THE USE OF PERFORMANCE MEASUREMENT IN KNOWLEDGE WORK CONTEXT

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Dissertation for the degree of Doctor of Philosophy
To be presented with due permission for public examination and criticism in Festia Building, Small Auditorium 1, at Tampere University of Technology, on the 20th of August 2004, at 12 noon.

e-Business Research Center. Research Reports 9
Tampere 2004

Distribution
e-Business Research Center eBRC
Tampere University of Technology and University of Tampere

Published by
Tampere University of Technology (TUT) and University of Tampere (UTA)

Printed edition
ISSN 1459-0158
ISBN 952-15-1208-3 (TUT)
951-44-6028-6 (UTA)

Electronic edition in **http://www.ebrc.fi**
ISSN 1459-0166
ISBN 952-15-1209-1 (TUT)
951-44-6029-4 (UTA)
978-952-03-1824-6 (Trepo)

Printed by Cityoffset Oy, Tampere 2004

Okkonen, Jussi. 2004. *"The Use of Performance Measurement in Knowledge Work Context"*. Department of Industrial Engineering and Management. Tampere University of Technology, Finland.

Keywords: Knowledge work, Measure, Measurement, Performance measurement, Management

Abstract

Contemporary organisations are based more on intangible assets than tangible ones. The notion of the importance of knowledge work has also drawn attention to the management of knowledge workers. To survive in competition, contemporary organisations need managerial processes that support leadership. There are several tools that suit this purpose. This study has its focus on using performance measurement in the knowledge work context.

The study is based on a series of action research projects conducted in Finnish knowledge work organisations during the period 2001 – 2003. The study is normative in nature, as it aims to prove the usability of performance measurement and also to provide guidelines for applying performance measurement frameworks. The main objective is to create recommendations of sound use of performance measurement in knowledge work context by identifying and defining the main attributes of quality and productivity of knowledge work, i.e. to point out critical factors of knowledge work and find suitable ways of measurement in that context.

The main outcome of this study was that performance measurement in knowledge work context does not per se differ from using performance measurement in a more traditional setting, but success factors in knowledge work are more resource orientated. The measures considering results, external key stakeholders or processes are somewhat similar. In the knowledge work context, the role of employees as the main asset is emphasised. Knowledge worker equals the competencies, i.e. knowledge and skills. The notions of emphasised competencies drive the measurement system toward active approach. Measures should be designed to control the accumulation of knowledge and skills and drive competency development.

The rationale for using performance measurement in knowledge work is threefold. Firstly, competencies are emphasised and measurement is also used to focus on new competencies or measuring the result of decided development schemes. Secondly, employees are considered an asset; hence some degree of democracy is required. And thirdly, the intellectual capital management perspective is emphasised, as it is possible to enable knowledge acquiring, disseminating and competence developing activities by defining certain measures for those issues. Always remember, you get what you measure.

Tiivistelmä

Nykyaikaisten organisaatioiden kilpailukyky perustuu enemmän aineettomille kuin fyysisille panoksille. Asiantuntijatyön merkitys on kiinnittänyt huomion myös asiantuntijoiden johtamiseen. Selvitäkseen kilpailusta, nykyaikaiset organisaatiot tarvitset ihmisten johtamista tukevia käytäntöjä. Johdon työkaluvalikoima tuohon tarkoitukseen on laaja. Tässä tutkimuksessa tarkastellaan suorituskyvyn mittaamisen käyttämistä asiantuntijoiden johtamisen yhteydessä.

Tämän tutkimuksen perustana on sarja toimintatutkimusprojekteja, jotka toteutettiin suomalaisissa asiantuntijaorganisaatioissa vuosina 2001 – 2003. Tutkimus on luonteeltaan normatiivinen, sillä tarkoituksena on osoittaa suorituskyvyn mittaamisen käyttökelpoisuus sekä tuottaa tietoa suorituskyvyn mittaamisen viitekehikoiden soveltamisesta. Keskeisin tavoite on luoda suosituksia suorituskyvyn mittaamisen järkevästä soveltamisesta. Jotta tavoite voidaan saavuttaa, pitää tarkastella asiantuntijatyön laatuun ja tuottavuuteen liittyviä keskeisiä ominaisuuksia eli osoittaa asiantuntijatyön kriittiset menestystekijät ja sopivat mittarit niille.

Tutkimuksen keskeisenä tuloksena on, että suorituskyvyn mittaamisen soveltaminen asiantuntijatyöhön ei sinänsä poikkea suorituskyvyn mittaamisen yleisestä soveltamisesta, mutta menestystekijät painottavat enemmän resursseja. Tuloksia, sidosryhmiä tai prosesseja kuvaavat mittarit ovat samoja kuin perinteisessä kontekstissa. Sen sijaan asiantuntijatyö korostaa työntekijöiden asemaa keskeisenä tuotannontekijänä. Asiantuntijoissa ovat organisaation kompetenssit eli tiedot ja taidot. Kompetenssien korostaminen fokusoi myös mittausjärjestelmää aktiivisen kehittämisen suuntaan. Mittareiden suunnittelussa tulisikin huomioida kompetenssien kumuloituminen sekä kompetenssien kehittämisen edistäminen.

Suorituskyvyn mittaamisen soveltamiseen asiantuntijatyössä on kolme pääideaa. Ensinnäkin, kompetenssien korostaminen sekä fokusoituminen uusiin kompetensseihin tai kehityksen kontrollointi. Toiseksi, koska työntekijöiden rooli on keskeinen, tulee järjestelmässä olla demokraattinen pohjavire. Kolmanneksi, aineettoman pääoman johtamisen näkökulma on korostunut, jotta voidaan mahdollistaa osaamisen ja tietämyksen hankkiminen ja levittäminen sekä kompetenssien kehittäminen sopivilla mittareilla. On tärkeää muistaa, että sitä saa mitä mittaa.

Acknowledges

I want to thank my supervisor Professor Mika Hannula, for his encouragement from the early stages of my work and actually enabling this dissertation by giving me the chance to become a researcher and helping me on the path to this point. I would like to express my gratitude to Professors Marjatta Maula, Harri Melin Asko Miettinen Juha Näsi, Erkki Uusi-Rauva and Dr. Mike Bourne for several valuable pieces of advice and sound criticism, which I surely needed. Official pre-assessors, Professors Pauli Juuti and Josu Takala have pointed out several targets for development in this work, thus it is also due to their effort to have it as it is now.

The empirical part for this dissertation is done in research project Asiantuntijatyön suorituskyvyn mittaaminen - ASMO. I would like to thank eBusiness Research Center and Information Society Institute for helping to build the research project, and Finnish Work Environment Fund for funding the project this thesis spawned from. Also the participating organisations have given very important contribution to the research project, and therefore to my dissertation. Yet, there are numerous people who I have been involved with the last three years. I want to thank you all for taking part in the research project. You have helped me to wonder and to understand the different aspects of work and managerial practices.

I have also received personal support from SNIL ry's Stipendirahasto, Liikesivistysrahasto (Foundation for Economic Education) the Fund of Maila and Sampo Toni, Tampereen kaupungin tiede- ja kulttuurirahasto and Finnish Work Environment Fund. That support has enabled the freedom to conduct research and to write this dissertation.

