR processes which must be in place to ensure that when key roles within the organization become vacant are filled with competent personnel, prioritizing talented and motivated existing personnel. This contains elements to include the forecasting of movement and position vacancies within the organization, definition of the competency requirements for various key roles and levels in the organization as well as determining the development path to reach those skills (e.g. formal development programs; mentoring; self-directed learning; etc.). This will be assessed with more precision in the knowledge management phase. This development model differs from the regular career management in the extent to which the activities are employee versus organizationally driven.

Performance management process was described to include:

- communication to the employees
- individual performance plans
- continuous feedback and management of performance
- constant evaluation reviews, containing reflection and future planning

Competence inventory profiles aims to support reliable, valid, fair and unbiased recruitment and selection decisions. The inventory attempts to provide standards for assessing whether candidates have the capability, potential and motivation to fulfill their position in the organization. However this functions the other way around also, trying to help the possible candidate to figure out whether he/she is really recruiting himself to the company of desire.

Easy to Use

After a short interview round and consulting with the professionals involved in the management process the simplicity and understandability of the competence inventory tool was verified, getting the acceptance from all of the stakeholders. “Best practices” research (Reinhardt & North 2003) suggests that a profile should have no more than roughly a dozen of general behavioral competencies. Otherwise, the tools and processes on which they are based become unwieldy, time consuming and difficult for employees and managers to use.

The following is a rough ensemble of the basic competency inventory structure and its components:

The Core competencies include those key competencies that all employees in the organization must possess to achieve its mandate and vision. These competencies describe in behavioral terms the key values of the organization and represent those competencies that are core to the organization’s principal mandate.

The Career Stream competencies are those behavioral competencies that are common to the all jobs in the stream, and combined with the organization-wide (core) competencies, make up the suite of behavioral competencies necessary for success in the Stream.

The technical/professional competencies tend to be specific to occupational areas, roles and / or jobs within the Career Stream, and include the specific skills and knowledge (know-how) to perform effectively within the jobs of the Stream (e.g. ability to use particular software; knowledge in particular professional areas such as finance, biochemistry; etc.). These competencies could be generic to the Career Stream as whole, or be specific to roles, levels or jobs within the group. The combination of these three types of competencies will make up the competency model for each of the Career Streams.

The development of the competencies has on overall process description as defined in figure 19.

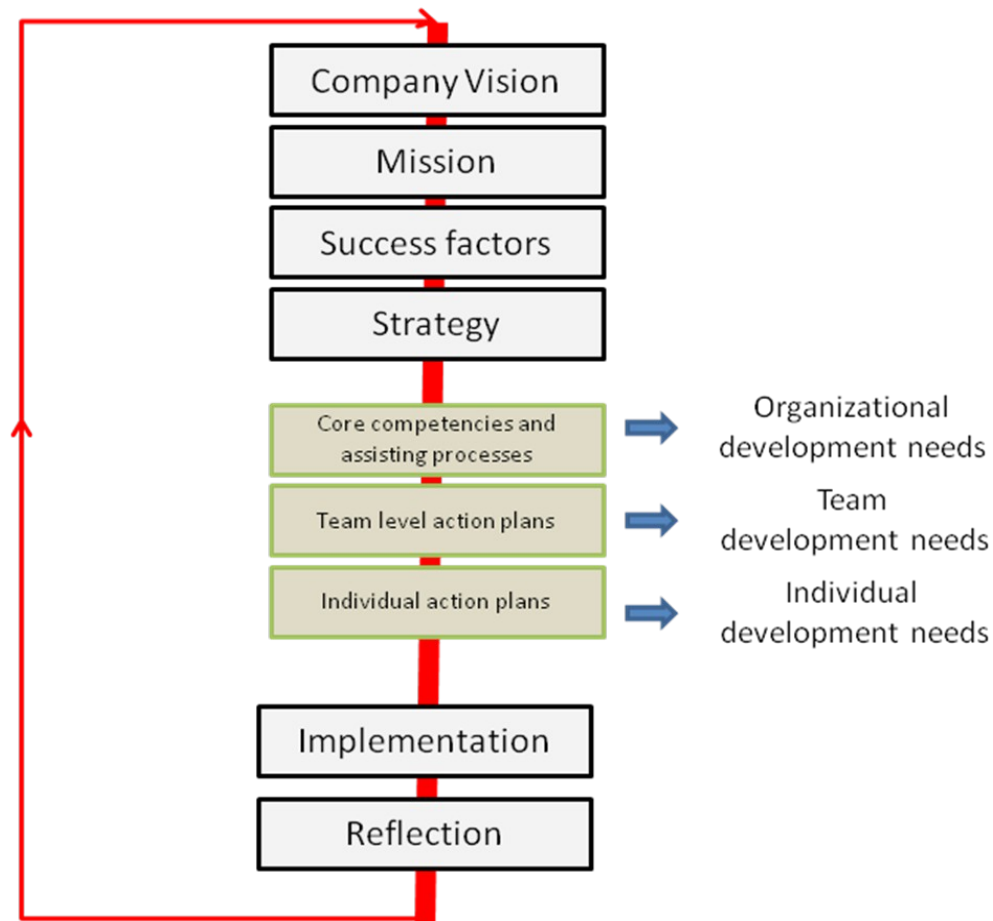


Figure 19: Organizational development process

The process contains company and management level definitions of vision, mission and strategy in order to define the direction the company is wanted to be taken into. After the management level decisions the core competencies and assisting processes are defined and organizational development needs mapped out to be divided into team level. This leads to team level requirement setting and development need assessment. Which then end up into an individual level action and development plans. These actions are first implemented and then reflected. After reflection the iteration and continuous improvement begins.

Basically three main levels of development is needed inside the organization:

1. Organizational development through key competencies and development projects
2. Team level development and action plans
3. Individual development plans

The development of personnel consists of two different areas, personal development and organizational development. When combining these two the overall personnel is developing as visualized in figure 20.