Dr. Harri Kulmala, Jukka Sädevirta, Pasi Pyöriä and Pasi Virtanen have helped me a lot when I have needed to talk about different issues considering my dissertation. They have also commented the manuscript and papers related to this work in different phases of the

research. Tampere University of Technology has affected greatly my work. It has offered me support, a place to conduct research, and, the most important, a work community. For all my colleagues in the Institute of Business Information management and in the Department of Industrial Management - I would like to thank you all.

I am in great indebt for Performance Measurement Team at Tampere University of Technology. Especially I would like to thank Sari Kemppilä for giving me crucial advice on aspects on evaluation my research and the rest of the team: Hannu Jungman, Mikko Leinonen, Antti Lönnqvist, Paula Mettänen and Virpi Pirttimäki for advice and support in both business and leisure. Being one of the team has been very important for me.

My family has encouraged me to write this dissertation. The support they have given me is priceless. For my most precious one, Heidi, it has not always been easy to live with me during the process of making this dissertation. I am sorry for not always being present as this other passion has been seducing me. You have supported me as I have needed it. Being with you has helped me as your love is unconditional. The work with this dissertation is almost done by now. It is time to head towards new adventures in the field of management science.

Tampere, June 21st 2004

Jussi Okkonen

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1 Introduction

Vast social and economic changes in recent decades have shifted society from industrialism to post-industrialism and now to one based on systems of information and communications. This has affected all economical entities, including people, organisations, and technologies. It has had an impact on actors at the local and the global levels. This last progression is referred to as one of informationalism, where the importance of information creation and transmission is accepted as critically important to all what society represents. It does not mean that economies would no longer break down in any physical sense, nor be able to break away from physical restraints, but it does mean that these traditional limitations would be modified by growth in information and knowledge. Both would have special roles in managing the more traditional activities. The importance of information and knowledge are increasing and being a critical aspect of competitive advantage to the activities of people and organisations. As such, this dissertation examines as well as it makes use of the increasing roles of knowledge and skills use, i.e. information competence as a main factor of production; especially in non-manual work contexts. The contribution of this dissertation will consider the manageability of the so called knowledge workers, i.e. how they can be managed by employing the framework of performance measurement. By choosing this theme, a new perspective in the discussion on knowledge workers is taken, as the research of the use of different key figures or parameters in this context is in the very early stage. This dissertation approaches the problem on the organisational level, as it is the level of implementing strategies and management. However, as the nature of knowledge work requires proximity, so the level of conducting the tasks is also considered.

1.1 Background

According to Bell (1974, 13-15) the post-industrial society deals with changes in the social structure, which occurs in three ways. Firstly, social structure is a structure of roles. Secondly, changes in the social structure pose management problems for the political

system. And thirdly, the new modes of life, which depend on the primacy of cognitive and theoretical knowledge, will inevitably challenge the tendencies of a culture. These will be manifested through their striving for enhancement of the self and through turning societal members into increasingly antinomian and anti-institutional entities. Bell (1974) states that the post-industrial society is a generalisation, but it can be understood by defining five dimensions: economic change from goods producing to service economy; pre-eminence of the professional and the technical class; the centrality of theoretical knowledge as the source of innovation and of policy formulation for the society; the control of technology and technological assessments and the creation of a new intellectual class.

In a post-industrial world people are not tied to a man - machine relationship, in which resources are drawn from extractive industries and in which nature is subject to the diminishing law of returns in the process of transforming natural environment to technical environment (Bell 1974, 116). The post-industrial world is a game between persons in which an intellectual technology, based on information, rises alongside the machine technology (ibid). This is suggesting the notion of importance of labour over capital. Moreover the continuum of data, information and knowledge emphasises quality and applicability over quantity (Thierauf 2001, 7-9; Niiniluoto 1997). According to Thierauf (2001) it is important for performance to have information, to attach it to prior knowledge and to create new knowledge (cf. Nonaka and Takeuchi 1995).

The change of society in this way has generated a new group of workers; people who work with the information and knowledge solving problems i.e. knowledge workers, experts or professionals (see Chapter 2.2. for detailed definition). Their work is mainly in service production[1], i.e. using competencies with the customer not necessarily producing anything physical, but some tasks are more like manual work[2]. The common feature of

[1] Service production refers to the use of labour to produce more or less intangible output. Services cannot be inventoried (e.g. Ojasalo 1999).

[2] Manual work refers to such work, where tangible inputs are processed in order to produce tangible output. In practice it does not exist in its pure form as performing any task requires some knowledge, at least knowledge on issues concerning the appropriate way to do things. Cf. Figure 12 on page 56.

all knowledge workers is that they work with an ambiguity between products and processes. The product can be a plan, or an advice, but it is more difficult to quantify compared to physical products. The production and consumption and the utility of consumption of services are not always simultaneous. The advantages of service products can be perceived long after they emerge, or are produced. Prior to information society knowledge work, work was seen as a support function of other production activities, e.g. research and development, R&D. With an increase in demand for service products, specialised R&D functional organisations have emerged. This has been consistent with the growth of a more complex society and increasing complex sources and forms of information and their related commodities and services. Knowledge work has become common (Kasvio 1994, 65).

Lash and Urry (1994) examined the idea of a service-based economy relative to the extensive importance of knowledge and information for contemporary economic growth. As an example they describe the significance of interconnections of different sectors of economy. They pointed to the non-economic institutions benefits for other sectors and how expertise in all sectors has gained importance. Even manual work has assumed a role in this re-division, where production has become closely tied to ’design-process’, along with a progressive ‘research and development process’. Production systems no longer operate as simply mechanical production systems. Instead, they have become expert-systems to work on both tangible and intangible raw materials. Contemporary industry and its dependency on a creative milieu for the exchange of ideas and people typify this change. Lash and Urry (1994) draw attention to this with their example of Silicon Valley, where network and horizontal relationships have replaced traditional hierarchies of control and information processing. This has supported the division based on specific expert tasks that can easily be outsourced within a network of design and production. There are additional strong tendencies in the development of services.

Castells (1996) emphasises the importance of different networks for informationalism. He argued that it is essential to have a medium for seeking, exploring and researching,

thus modern economic structure is dependent on the information networks. He (ibid., 61) defines a new paradigm for an information-based society. In an information society information is raw material as technologies act on information not only vice versa. New technologies have pervasive effects because information is an integral part of human activity and all processes of individual or collective existence are directly shaped by the new technologies. Networking logic of any system or a set of relationships using new technologies as the morphology of the network is adapted to increasing complexity of interaction and to unpredictable patterns of development arising from the creative power of such interaction.

Management classics, e.g. F.W. Taylor, emphasised control over the process. Separation between thinking and doing was thus established (Savage 1996, 171-173). A Taylorian system was based on strict distinctions between the engineering (the planning) of the product and the follow up processes associated with production (the making). This builds on earlier considerations relative to how to achieve productivity gains via specialisation, as articulated by Adam Smith (2001). In informational and knowledge based professions intellectual process is seldom clearly divided to Adam Smith type subprocesses or explicit Tayloristic formula. Thus, industrial age ideas of management are less applicable, and can even become impediments to information age management.

There seems to be unanimity between most scholars of the subjects that information and knowledge are as marketable commodities as physical assets, thus they argue for finding ways to calculate and include information and knowledge as organisational assets. Thus, if knowledge is as much of a factor as merchandise, then attention is drawn to practices that surround it (cf. Castells 1996). How to measure the apparently immeasurable becomes a central problem. It could be approached from several perspectives, including the social, the economic and the managerial. Moving into greater depth in the third perspective it would seem that, in order to manage something, one should be able to follow the old dictum that “what cannot be measured can be exaggerated, and generally is,” to say that: “What you are not able to measure, you are not able to manage”.

Knowledge society and knowledge activities are a rising theme also in sociological discussion. E.g. Blom et al (2001) discuss the theme of informationalism, and especially the changing nature of the knowledge work. As they state, advancement in information and communication technology has brought Finland to a new turning point in its history, which is comparable with the industrialisation in the late 19th century, the depression in 1930's and the post second world war economic boom (Blom et al 2001, 15). Knowledge work is seen as critical distinction between the "old" industrial and the new informational occupations, and as such it emphasises the economical and the societal importance of managing knowledge and information (ibid., 24). The new ways to trade, manage everyday life and utilise different services are possible for the masses via internet (Hannula and Comegys 2003)

Castells and Himanen (2001) consider knowledge intensive work to be the normal form of future work, with most of Western Europe and North America entering the information society phase. In addition, global change is primarily being driven by information technology revolution, the new global economy and the accompanying rise of the network society (ibid., 13). Even if Castells and Himanen tend to over-emphasise the superiority Finnish information society model, it still offers some interesting lessons. That society is built on well-educated people with high working ethics who are skilled and not afraid to risk utilise technology to make sense of themselves and understand their society. Moreover, the Finnish information society provides a platform for common societal achievement.

Ritzer (1996) explains post-industrial change through the concept on macdonaldization, which refers to what they see as a demand for increased efficiency in services. They see how every human activity should be done more efficiently. As an analogy, Ritzer takes MacDonald's' restaurants, where consumers have limited selection and where the products are manufactured by outside standards, in order to standardise mac-quality. Macdonaldization is extended also to knowledge intensive work, e.g. education, research,

and health care. By taking this approach knowledge intensive work is challenged by the demand for better manageability via efficient control over workflow and results.

Efficiency[3], and effectiveness[4], in knowledge work can also be measured by standardising scales, where they become measurable by giving each unit of e.g. research a value in order to allow summing up and comparing statistics (Ritzer 1996, 66-67). By measuring knowledge, the knowledge creating process itself becomes more controllable. The question then would be, does this process of measuring tend to change what knowledge is? Can intelligent people be expected to do things just as they are expected to do them, to meet their superiors' expectations and targets, or do they just become annoyed by the control? If so, then measurement should be seen to have a negative effect. But, on the other hand, if measurement is designed to account for this, and is implemented via a mutual understanding of mutual improvement, it should help the reorganisation of the process, to benefit and help the participants in the process.

Organisational form is a critical aspect of encouraging knowledge-related work, where some contemporary organisation forms illustrate the essence of how to manage knowledge workers. In order to cope with knowledge work assignments one must know somebody who knows, or know themselves; which is unlikely in complex tasks. Information society, or the new economies of information and knowledge, are based on knowledge workers (Harryson 2000, 5). If people's flexibility is the main attribute into knowledge work then the meaning of organisation must be changed and perhaps the role of the form of organisation must be diminished. It may be more important to have flexible and broad networks than strictly controlled weberian hierarchical structures. It has been widely suggested that networks and virtual organisations are ideal organisation forms, within

[3] Efficiency is the ratio between realised output and the output level, set as a target (Hannula and Lönnqvist 2002, 38).
[4]Effectiveness pertains to that particular quality of a product or service or process, which enables it to achieve desired change. Effectiveness may be applied to evaluate intangible outputs too. (Hannula and Lönnqvist 2002, 38)

which to conduct knowledge work (e.g. Hoefling 2001; Ali-Yrkkiö 2001; Jackson 1999).

New managerial challenges for contemporary organisations and forms of work have been rather well defined, but there is a lack of viable responses. According to Drucker (1999) knowledge worker productivity is the biggest challenge of the current economy. Unfortunately, service productivity is a very ambiguous concept at best and the knowledge work process is difficult to measure, since the actual work is done in the minds of the workers, not by a machine. Almost every aspect of this form of work requires some special role and competencies, to which attention should be paid. Savage (1996, 101) lists four management and leadership challenges for 21st century. First, how to move beyond the fragmentation of industrial era companies? Second, how to maintain accountability (measurability) in flat, dynamic network organisations? Third, how to support the focusing and coordination of multiple cross-functional task teams? And, fourth, how to build into the organisation structure the capacity for continual learning and quick market responsiveness?

Measurement and management in an information age obviously face new and difficult challenges. Measures designed for managing industrial companies have become obsolete (Kaplan and Norton 1996, 3). The study outlined herein does not answer to all of these challenges but limits itself to the aspects of knowledge work and its measurability in contemporary organisations. The main point is in the use of measurement, i.e. how performance is perceived by management and employees, what are the motivations to use performance measurement as a management paradigm etc. Next sections outline the questions and this study more precisely.

1.2 Research problem, objectives and scope

This study is limited to performance measurement in the knowledge work context at organisational level. *The main objective is to create recommendations of sound use of performance measurement in knowledge work context by identifying and defining the main attributes of quality and productivity of knowledge work, i.e. to point out critical factors of knowledge work and find suitable ways of measurement in that context.* That objective requires contribution to practice along the theoretical contribution, as the findings are reflected to the theoretical premises. Austin and Larkey have approached that problem in their article "The future of performance measurement: Measuring knowledge work" (Austin and Larkey 2002). They sum up the challenge to three points: knowledge work is less observable, motivation is the key to performance, and knowledge work is dependant on individual capabilities (ibid.). The points are tackled in this study in both theory and practice

In Figure 1 the questions begin with: "How to design measurement systems?", "How to implement performance measurement systems?" and "How to use performance measurement systems". The process of designing measures and implementing them is a well researched topic and there are several models for such a process, thus it could be delimited out (e.g. Hannula et al 2002; Toivanen 2001; Neely et al 2002). There is lot of empirical research about the measures to be used and the implementation and also several handbooks for that (e.g. Suomala 2004, Neely 2002, Hannula et al 2002, Bourne 2001, Bourne et al 2000, Kaplan and Norton 1996). The general response to the first question is to begin by defining critical success factors, and then their measurement, for the attributes that seem to be present in knowledge work. The second question has been answered by process models, which consist of several steps to be taken in order to have a functional performance measurement system. In this study, a simplified process model is also presented as a premise for collecting data as well as a managerial guideline. The third question is more complex, as it depends on the perspective chosen. Here the perspective is the one of organisational level, thus the conflicts between the management and the employees are supposed to be solved in the implementation process and mutual

recognition of suitable measures. Moreover, using performance measurement is dependant on the context, general goals and capabilities in organisation.