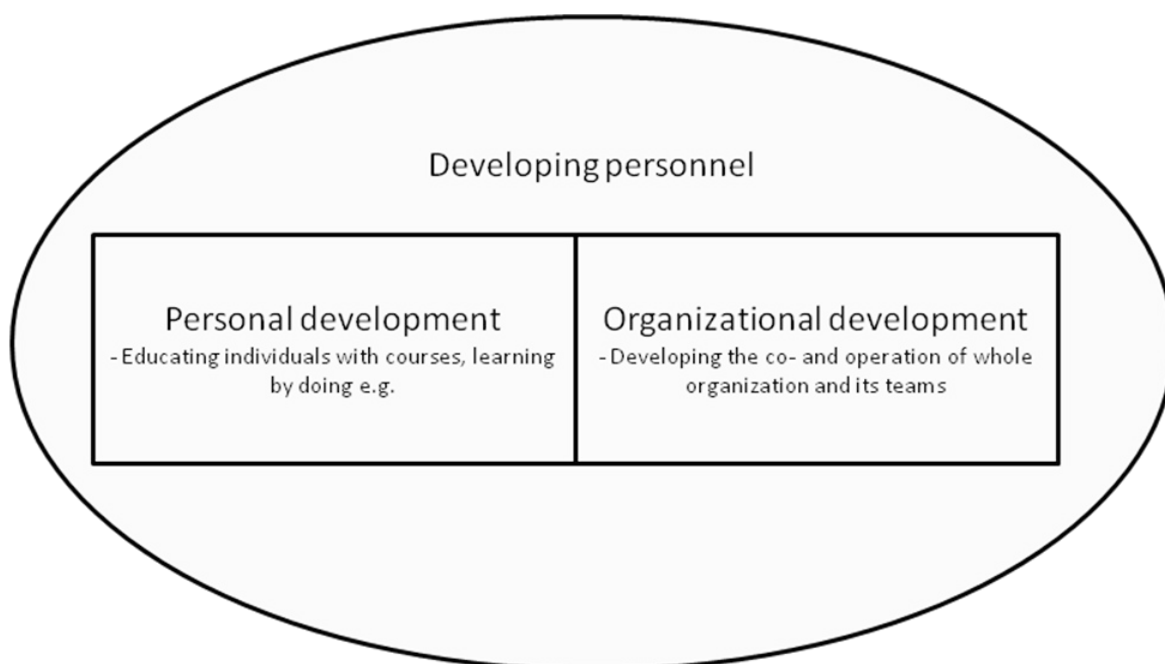


Figure 20: Two sections of personnel development, (Ritala & Tarvainen 1991)

4.3.3 Knowledge evaluation

Determining the value of the knowledge possessed in an organization is an important issue which was reflected mostly based on the Daniel Andriessen's (2003) "intangible economy". According to Andriessen, "a value reflects the concept an individual or group has regarding what is desired. It serves as a criterion to determine a choice from existing alternatives" (Andriessen 2003).

Andriessen presents four methods for determining the value for company knowledge's.

1. **Financial evaluation method**, which assigns monetary value to an object
2. **Value measurement method**, which involves using a non-monetary criterion and translating it into observable phenomenon
3. **Value assessment method**, which is dependent upon the personal judgment of an evaluator
4. **The measurement method**, which determines the measuring of the knowledge. (Andriessen 2003)

In financial evaluation method the guiding figure is money. It determines the needed and not needed knowledge's i.e. knowledge's which possesses the most customer value generating dimensions.

The value measurement method is used to assign value to organizational knowledge. It strives to gather the knowledge's with an observable effect and non-monetary criteria. Positive atmosphere towards knowledge development is build through value measurement method.

The value assessment method is be applied in situations where a leader, manager, or commander is able to evaluate the immediate value of organizational knowledge. In the commander's case, perhaps having access to organizational knowledge allows him to make a critical decision more quickly and easily. An assessment can then be made based on the results.

Finally, organizational knowledge or extra-organizational knowledge acquired might give and organization a competitive advantage in an advertising campaign. The success of that campaign can be measured on a numerical scale and perhaps be observed if the campaign contained a tag line that becomes part of common language and culture in the general public. In this case, the measurement method might be used to assign value to organizational knowledge.

Ultimately, the ability for an organization to be agile, successful, improve performance and positively impact its internal culture will determine the true value of organizational knowledge to the organization. And this is what is strongly emphasized in the case company.

By usage of these methods the values were evaluated and placed on a four dimension scale (fig 21) which determines the critical knowledge's and not so critical ones.

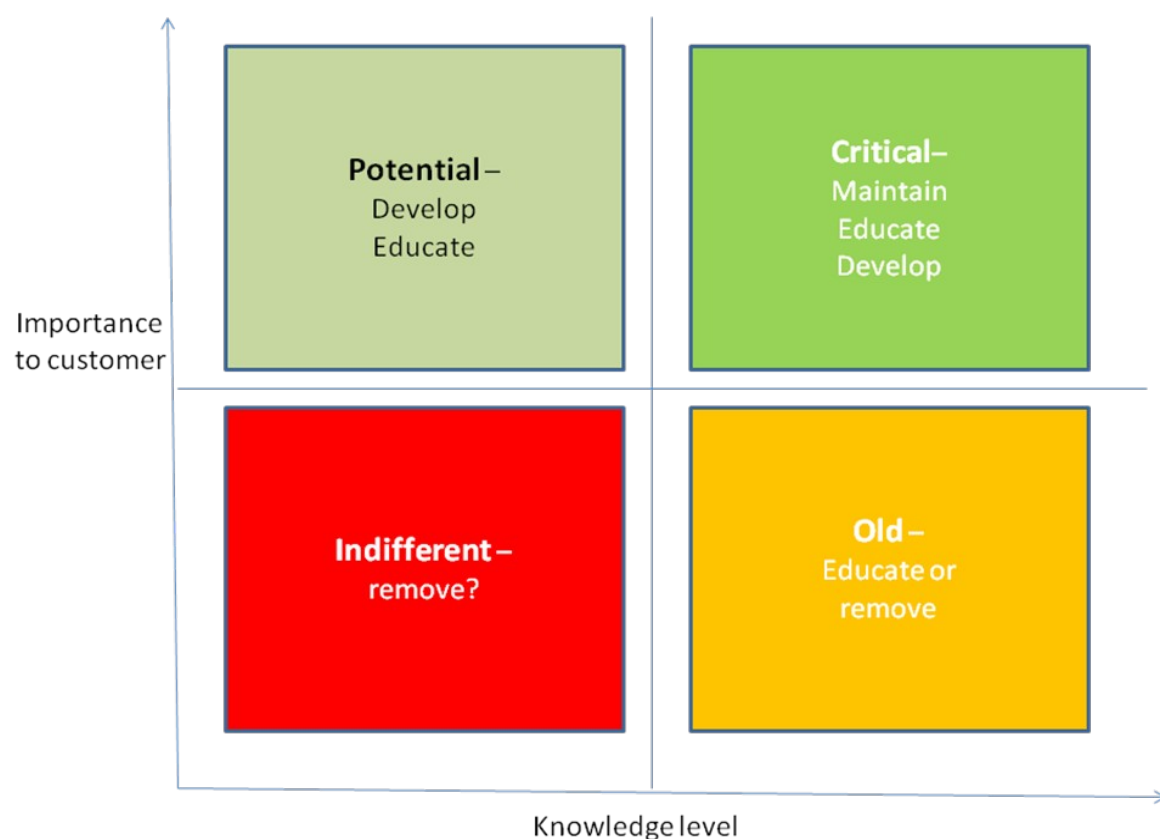


Figure 21: Four dimension knowledge evaluation method.