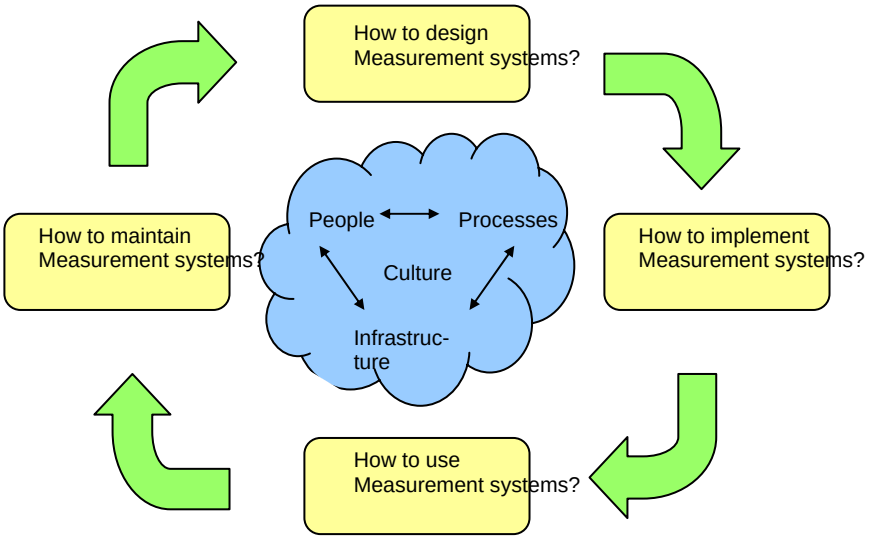

Figure 1 **Research themes of performance measurement research (Neely et al 2000)**

The study is partly focused on managerial norms, and partly on more contextual social norms. Managerial accounting gives us a wide array of tools for defining performance and its measurement. Sociology offers ways to define the wider environment for work and organisations, and thus gives managerial measures more meaning. The traditional theoretical framework of performance measurement is based on the neoclassical theory of organisation as the primary unit of production. The research problem outlined herein will be studied from the managerial viewpoint, so knowledge work is then seen as a value creating activity. This study will then concentrate on definitions and operations of contemporary work setting and knowledge work, knowledge work performance, performance measurements of these at an organisational or business unit level, and the use of such system.

The contribution of this study lays on a cross-discipline approach to the management of knowledge workers or knowledge work organisation. Managerial accounting has a

strong position as a managerial philosophy, especially the use of balanced measurement has gained ground since 1990's. Social sciences have studied knowledge work at least from perspectives of changing work life, knowledge work as a form of self-expression and knowledge work as part of social activity (Pirttilä and Eriksson 2002). Information studies and psychology approach knowledge work from the perspective of the creation of new knowledge and cognitive process (Kiianmaa 1996; Hakkarainen, Palonen, Paavola 2002). However, there is a gap between managerial practices and the more philosophical approaches. The contribution of this study is twofold. Firstly, it considers how performance measurement is applicable in knowledge work context. And secondly, the main contribution is to represent performance measurement as a tool for a management system in a contemporary knowledge-based organisation. The results will have both practical and theoretical value, as empirical results will contribute to the existing theory of performance measurement by focusing on a certain particular form of work.

The research tasks for this study thus become:

1) Defining contemporary work setting by identifying key attributes of a postmodern organisation and management of an organisation.

2) Defining knowledge work by identifying the nature of it.

3) Identifying how performance can be defined in the knowledge work context.

4) Examining issues considering managerial conventions of knowledge workers.

5) Finding out how performance measurement is perceived as a part of the management system and what are the main rationales for using performance measurement, i.e. how knowledge workers are managed by performance measurement.

The emphasis is on knowledge work, knowledge work performance, and performance measurement at the organisation or business unit level. As performance measurement itself is a popular research topic, this study extends the scope to the third theme presented in the Figure 1, i.e. the use of performance measurement in the knowledge work context. The premise for this study to that extent is to take performance measurement more granted and concentrate on the management and leadership issues.

As this dissertation aims to give normative rules, there are three aspects for measurement in this study from the viewpoint of the use of performance measurement. Firstly, how the strategy is implemented by using performance measurement. Secondly, how performance measurement is used for motivating the employees. Thirdly, how performance measurement is applicable to help workers develop their competencies, how it is used for promoting learning, and how it can promote creation and transformation of knowledge and skills.

1.3 Research approach

In action research the primary objective is the usability or practical improvement of a constructed intervention, thus finding the ultimate truth is a secondary objective. An action research project is successful if, and only if, it has affected or changed the research object (Huttunen et al. 1999, 118-119). This means it needs to be a more practical, rational or reasonable practice, which is proven via actually working conventions (ibid). The challenge in action research is defining and meeting the standards of appropriate rigor (Argyris and Schön 1991, 85). Action research has three demands: a way of representing research results that enhances their usability in the context of research, a complementary way of constructing causality, and an appropriate method of causal inference (ibid.).

Action research can be based on an inquiry paradigm of constructivism. In Table 1 the basic beliefs of constructivism are related to other alternative inquiry paradigms. Paradigms categorised by Guba and Lincoln (1994b) have historical and research strategic classifications for the included paradigms. The paradigms represent the logic of the inquiry being conducted and how the results will be seen in the analysis. Taking two of those paradigms, positivism and constructivism, the difference is illustrated in the following.

Table 1 **Basic beliefs (metaphysics[5]) of alternative inquiry paradigms (Guba and Lincoln 1994b, 109)**

	Positivism	**Postpositivism**	**Critical theory et al.**	**Constructivism**
Ontology	naive realism - "real" reality but apprehendable	critical realism - "real" reality but only imperfectly and probabilistically apprehendable	Historical realism - virtual reality shaped by social, political, economic, ethnic, and gender values; crystallized over time	relativism - local and specific constructed realities
Epistemology	dualist / objectivist; findings true	modified dualist / objectivist / community; findings probably true	transactional / subjectivist; value-mediated findings	transactional / subjectivist; created findings
Methodology	experimental / manipulative; verification of hypothesis; chiefly quantitative methods	modified experimental / manipulative; critical multiplism; falsification of hypothesis; may include qualitative methods	dialogic / dialectic	hermeneutical / dialectical

Ontology in positivism represents naïve realism, assuming an objective external reality in which inquiry can converge. In constructivism ontology represents relativism, assum-

[5] Metaphysics refers to the philosophical study of the nature of reality i.e. in this context the nature of external environment affecting the conception of real and the nature of perceptions.

ing multiple, apprehendable, and sometimes conflicting social realities (Guba and Lincoln 1994, 110-111). Constructivism requires reflecting on certain situations as they relate to other similar or different situations and making sense of the comparisons (Schwandt 1994, 118). Constructivism is a more pragmatic approach to social action, hence different situation forms of action can be different. Any finding in constructivism is not to be seen as absolutely true or false, but as relative to their separate realities (Guba and Lincoln 1994b, 111).

In the positivistic epistemology the nature of things or "how they really are" or "how they really work" (Guba and Lincoln 1994b, 111) is critical. In constructivism knowledge is value mediated and created by interaction between research subject and research object (ibid.). In the process interaction literally creates the findings, thus the findings are dependent on the process as well as on the reality affecting the phenomena. Thus it could be stated, that the journey is at least as important as the destination.

According to Alasuutari (1989) the constructivist approach relies on making visible the rules of reasoning and collective presumptions, which are used in everyday situations to help people to make sense of different occasions. This is called hermeneutics (Huttunen et al 1999, 124 – 125). In action research hermeneutics is discourse between the question and the answer. Every question can lead to a new one, and thus the primal question is never fully answered (ibid.). In order to approach complex social phenomena hermeneutics causes a circle of new emerging problems and questions. It is up to the researcher to decide when a sufficient amount of knowledge has been attained, in order to solve the primal problem. Schwartz and Jacobs (1979) point out two categories for this point of view. First, there may be more important goals than scientific ones. And, second, in order to create social science, it is necessary to learn the objects point of view.

Table 2 describes the differences between survey and qualitative research. In action research survey results represent positivism, as there are predetermined hypothesis and questions to ask. Thus results are somewhat predetermined by determining whether the

hypothesis is true or false. Qualitative research is to help access and explain phenomena that are undefined, or vague, thus observations are used for supporting researchers intuition. Also, the observations are seen from different angles and can be used for different purposes. Qualitative research depends on the sociological imagination; the researcher's craftsmanship (Mills 2000). The phases of research in Table 2 are considered opposite to each other in a philosophical sense. However, there is seldom a pure survey or qualitative research as a research setting. Both ways of conducting research depend on the other. It could be stated, that research could be positioned to either, as most obvious features determine the position.

Table 2 Phases of research (Alasuutari 1995, 20)

Phase	**Survey**	**Qualitative research**
Unriddling	Elaboration: interpretation of statistical relations; references to other research and hypothesis	Interpretative explanation; references to other research and theoretical frameworks
Production of observations	Definition and coding of variable; computing mean Figures and statistical relations	Purification of observations: concentrating on essentials; combination of raw observations

This study is positioned to qualitative research, as the aim is to explain the management of knowledge workers by applying a suitable tool. Moreover observations are generated more or less randomly during measurement system design processes. The processes also yield material manifestation, i.e. documentation of measures, which are studied as observations. The material outcomes from the action research process are the main dataset for this study.

Deduction and induction are two ways of making logical conclusions from logical beginnings. Action research represents the latter, i.e. conclusions can be based on a single observation related to its surrounding reality. Induction is essential to such ideographic

methods. Qualitative data is explained by several filters, including the subjective meaning to the researcher. Figure 2 introduces Bloor's approach to analytic induction. (Gill and Johnson 1997.)

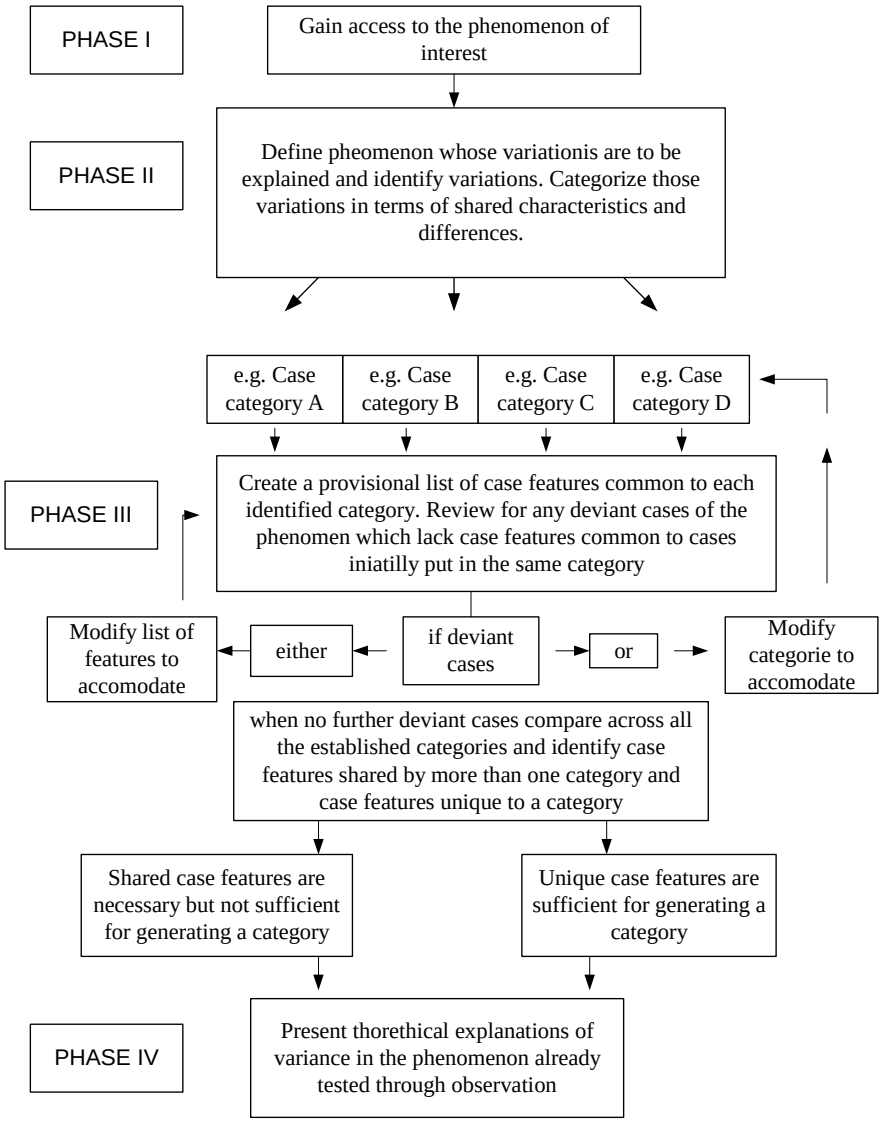

Figure 2 Bloor's approach to analytic induction (Gill and Johnson 1997, 123)

The research approach in this dissertation can generally be seen as a constructive one, since its aim is to find solutions for measurement problems and explain the use of measurement framework, and to do this by finding and constructing descriptions of the nature

of knowledge work. In this dissertation constructions are applications of certain ideas tailored according to the needs of case organisations. Constructivism can also consider testing a single construction that is an outcome of deduction or induction – that is not the case here. Lukka (2001) defines the constructive approach as innovative constructions aimed at solving real-life problems. The core concept in (any) construction (e.g. human made artefacts, models, diagrams, plans, organisational structures, commercial products and information system models) is end with a manifestation of the phenomenon. Constructive research is thus empirical. It is used to examine designed and implemented constructions as an instrument, and thereby illustrate, test or develop existing theory, or evolve a new one. The constructive approach is derived from an idea from pragmatic philosophy that comprehensive practical analysis of what is functional (or non-functional). This can result in significant theoretical contribution.

Any research process in the above context must be grounded in theory, but also must have a sufficient amount of imagination to contribute new results. Constructive approach is largely inductive[6], where deductive method is based on hypothesis testing. This is not the case in constructive approach, as stated in Figure 2. However, constructive approach can also be deductive, when it is used to prove existing construction false in certain contexts. This study is based on induction and active approach during the performance measurement process. Both researcher and other participants contribute to application in each case organisation. Researcher contributes with knowledge about the process and other participants by knowledge on the context and actual situation in each case organisation. Both researcher and other participants acquire new information and knowledge via participating and observing. The acquired new information is connected to prior knowledge and actually that rises up new ideas to be applied. Taking this as a premise of conducting this research, it is comprehendible that deductive method would be almost impossible to use.

[6] In logic, induction refers to a process of deriving general principles from particular facts or instances or conclusion reached by this process.