And according to this rating method and previously presented methods to select the needed knowledge areas the overall competence inventory was collected. In addition to the knowledge's and competencies the improvement of organizational knowledge which leads to improved potential to use the possessed competencies must be processed. Knowledge management plays an important role in this.

4.3.4 Ways to improve knowledge management and knowledge sharing in case company

Grönroos (2006) presents in total four aspects of networking styles are involved when determining the totality of knowledge sharing in an organization:

1. Internal, formal network
2. Internal, informal network
3. External, formal network
4. External, informal network

Step three, external formal information addresses mostly company level brand and image, not directly related to competences and knowledge's thus it will not be addressed here.

In order to utilize internal, formal network and the human capital of an organization two things must be assessed. **First aspect** is to clarify and make public knowledge of organizations strategy and visions. The well known Finnish saying of “emmä mitään tiedä, oon vaan töissä täällä” (“I don't know anything, I just work here”) has been acknowledged by several studies (Grönroos 2006) that only few employees of an organization have a clear view about organizations future strategies, visions, and the ways at accomplish these functions are. These studies also inform that managers tend to greatly overestimate the personnel knowledge about organizations success factors. In order to reveal and bring these areas to common knowledge the communication of the case company will be planned, improved, and processed.

The second aspect is to ensure that the employee's knowledge is at the same level as organizations knowledge. An organization possesses a large amount of information and to utilize it to its most it has to be spread. Three major functions to enhance this have been assessed in the case company. *The competence inventory* brings out the exact competencies of all employees, and e.g. with search function one is able to find the needed knowledge with ease. This feature can also be assessed in project resourcing and sales.

Best practices are gathered to the company intranet from different use cases and projects. When working in software development, similar problems are constantly faced and by making the best solutions of these cases explicit and documented the wheel does not need to be invented over and over again.

Project log is gathered to the company intranet to document the different types of projects, their practices and case dimensions made assessable and usable for the future projects. This way the already gathered information from certain areas or projects is not thrown in waste, but made accessible for anyone.

The internal, informal network normally forms very quickly inside an organization. Typically they are horizontal in hierarchy and do not necessarily have anything to do with daily work. However these communication channels are just as important, in some cases even more important, than the official communication. This communication is normally limited to quite high level and general things are

discussed partly without comprehensive information. This easily leads to rumors, beliefs and hear say.

When tackling these challenges the case company attempts to keep the *communication as open and informative* as possible. This has to be done in every step of each and every process in order to avoid uncertainty.

For the general feeling and good spirits in the company it is highly important to find out the most influential people from within the organization and keep them well informed. In the case company this activity is assigned to the team leaders, who are responsible for keeping the information flowing freely and even so keep the influential people inside the organization well informed.

Internal, informal networks are recommended and supported by the case company by organizing few sports activities in a week and team meetings monthly. Through these networks the influential people can be recognized and also the whole personnel activated to enjoy spending time with themselves and maybe enhance the results of togetherness.

The external, informal networks are the most chaotic networks from the organization point of view. They consist of the networks of every individual employee inside the company and are therefore impossible to control. However these are the networks which are most valuable sources of new innovations and new knowledge to the company. Therefore Case Company embraces and favors the networks of an individual and advises them to upkeep and develop their networks and bring the information gathered to knowledge of the Case Company. Following steps to ensure this are taken;

Every employee is *encouraged* to carefully listen and assess the information from their networks. Even the smallest things might end up flourishing after they are taken seriously and developed onwards. A large number of basic processes are the same regardless of the area company is involved in, despite this most of the innovations are originated from elsewhere. This step derives from the saying “you never know which pocket has the dollar”.

Organizational visions must be clearly communicated, and also must be ensured that everyone understands that organizational development is a long process which does not happen over one night, but demands a lot of *small improvements to everyday actions*. With this in mind, the communication process must work both ways around by ensuring that *all new ideas are handled*. All new ideas from the personnel are taken into the development process for analysis and processed. Must be remembered that the dynamic level of the organization might possess an endless source of new ideas but if the organic (management) level is missing or works inefficiently no innovations are discovered.

Once the networks of an organization are taken into account when managing and developing organizational processes the creating of organizational knowledge in the organization can be addressed.

4.3.4 Knowledge management

Knowledge management as a method of management aims to process the intellectual capital of personnel in a way that it brings value to the company and changes the capital into competitive edge. Knowledge management itself is not an easy management method, since it challenges the traditional way of top-to-bottom management. The basic principle is that the power for renewal and development strives from inside the company, its personnel, not by dictation of management. This may cause uncertainty to the managers, since distribution of power is thought to open Pandora's Box of chaos and problems. This is the management method of the future and the traditional methods are losing their meaning during the time (Grönroos, 2006). However changing to knowledge lead management does not mean throwing away the management or leadership, it just means changing the targets and processes. When knowledge is raised as one of the key values of company and main way to compete in the industry, it demands more from the organizational development and competence base, not just individuals. However the reflection and development of processes and ways of working is originated from the individual and divided to the organization from there. A clear and united vision of continuous development of organizational innovation power must be set as a target. Striving from that point of view the possibilities of individual development must be given for everybody and the members of organization must take responsibility of personal and organizational development.

As described earlier the competencies are derived from knowledge's. Therefore the handling, enabling and creating new knowledge is important. Following chapter describes the ways undertaken in the Case Company to ensure the fulfillment of these conditions.

4.3.5 Internal knowledge sharing and creation

Pirinen (2000) presents a 10 step program which was assessed, evaluated and implemented with modifications to the Case Company. Following describes what and how was done in order to enhance internal knowledge sharing and creation.