The constructive research approach as described by Kasanen, Lukka and Siitonen (Kasanen et al 1993a) is connected to the decision-orientated (management science orientated) and action orientated (hermeneutic) approaches (Figure 3). Constructive approach may be either quantitative or qualitative. It is distinguished from positive research, as it is inherently goal-directed problem solving activity. It typically applies case-method with normative emphasis.

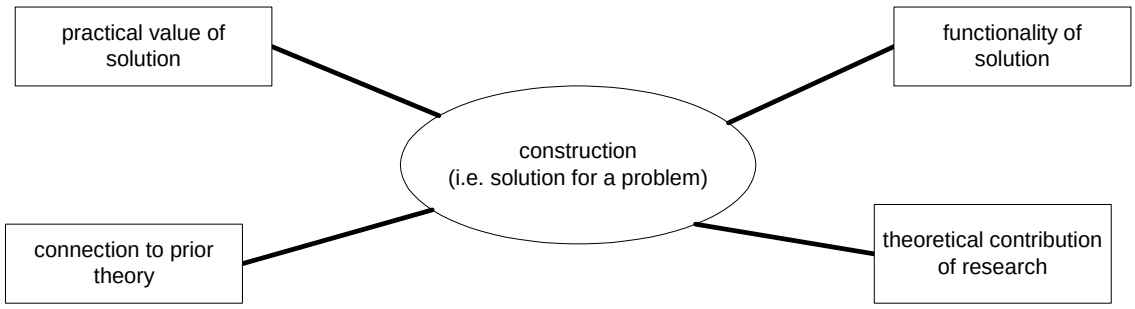

Figure 3 Central elements of constructive approach (Lukka 2001, 2)

The research herein applies a more action-orientated than decision-orientated approach. The problem to be solved is complex by its nature and should be studied in practice. The nomothetical approach does not bring human being into the focus (ibid.). The best way to access practice, as an outside researcher, seems to be via an action research project, which benefits both the object of a study and research objectives. Key words of action research according to Heikkinen and Jyrkämä (1999) are reflectivity, practical relevance, change intervention and participation. Action research is normative and the intended changes can be best accomplished in practice through understanding organisational processes and practices (e.g. Kasanen et al 1993).

Action research can be seen from at least two perspectives. Gummeson (2000, 118 – 123) suggests the categories of societal and management action research, which differ from each other by the viewpoint they offer. Societal action research takes social and political point of view, whereas management research is focused on the company as a business. Gummeson (ibid.) gives ten attributes for management action research. First, an action scientist takes action in order to have an active role as a change agent. Second, action research has dual goals: to contribute to the client (an object or unit of a study) and to contribute to science. Third, action research is interactive; it requires co-operation between researchers and clients personnel and continuous adjustment to new information and new events as interpretation leads to conclusions and recommendations that in turn lead to decisions and action in an iterative, cyclical process. Fourth, the understanding developed during an action research project aims to be holistic, and recognize complexities. Fifth, action research is applicable to the understanding, planning, and implementation of change in organisations. Sixth, it is essential to understand the ethical framework and the values and norms within which action research are used in a particular project. Action research does not focus per se on solidarity between individuals. Seventh, action research requires the total involvement of a researcher regardless of how the data is generated or collected. Eighth, pre-understanding of conditions of business and organisational environments and cultures is essential to effective researcher intervention, action and advice. Ninth, management action research should preferably be conducted in real time, although retrospective action research can be an option. Tenth, the management paradigm can require its own quality criteria, as scientific and practical results are equally important.

The idea of action research rises from uncertainty about the premises, thus use it emphasises of the constructivist approach as inductive process, not a deductive hypothesis testing. In this dissertation induction is set up to have a dual role. First, problems and solutions are handled in iterative process, thus one conclusion leads to another problem. The iteration is also triangulation process, as there is exchange of ideas and opinions between the participants in action process. Second, scientific results are derived from practice and

reflected to the theoretical framework, not vice versa. Multiple case approach is applied in order to find similarities or differences between solutions developed to client organisations. Multiple case approach is used also to attain better validity for findings.

1.4 Research method

Case study is used as the research strategy to investigate and capture the real-life events being studied. This method is used in order to retain a more holistic view of the relatively complex and dynamic phenomena**.** Case study is a form of research what is generally called field method**.** This is where a phenomenon is approached in its natural environment (Yin 1994, 1-3). In managerial research, case method is a common approach to organisational processes and complex decision-making situations. To some extent, these situations are all uniquely different, as well as subject to change. Case method relies on the observations of events. In action research the observations are also participative, and entail a plan for active intervention as required. Qualitative data gathered in the process of action plays a significant role in the interventions, but sometimes even quantitative analysis is performed for certain pieces of data (e.g. Gummesson 2000; Gill and Johnson 1997).

Figure 4 outlines how the study was carried out. Knowledge work was studied in specific organisations dealing with the fields of research, education, and consulting. In the research for the dissertation there were four different organisations with four different sets of tasks and goals. The common feature to all four was the importance of human capital to their operations. As human knowledge is the main input, the problem is approached through the individuals directly involved. Each case had a certain set of problems to be solved. In the described cases the management and personnel identified a need for performance evaluation, with the presumption being that they will change their behaviour in order to maintain and improve the performance. The performance meas-

urement system will be implemented as tailored for an existing framework, in order to meet the functional needs of the organisation in question. The process is seen as educational and unique.

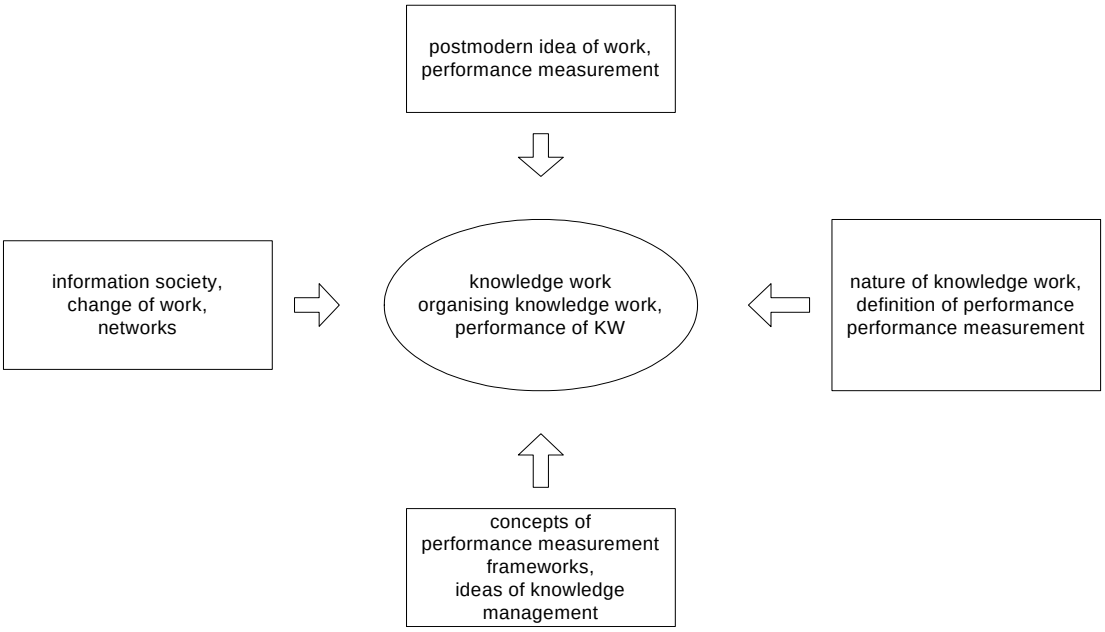

Figure 4 **Action research: relation of background, theory, objective, practise and research object of this study (adapted from Olkkonen 1994, 75)**