1. Knowledge and learning goals are individually defined. Each individual learns from each other via internal courses and knowledge transfer. The key source of information is gathered and an incentive provided to the "best sharer".
2. Knowledge is a collective, dynamic, human process. Performance and organizational knowledge creation are less dependent on individual skills than on social-relational circumstances. When knowledge and learning are regarded as collective, dynamic, human processes, there is a stronger link between actual activities and learning, which is often claimed to be too detached from bottom-line results.
3. Collective care is individualized. Individual, tailor-made opportunities should be provided to each person to engage in organizational learning and knowledge creation.
4. Knowledge creation by individual is supported. Using each individual's full potential in organizational knowledge creation is made everybody's responsibility.

5. Similar organizational structure to each department and team is implemented.
6. Local communities-of-practices and ways to bring people closed to each other are supported. Knowledge creation in distance and diversity is possible, but it requires local roots and bases to be very strong, this raises higher need for direct socializing – “High tech need high touch”. Local community and face-to-face contacts for sharing “lessons learned” support is highly important for knowledge creation. The usage of internal and external networks is continually supported.
7. Structure for collective learning e.g. from projects is established. Surveys, mentorship programs, turning tacit knowledge to explicit, and off-the-job training sessions as well as workshops are facilitated.
8. Expertise knowledge, e.g. technical, is supported by interaction knowledge and also measured and assessed by PAPI. Individuals and teams are taught to share know-how and then effective know-what knowledge sharing can take place.
9. Strategic discussion and dialogue on all organizational levels is encouraged. Dialogue and discussions are important, especially where the product development process is so complex that not all features can be documented, and when learning the key aspects of the job requires years of hands-on experience. The more understanding of data and information needed, the more direct discussions and feedback should be created.
10. Continuity and stability is supported by promoting people with long experience inside the company. This is possible through mentoring and coaching. Also horizontal job opportunities are provided which enables personnel to initiate different roles to enlarge competence.

Once the creation of knowledge is presented the other dimensions of knowledge management implementations will be presented in Core Company entity.

4.3.6 Other implementations of knowledge management in Case Company

The meaning of knowledge sharing has been evaluated as one of the core values by many organizations nowadays. When knowledge is actively shared the knowledge's and competencies will cumulate and incentives are also divided.

Trust is one of the key aspects of knowledge management. Trust is developed in human interaction, and in order to generate trust it must be earned. One main features of trust is that it is very hard to be gained, but very easy to be lost. When trust is built the possibility of genuine opinions, interests and thoughts is enhanced.

The amount and quality of trust effects knowledge sharing, and therefore the paradox of knowledge sharing is culminated to the belief that knowledge sharing means power and everyone gains from it, also the knowledge sharer. Generally people only share information if they feel secure about themselves and their position in the company. Therefore following points of views are taken into consideration also in the case company.

Since consultants mainly work solo in the customer projects or are at least regularly in direct contact with the customer the goals of the functions have to be clear for

everyone. Unclear communication about the goals and ways to get there easily lead to the feeling that things are kept a secret, this leads up to uncertainty and failure in co-operation. Every time an employee has to work separate from the home base the feeling of loneliness might start erupting and this might quite fast lead to lose of motivation and depression.

Feeling that every member of the organization is an important part of the whole picture must be enforced. The better an individual understands his position in the organization the better he can participate to reach the common goal. Robert Bucham, CEO of Bucham Laboratories has said that: “No one in an organization should ever feel that they have to face problems alone, but they have to have the feeling that the organization is behind them 100% every day”.

Consistency is an important part of the communication when working with consultants. The information divided to the organization must be consistent and if plans have to be altered the reasons has to be provided.

Information flow has to be open, constant and sufficient in order for the consultant to feel being a part of the organization and also know the current situation. Information has also the dilemma of being plenty, therefore the information flow has to be consistent and it has to contain the needed facts, also taking notice on the confidentiality of the information.

Leadership and management possess an important role in the knowledge sharing process. In consultant type companies the flow of information should be as free and open as possible. The amount of co-operation and relationship networks affect the volume of knowledge sharing. Open organizations are visualized as a comprehensive relationship network in which knowledge gaps or lose of contacts seriously threaten the renewal and competition abilities of an organization. Therefore the manager has an important role when building open relationship network to the organization and they have to act as an example in knowledge sharing and dividing. The management play three major roles in the information flow; knowledge collector, knowledge sharer, and spokesman. Collector attempts to fully comprehend the organization and its surroundings. Sharer attempts to divide facts and values through the organization. Spokesman divides the information to external networks. These values are also reflected in the trust building areas as described before.

Interaction is an essential part of each organization. Everyone must be open to interaction to every direction. Individual knowledge is not enough for the organization to perform to its fullest, but dividing and sharing individual knowledge, combine and develop it is the key for the whole organization to develop, this raises the need for effective interaction. Interaction helps the individuals to evaluate and reflect the knowledge they possess and derive development from there, enforcing the needed knowledge and giving up the not needed. Interaction helps the organization to enhance its actions and avoid making mistakes.

Communication technology and IT-systems are taken into use to divide knowledge and share information. Company intranet, company wiki, company forum, direct internet communication tools, chat forums (social networking) and VoIP are amongst the tools taken into usage in the company being the most natural way of communication and information sharing for IT-professionals.

Documentation is a key function of knowledge management. If the information is not made explicit and well documented the amount of tacit and explicit but scattered information might end up to amount so significant that the essential information is not divided at all. The company intranet and wiki will provide the storage for documentation which will be stored from technologies, projects and other vital information. Through the platform the search functions are available making the information accessible and usable.

Used processes will also be documented and educated to the personnel. As explained before the value-added from the availability and tools that documenting processes enable to an organization are very useful and end up donating not only functional sense to the organization but also financial profit while processes are reflected and developed.

4.3.7 Knowledge transfer

Knowledge transfer is an efficient and very useful way to maintain, upgrade and develop competencies inside a company. Anticipation to changes is necessary when company is defining strategy for the future. The 4 dimension knowledge evaluation method is used to assist the evaluation of current knowledge's. This information is used when assessing the needs of the business, determine the knowledge gap and figure out the future needs. Once the knowledge's already in possession of the company, knowledge's needed and the anticipated retirement's of knowledge's – by actual retirement or termination of employment – has been mapped out the transfer of needed knowledge can be planned.

One dimension of knowledge transfer for the company is to upkeep performance. However the expansion of valuable knowledge is also vital for organizations. Other perspective is to react actively or reactively to the upcoming changes, whether they are internal or external. Changes in personnel is natural, thus it is important to separate internal and external movement of personnel. Internal movement means changes of role and position which means that the competences and knowledge's still remain inside the company. External movement means either movement inside-to-outside or outside-to-inside. In the first case it is highly important to determine the reasons for the change and try to lay out the possibility of re-recruitment of the most valuable assets in the future. Also when personnel is leaving the organization it is important to set up a proper knowledge transfer session or sessions in order to gather as much valuable information and change it to explicit before totally losing the resource. When the movement is outside-to-inside, it is valuable to get the new organization member actively involved to the organization and acquire as much knowledge base to the use of the entire organization as possible. As detailed in the previous chapters the knowledge and competence of an organization is in the possession of the organization, team, and individual. Thus the knowledge should be made explicit as effectively as possible.

Transferring knowledge with the means possible is a part of performance upkeep and development which is not possible without positive attitude and atmosphere inside the company. The responsibility for development of competence is on the shoulders of every individual themselves, but the individual has to also participate on the sharing of knowledge and support this throughout the organization. Committing to the knowledge transfer is one of the most important tasks for the management when enabling and effectively making the transfer functional.

Following chapter describes the methods taken into use for knowledge management purposes.

4.3.8 Tools for knowledge management implemented to case company

Development discussions which will be held 4 times per year is the basic structure for managing knowledge and competence of an individual employee. The discussions contain updating the competence inventory and thus maintaining the current knowledge of the possessed competences and knowledge's. Also the discussion is used to map out the personal competence gaps in order to determine the needs for training and development against the company mission and vision. These meetings are also used to assess the 360 degrees (personal, company, customer views included) reflection of the performance of an employee. Also personal goals and profit targets are set together with the superior.

Mentoring will be taken in use to spread out the valuable knowledge possessed by the senior more experienced organization members. Mentors are mostly selected from inside the company, but for special roles the consultancy of an outsider might be needed. Mentoring is not only sharing and receiving knowledge, but also multileveled learning and interaction, which in best case scenario transfers networks and best practices. Mentor supports the career of the actor (junior member of the senior-junior duo) and it is a natural way to combine theoretical and functional aspects of the work, also suitable to the transfer of tacit information.

Pair work has the ideology of a traditional master-apprentice –model, in which the apprentice orientates to the tasks with the master. Knowledge and competence transfer is a natural process in this model and is well established in specialist as well as support work. Also pair work contains in nowadays software development the concept of two same level specialists working together. This also leads to natural knowledge transfer whereas two specialist never possess identical knowledge's compared to each others. Also this is a good way to ensure or raise the quality of the work done.

Collaborative learning contains formal and informal ways of learning together and usage of each other's networks. Formal ways in use are meetings, trainings organized together and informal are the learning and peer forums set up in the company intranet.

Final handled issue of the knowledge management is the **analysis of the personnel** and their knowledge's. It contains the reflection of the competence inventory, figuring out the core competences, determining if the competence base is wide enough and what is needed if not or if organization starts to expand. This reflection adds value to the determined roles in the organization and also forces the continuous development of those roles and competencies related to the roles. The analysis also add a new tool to the management as it incorporates the structure and development of the personnel, personnel costs, amount of personnel, competence and knowledge and their development as well as the well being of the personnel.

4.3.6 Competence inventory

The Competence Inventory was compiled from the visions and opinions of case company consultants. The Core Competences were identified by the 4 dimension analysis and made the headlines of the competence inventory. Under these sections the core competencies were divided into smaller entities. This enabled the skills and knowledge's to be identified with more precision and measurement made possible.

Different roles used and needed in the company were constructed to contain a specific set of these competencies and role profiles were established as displayed in figure 22.

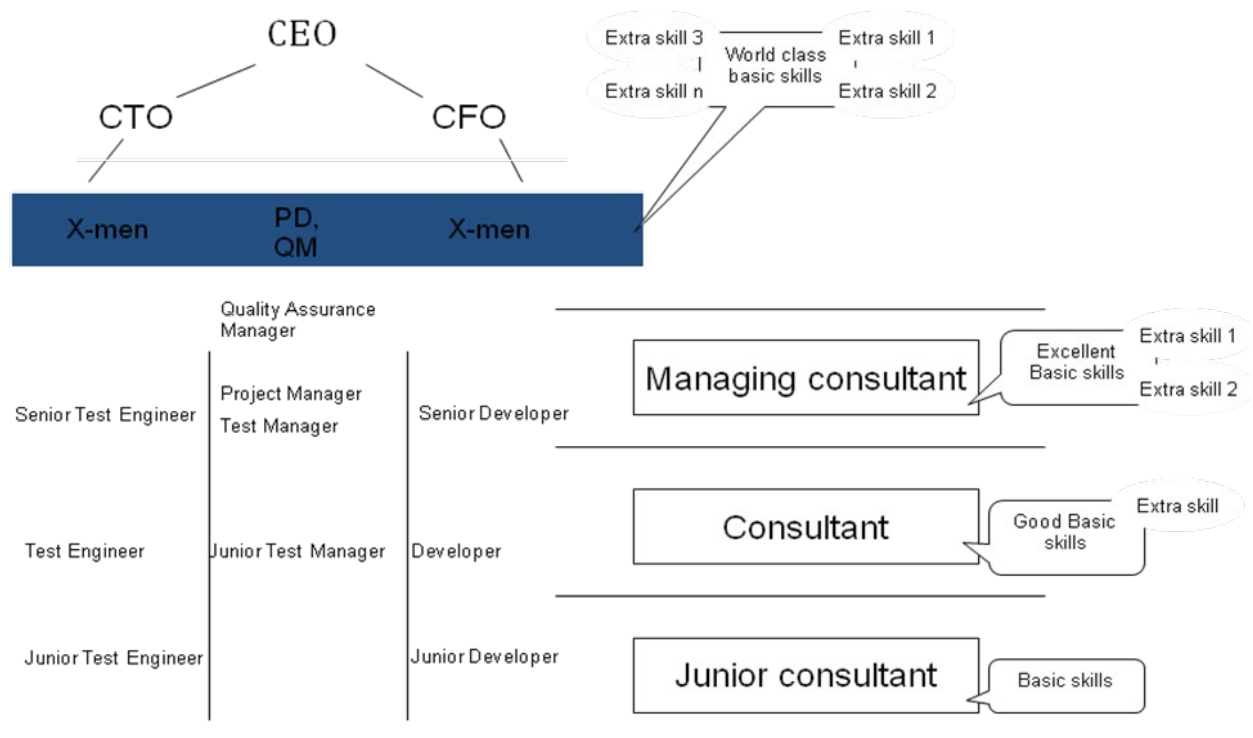


Figure 22: The roles in the case company.

These utilizations enable the planning, reflection and development of competencies as described in the earlier chapters.