Participatory action research is a form that involves practitioners as both subjects and co-researchers (Argyris and Schön 1991, 86). In the cases of this dissertation, the researcher will have an active role in performance measurement and systems building. The researcher acted as a facilitator, or consultant, in the process of performance measurement. The role of the researcher was active, thus the participation level was high. High level of participation refers to the role of researcher as an active actor in each step of the process of developing performance measurement system (cf. 3.1.1.). However, the researcher has only his prior knowledge on the context and the knowledge on the process, other is delivered by the people in each case organisation. The action research process is a dialogue, thus the outcome is the result of dialogue. In this study the input from other participants was vast – this dissertation only reflects the information by informants and observations. It could be claimed that there might be a bias, as the people in the case or-

ganisations are faded to the background. It is a conscious choice, as this study considers delicate matters. By request of two case organisation the research report includes only the outcome artefact (the measurement system), not the whole discussion on strategic issues or different development phases. Moreover, due to the ethical perspective considering action research it would have been unethical to act against particular wish of participants. The data presented here has been checked by each case organisation, found truthful and approved to be published.

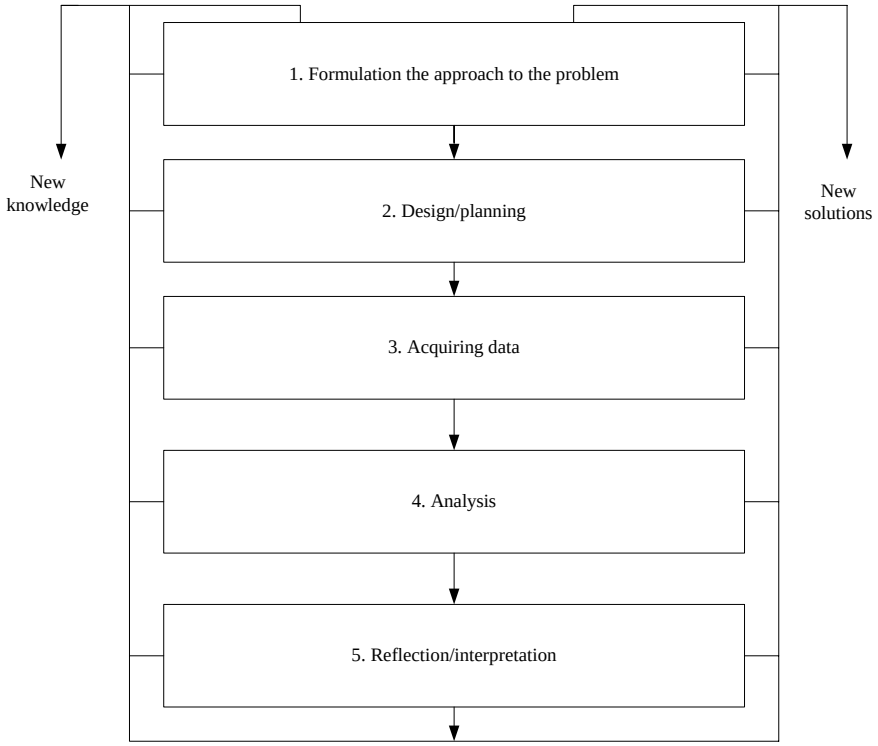

Figure 5 Steps in Action Process (Karlsen 1991, 150)

Formulation of the approach to the problem was made in co-operation with the case organisations, assuming each to have a different situation. The people in project groups played very important role when performance measures were designed. Planning was done along with the data gathering and analysis, and thus re-planning will be an integral part of the process. The building of a performance measurement system and its rebuilding was also iterative, with some steps seeming to go backwards as well as forwards.

The data was collected through discussions and interviewing individuals, or groups of individuals, in their work settings.

Figure 6 describes the process of performance measurement system building in the context of action research. A condition is created as a problem is identified. Action requirements are clarified as the organisation, via its representative members, are committed to the objectives of action process. Intervention and evaluation will be carried out via an idea of an improvement process, which must necessarily be iterative. New practices can in this way be adopted as performance measurement is clarified, redesigned and implemented. Communication will be essential to the utilization of the improved performance measures.

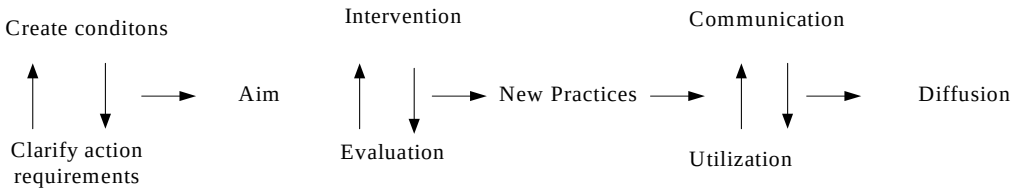

Figure 6 Planned Innovation Process (adapted from Karlsen 1991, 151)

The unit of analysis in the dissertation is the organisation, with the focus on performance measurement systems built into them. As members of the organisations, and the researcher, will mutually agree on the same goals, the data produced in the discovery process can be examined from a mutually beneficial perspective. This can be done via a factist perspective, which refers to the fact that generated data is not interpreted, as if there were bias between what informants say and what are their true intentions. On the contrary the data will be presumed to represent the organisational insight of individuals in terms of an organisation's vision, strategy and critical processes. It is presumed that the researcher does not have a particular right to challenge it.

Table 3 Factist and specimen perspective (Alasuutari 1995, 63)

Perspective	**Data and reality**	**Truthfulness and honesty**
Factist	Separate	Required
Specimen	Reality of data	Not a relevant question

The data created in the performance measurement system implementation process is thus later analysed in a way that allows it to contribute to science; with rigor and scepticism. This form of scientific analysis will consist of examining the features of a single measurement system, then comparing the similarities and differences of any two or three case systems.

Validity and reliability are not applicable per se in action research (Huttunen et al 1999, 113). Reliability is not a suitable concept, as idea of action research is to intervene. The research project is based on intervention, in order to change the state of the research object. The result should be evaluated through new conventions established and how the practices have changed (ibid., 118). In action research, it is not a primary goal to make empirical observations corresponding to theory, i.e. to validate theories, hence the aim can be to construct the new while changing the old (ibid., 132). This study should be evaluated according to the evaluation criteria of qualitative research. Concepts of internal validity and external validity are still valid, but reconsideration is needed. Internal validity in quantitative research should be replaced by credibility in qualitative research (Guba and Lincoln 1994, 114). The criteria of external validity should be replaced by transferability and reliability by dependability (ibid.). The criteria of objectivity can be replaced by conformability, as this qualitative research in this study subjectivity of truth is central assumption (c.f. Guba and Lincoln 1994, 114). (See 6.2. for discussion on the issue and evaluation.) Figure 7 sums up the research objectives in their philosophical background.