The traditional competence catalog is enhanced with PAPI personality assessment in the competence inventory. PAPI™ is based on the big five personality traits theory which was originally presented by Digman (1990) and its constituent traits are; openness, conscientiousness, extraversion, agreeableness, neuroticism.

PAPI is used to assess the behavior and preferred work styles of individuals at management, professional and other levels. It is useful and helpful tool because it can be used by non-psychologists and it still comprehensively covers aspects of personality relevant to the workplace. The PAPI itself is divided into personality dimensions which split between Role and Need scales

The Role scales measure the individual's perception of themselves in the work environment and look at areas such as leadership, work style and planning.

The Need scales probe the deeper inherent tendencies of an individual's behavior such as the need to belong to groups, the need to be noticed and the need to be supportive.

The test ending up to the analysis can be filled out as a questionnaire in the internet. PAPI can play a key role in increasing the efficiency of staff development initiatives. In particular, it can be used to pinpoint what needs to be done to improve an individual's effectiveness in their role, to develop their skills to enhance future performance, and provide remedial action if an individual is under-performing. By

overlaying the profiles of individual team members on to one PAPI wheel, team leaders and HR professionals can:

- Quickly assess the strengths and weaknesses of the team
- Understand why problems arise between people
- Highlight ways to re-engineer a team for optimum performance
- Honestly discuss issues of concern in a methodical and reliable framework.

Through these tools the “consultant card” containing individual competences, knowledge’s and professional experience is built and placed to the intranet for general use for internal development, resourcing and sales.

Tool/Domain	Experience Level	Progress Bar	Additional Information
UI & usability design (käyttöliittymäsuunnittelu)			Additional information
Usability audit			Additional information
Testing, test management tools & domains			
Bugzilla	I'm expert		Additional information
Capacity testing	I'm competent		Additional information
Compuware Functional Tester	I have a lot of experience		Additional information
Compuware QADirector	I have some experience		Additional information
Compuware QALoad			Additional information
CruiseControl			Additional information
Functional testing	I'm expert		Additional information
JMeter	I have a lot of experience		Additional information
JProfiler	I have some experience		Additional information
JUnit			Additional information
Mercury LoadRunner			Additional information
Mercury Quality Center (QC)	I have a lot of experience		Additional information
Mercury QuidTestPro (QTP)	I have some experience		Additional information
Mercury TestDirector			Additional information

Figure 23. An example view of the Competence Inventory Assessment tool.

4.2 Indirect advantages of the competence inventory

Indirect advantages gained with the competence inventory assessment can be seen in projecting, resourcing and sales. When the company is aware of its competencies and sources of competences the projecting, resourcing and sales can be incorporated to general processes and the know-how is utilized more efficiently.

Since nowadays companies acting reactively are always one step behind compared to the “top dogs” of the industry. The information gathered from the questionnaires and such done to the potential customers provide a lot of information, which easily ends up to be unsymmetrical which means that the information itself is not useful because the lack of background information. This leads the customer to make irrational decisions based on insufficient information. The responsibility actually is shifting from customer to service provider who possesses more comprehensive amount of information of available solutions and possibilities. Certainty is that the customer is always interested in product or service improvements. This leads to the problem of every company presenting the same service to the market and actually opens a possibility for an innovative and proactive approach for any company to grasp. The rule of the thumb in innovations is to focus on the innovations which are producible. In order for a company to prosper in innovation business, demands for continuous competence development and usage of human capital which are strived from different networks, are at hand. The question is whether the company desires to take the initiative and lead the development proactively or just reactively sit back and follow others. The competence inventory assessment and knowledge management open the

possibilities for proactive ways of working and taking the one extra step in order to differentiate from the competition.

5 CONCLUSIONS

This development work was about developing the competence management in the case company. When handling competence management the closely related knowledge management was opened and methods to generate possibilities for the organization presented and implemented. These aspects have an effect to the whole organization including related processes. This chapter will shortly draw conclusions and evaluate the development work.

5.1 General conclusions

The renewal and development cannot only be assigned to the management level of an organization, but it has to originate from all members of the organization. Company which enforces and emphasizes on human intellectual capital has to set the strategy, mission and visions to support this capital. Also the possibilities to develop the capital have to be equally set to the whole organization. The responsibility for development of knowledge and competence is on the individual.

The practical contribution of this study was motivated by the needs of the case company. The practical problems of the case company were attempted to be solved by combining previous theories from the research areas together with the results from the empirical study and experience. The research has contributed the case company with a framework model and means for improving the competence and knowledge management.

The goals for the development work described in the first chapters have been partly met during this process, mainly due to the schedule of the education programme all of the processes are not yet defined and documented and the reflection and continuous development has not yet been used. However the competence inventory assessment (CIA) tool has been defined and created as well as different knowledge management processes have been set into motion during the development work, containing the flow of information, knowledge sharing, and knowledge transfer. The added value to the related processes have been recognized, but not yet formally documented into official processes.

5.2 Validity and reliability

The validity refers to the ability to measure what was supposed to be measured. (Hirsjärvi et al. 2007). The validity of the development work was assessed by utilizing and exploiting the experience and knowledge base of the consultants inside the case company. Personnel from every part of the organization were involved in the validation of results and thus making the overall compilation of results been reviewed by more than 30 people altogether. In addition to the common topics discussed, individual interviews came up with valuable ideas and thoughts. Since this is a qualitative research, also such points and ideas have been included where they have been regarded relevant.

The sister company in Finland was left outside the study in the beginning of it. However, during the research process, the impact of the sister company has grown as the two companies were combined into one larger company at the beginning of Q2 2010. Along with this combination the organizational structure was reformed. Despite

the increased co-operation, all the results of this study do not directly concern the companies together since any representatives from the sister company were not interviewed. In many interviews, though, impacts of the integration with the sister company were noticed. Since representatives from the sister company have not been interviewed, the results of this paper only stands for the view of the case company, as was pointed out in the introduction of this development work.

The framework model developed during this research can be used for further research at the case company, but since this is a single case study, results may not be generalized into other companies as such.

5.3 Recommendations for the case company

Due to the schedule part of the planned work has been planned but not yet executed. This documentation, reflection and development of processes should be followed through and set in motion. Also the possibilities for the management to move more and more to the knowledge management way of leadership, where knowledge and information are the vital building points, and at the same time give up on the traditional leadership model should be assessed.

The actual combination of related processes should be incorporated on the basic level to the original targets of this development, but could also be further studied and developed in more detail.

Since developing organization originates from the individuals and the development process newer ends, an excellent are of research or development would be creating and studying the innovation process, and enabling the basis for creativity.

Since Finland is getting more and more international, the diversity management should be taken into consideration. Collective care does not imply that care should be similar for every person. On the contrary, care means providing individual, tailor-made opportunities for each person to engage in organizational knowledge creation and learning. This is where managing knowledge and managing cultural diversity are united. Focus on Diversity Management should be closely bound to the organizational knowledge goals and should also be studied in more detail.

References

- Anttila, Pirkko, "Tutkimisen taito ja tiedon hankinta", [online] [referred 11.05.2010].
<http://www.metodix.com/showres.dll/fi/index>
- Amit, R.; Shoemaker, P.J.H. 1993, Strategic assets and organizational rent. *Strategic Management Journal*; 14, (1), pp.33–46.
- Andersen, Bjørn. 1999. *Business Process Improvement Toolbox*. ASQ Quality Press, Milwaukee, Wisconsin, 233 pages.
- Andriessen, Daniel 2003. *Making Sense of Intellectual Capital*. Butterworth-Heinemann.
- Artto, K., Martinsuo, M., Kujala, J. 2006. *Projektiliiketoiminta*. WSOY Oppimateriaalit Oy, Helsinki. 405 pages.
- Barney, J 1991, Firm resources and Sustained Competitive Advantage, *Journal of management*, 99-100.
- Camp, R. 1995. *Business Process Benchmarking, Finding and implementing best practices*. ASQC Quality Press, Milwaukee, Wisconsin, 406 pages.
- Childe, S. J., Maull, R. S., Bennett, J. 1994. Frameworks for Understanding Business Process Re-engineering. *International Journal of Operations & Production Management*, Vol. 14 No. 12, pp. 22-34.
- Cook, S.D.N. & Brown, J. S 1999. Bridging Epistemologies: The Generative Dance between Organizational Knowledge and Organizational Knowing. *Organization Science*, pp. 381-400.
- Corrêa da Silva, Soares F. and Agustí i Cullerell, J. 2003. *Knowledge Coordination*. John Wiley and Sons.
- Cubics Ltd. [www page]. [Referred 11.6.2010]. Available <http://www.cubiks.com/>.
- Davenport, T. H. 1993. *Process Innovation – Reengineering Work through Information Technology*. Ernst & Young, USA, 307 pages.
- Digman, J.M. 1990. Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*, 41, 417-440.
- van Donk, D. P., Riezebos, J. 2005. Exploring the knowledge inventory in project-based organisations: a case study. *International Journal of Project Management* 23, pp. 75–83.
- Eisenhardt, K. M. 1989 Building theories from case study research. *Academy of Management Review*. Vol. 14, No. 4, 532-550.

- Engeström, Yrjö 1995): Kehittävä työntutkimus. Perusteita, tuloksia, haasteita. Hallinnon kehittämiskeskus. Painatuskeskus, Helsinki
- Forselius, P., Karvinen, M., Kosonen, M. 2005. Tivi-projektien johtaminen – Projektimallit ja läpivienti. Talentum Media Oy, Gummerus Kirjapaino Oy, pp. 39-40.
- Gröönroos, Mauri 2006. Mahdollisuuden aika, kohti virtuaalista organisaatiota. Tammerpaino Oy, Tampere.
- Harrington, H. J. 1991. Business Process Improvement. The Breakthrough strategy for total quality, productivity, and competitiveness. McGraw-Hill, Inc, USA, 274 pages.
- Hannus, J. 2004. Strategisen menestyksen avaimet. Tehokkaat strategiat, kyvykkyydet ja toimintamallit. ProTalent Oy, Jyväskylä.
- Hamel, G., Prahalad, C. K. 1994. Competing for the future. Harvard business school press, Boston, Massachusetts, pp. 160-176.
- Hammer, M., Champy, J. 1993. Re-engineering the Corporation: A Manifesto for Business Revolution. Harper Business, New York, USA.
- Hammer, M. & Stanton, S. 1999. How Process Enterprises Really Work. Harvard Business Review, November-December, pp. 108-118.
- Harrington, H. J. 1991. Business Process Improvement. The Breakthrough strategy for total quality, productivity, and competitiveness. McGraw-Hill, Inc, USA, 274 pages.
- Hafeez, K., Essmail, A. 2007. Evaluating organisation core competences and associated personal competences using analytical hierarchy process. Management Research News. Vol. 30 No. 8, pp. 530-547.
- Helakorpi S, 2004. Osaamisen Johtaminen, article.
- Hendricks, M., Voeten, B. & Kroep, L. 1999. Human Resource Allocation in a Multiproject Resource and Development Environment. International Journal of Project Management.
- HiQ. [www pages] [referred 11.6.2010]. www.hiq.se
- Hätönen, Heljä 2000: Mistä liikkeelle? Kehitystarveanalyysi oppivan organisaation kehittämiseen. HY-Palmenia, Helsinki
- Javidan, M. 1998. Core Competence: What Does it Mean in Practice? Long Range Planning, vol. 31, no. 1, pp. 60-71.
- Järvenpää, E., Kosonen, K. 2003. Johdatus tutkimusmenetelmiin ja tutkimuksen tekemiseen. Helsinki University of Technology. Teaching material, Work and Organizational Psychology. Otamedia Oy.

- Kasanen, E. Lukka, K. Siitonen, A. 1991 Konstruktiivinen tutkimusote liiketaloustieteessä. Liiketaloudellinen aikakauskirja 3, pp. 301-327.
- Kamensky Mika 2003. Strateginen johtaminen. Gummerus Kirjapaino Oy, Jyväskylä.
- Kamensky, Mika 2008. Strateginen johtaminen, Menestyksen timantti. Talentum.
- Laamanen, Kai. 1993. Liiketoimintaprosessien kehittäminen. Metalliteollisuuden Kustannus Oy. Tammer-Paino Oy, 54 pages.
- Lorino, P., Tarondeau, J-C. 2002. From resources to Processes in Competence-Based Strategic Management. Systems Perspectives on Resources, Capabilities, and Management Processes, Elsevier Science Ltd, pp. 127-152.
- Lomax Alistair, The Future of Knowledge Management Consulting, [online] [referred 17.5.2010]
http://www.knowledgepoint.com.au/knowledge_management/Articles/KM_AL001.html#_Toc495198181
- Lukka, Kari, ”Konstruktiivinen tutkimusote”, [online] [referred 11.5.2010]
<http://www.metodix.com/showres.dll/fi/index>
- Lähteenmäki, Satu 1999: Osaamisen johtamisella oppivaksi organisaatioksi. In book by Nurmi, Raimo: Neljännesvuosisata johtamis- ja organisaatiotutkimusta Turun kauppakorkeakoulussa. Turun kauppakorkeakoulun julkaisuja, Sarja Keskusteluja ja raportteja, Turku
- Mahnke, V., Aadne, J. 2002. Managing Speed in Competence Driven Strategic Renewal. Systems Perspectives on Resources, Capabilities, and Management Processes, Elsevier Science Ltd, pp. 173-196.
- Maylor, H. 2005. Project Management. Pearson Education Limited, Third edition, 392 pages.
- Mollona, E. 2002 A competence View of Firms as Resource Accumulation Systems. Systems Perspectives on Resources, Capabilities, and Management Processes, Elsevier Science Ltd, pp. 93-125.
- Nonaka, I. 1994. "A Dynamic Theory of Organizational Knowledge Creation," Organizational Science (5:1), pp. 14-37
- Nonaka, I. & Takeuchi H. 1995. The Knowledge-Creating Company. Oxford University Press. New York.
- Ovum Ltd. 2009, Premium report. [referred 11.2.2010]. <http://www.ovumkc.com/>
- Pennypacker, J. & Dye. L. 2002. Project Portfolio Management and Managing Multiple Projects: Two Sides of the same coin?.
- Pirinen, P 2000. Enabling Conditions for Organizational Knowledge Creation by

International Project Teams. The University of St. Gallen.

- Polanyi M. 1962. Tacit Knowing – "Its bearing on some problems of philosophy"
Reviews of Modern Physics (34:4), pp 601-616.
- Pöntinen-Heinonen, Arja & Iittiläinen, Kaisa 1999. Kotisairaanhoidon ja kotipalvelun hallinnollinen yhdistäminen. Oppivan laatuorganisaation elementtien piirteiden tarkastelua organisaatioissa taustana johtajuus sosiaali- ja terveydenhuollossa. Sosiaali- ja terveystoiminnan erikoistumiskoulutus.
- Reinhardt, K. & North, K. 2003. Transparency and Transfer of Individual Competences – A Concept of Integrative Competence Management. Journal of Universal Computer Science, vol. 9, no. 12, pp. 1372-1380.
- Richter, Frank-Jürgen 2000. The Asian Economic Catharsis: How Asian Firms Bounce Back from Crisis. Greenwood Publishing Group.
- Ritala, R & Tarvainen H. 1991. Henkilöstön kehittäminen. Osaavat ihmiset – menestyvä organisaatio. Kirjayhtymä. Tampere.
- Ruohotie, Pekka 1998. Oppimalla osaamiseen ja menestykseen. Helsinki: Edita.
- Ruggles, Rudy, 1996. Knowledge management tools. Butterworth-Heinemann, 303 pages.
- Rummler, G. & Brache, A. 1995. Improving Performance, How to Manage the White Space on the Organization Chart. Second edition, Jossey-Bass Publishers, San Francisco, 218 pages.
- Sanchez, R., Heene, A. 2004, The New Strategic Management: Organizations, Competition and Competence, John Wiley & Sons.
- Sanchez, R., Heene, A., Thomas, H. 1996. Dynamics of competence-based Competition: Theory and Practice in the new Strategic Management. Oxford: Elsevier Science Ltd.
- Sarala, Urpo & Sarala, Anita 1997: Oppiva organisaatio, Helsingin yliopiston Lahden tutkimus- ja koulutuskeskus, Tammer-Paino Oy, Tampere
- Schulz, M. 2002. The Uncertain Relevance of Newness: Organizational Learning and Knowledge Flows. Academy of Management Journal. University of Washington.
- Schulz, M., & Jobe, L. A. 2001; 2001. Codification and tacitness as knowledge management strategies: An empirical exploration. Journal of High Technology Management Research, 12(1; 1), 139.
- SEI, Software Engineering Institute. 2003. CMMI® V1.1 Tutorial. Carnegie Mellon University, Pittsburgh.
- Software Engineering Institute. 2006. CMMI for development, version 1.2. Carnegie

- Mellon University. [online] [referred 2.6.2010]
<http://www.sei.cmu.edu/pub/documents/06.reports/pdf/06tr008.pdf>, 2.6.2010.
- Solow, Robert M. 1957. "Technical Change and the Aggregate Production Function".
 Review of Economics and Statistics 3: 312–320.
- Stähle, P. & Grönroos, M. 1999. Knowledge Management – tietopääoma yrityksen
 kilpailutekijänä. Porvoo: WSOY.
- Stewart Thomas A. 1997 "Intellectual Capital - The New Wealth of Organizations,
 New York
- Sveiby, K. 1997. The New Organizational Wealth. Managing & Measuring
 Knowledge-Based assets. Berrett-Koehler Publishers, Inc, San Fransisco. 222
 pages.
- Sydänmaanlakka, Pentti 2007: Älykäs organisaatio, Talentum Media, Helsinki.
- U.S. office of personal management, Performance Management [online]
 [referred 4.6.2010]. <http://www.opm.gov/perform/overview.asp>
- Vesala, Jukka and Strömmer, Riitta 1999: Yksilön oppimisesta verkoston oppimiseen
 – Verkostot oppijoina ja oppimisfoorumina. In book of Alasoini, Tuomo –
 Halme, Petteri (toim.): Oppivat organisaatiot, oppiva yhteiskunta. Edita,
 Helsinki
- Viitala, Riitta 2002. Osaamisen johtaminen esimiestyössä (Knowledge leadership),
 Acta Wasaensia, No 109, 254 p.
- Vvm, 2001. Osaamisen johtaminen kehittämishankkeen loppuraportti.
 Valtiovarainministeriön työryhmämuistioita 6/2001
- Wallin, J. 1997. Customers as the originators of Change in Competence Building:
 A case study. Competence-based strategic management, John Wiley & Sons
 Ltd, pp. 111-126.
- Warren, K. 2002 Operationalizing the Impact of Competence-Building.
 Systems Perspectives on Resources, Capabilities, and Management Processes,
 pp. 41-55.
- Webb, M. 2006. Sales and marketing the Six Sigma Way.
 The New Sales and Marketing Management Strategy. Chicago, 298 pages.
- Wilenius, M. 2004. [online] [referred 3.5.2010].
<http://www.tukkk.fi/TUTU/Osaamisalueet/Wilenius/markkuosaamistarp.pdf>