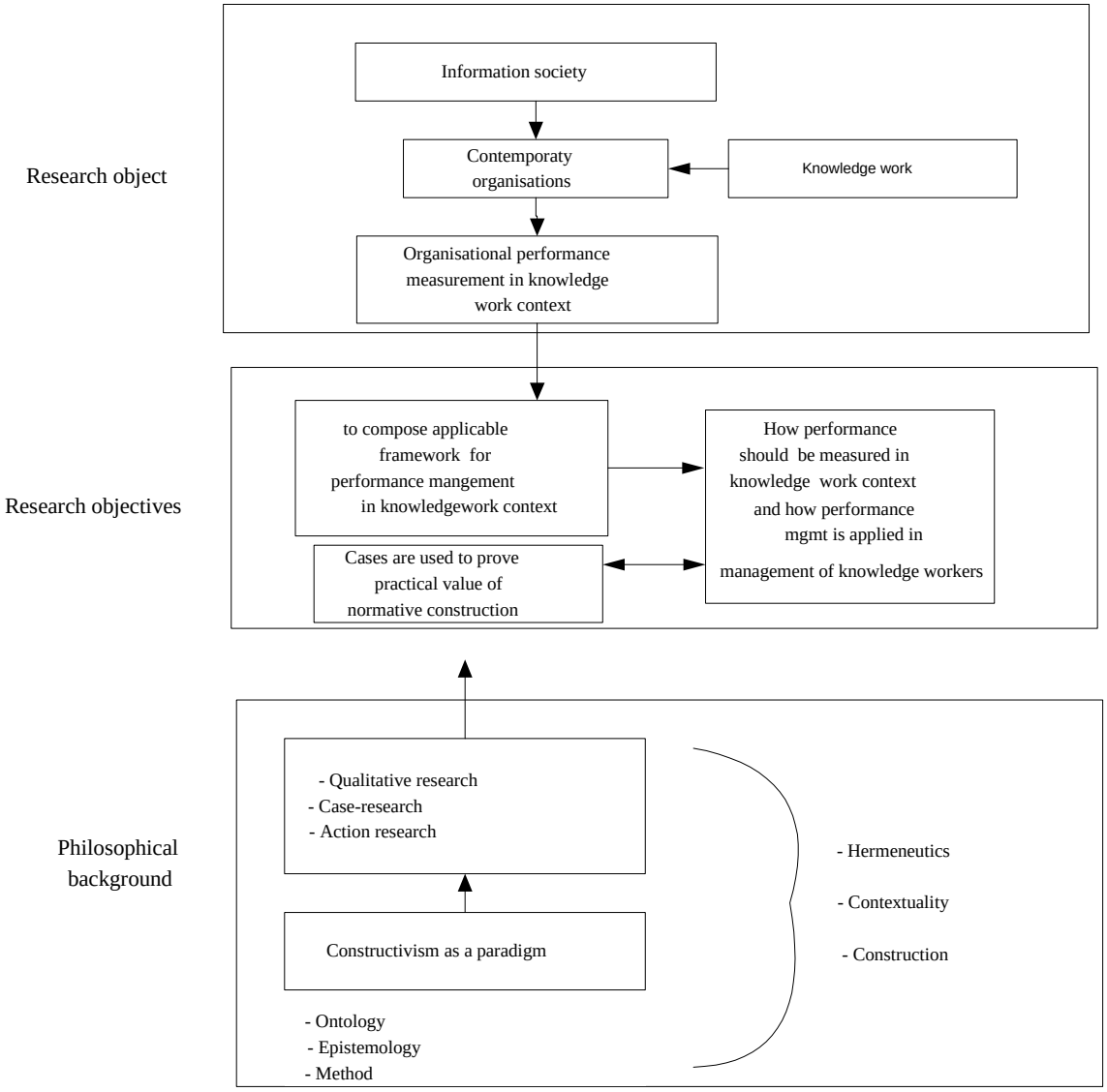

Figure 7 **Research objectives in theoretical and philosophical background (idea adapted from Laine 2000)**

Putting the research objectives, i.e. the use of performance measurement in knowledge worker management, into context alongside with the research object, i.e. knowledge work as value creating activity, the research approach is justified. There would also be alternative ways to approach the objective, yet the access to data would be different. By applying constructivist approach the data appears per se in its natural environment. Moreover identifying the nature of knowledge work is done by observation, not by inquiry. Identifying how performance can be defined in the knowledge work context and if

organisational attributes affect performance is done by active discussion with the people involved in such activity. Discovery of how knowledge work performance is measured rises also from the same source. Yet the set of research tasks is conducted in co-operation with informants as the philosophy behind the approach suggests.

The aim of this dissertation can be achieved as there are performance measurement systems to be examined and conclusions can be made. The process of performance measurement system design is as important as the nature of knowledge work. The nature of process is discussed and critical factors of it are pointed out. The design process also answers the question how management and employees perceive performance measurement as a part of management system. The main rationales for using performance measurement, i.e. how knowledge workers are managed by performance measurement, are approached by interpreting the observations and the constructed performance measurement systems. Due to the nature of the research strategy chosen, there is also an access to delicate issues, therefore the observations and data are analysed anonymous.

1.5 Structure of the dissertation

In chapter 1, “Introduction”, background of the dissertation is discussed and the research problem, objectives, and the scope of the study are outlined. Research approach and method are approached from philosophical background and research approach and introduction to research methods. The chapter is concluded by outlining the structure of the dissertation.

In Chapter 2, “Theoretical Framework” the theoretical premises are introduced by defining four propositions that are based on literature review. The role of the propositions is to serve as contentions of the very essence of this dissertation. However, propositions do not have a role of hypothesis to be verified or falsified; the propositions are more like theoretical observations. Knowledge work is studied as a contemporary form of work.

Organisations and performance are also key themes in this chapter as management is the activity conducted in organisations. Performance measurement is approached by introducing applicable performance measurement framework in knowledge work context, and explaining how the process of measurement system implication is conducted. As a conclusion a synthesis of performance measurement in knowledge work context is presented and some problems and key questions are discussed.

In chapter 3, “Cases” case criteria and case justification are introduced. Research strategy and method are also considered. Explanatory and analysis model for cases is introduced in order to enlighten outcomes of each case. Cases are reported separately, including case description, description of a measurement system implemented and outcomes of each case. The outcomes of the cases that are relevant to this study are collected together for separate examination.

In chapter 4, “Results and evaluation of measurement systems” a comparison of four systems is made to point out similarities and differences. Attention is also paid to criteria of sound measurement i.e. validity, reliability, relevance and practicality (cf. Hannula 1999). The criteria are discussed especially to enlighten critical points of the use of performance measurement of knowledge work organisation. In order to answer the main research question: How performance measurement is applied in management of knowledge worker, there is a dual analysis. Firstly, an analysis of critical success factors and measures. And secondly, there is an analysis of coherence of measurement system, i.e. is there dissonance between success factors and measures.

Chapters 5, “Conclusions” and 6, “Discussion” gather up and evaluate results of the theoretical and practical work to one package and reflect them to general performance measurement theory. Further research possibilities are also discussed as this study is constructive and new questions will arise. Chapter 7, “Summary” is a summary of this study.

Figure 8 illustrates the outline of the study. The structure is linear, as the results of defining theoretical framework is applied to cases in order to test it in practice and the results and notions produced in the cases are evaluated and discussed.

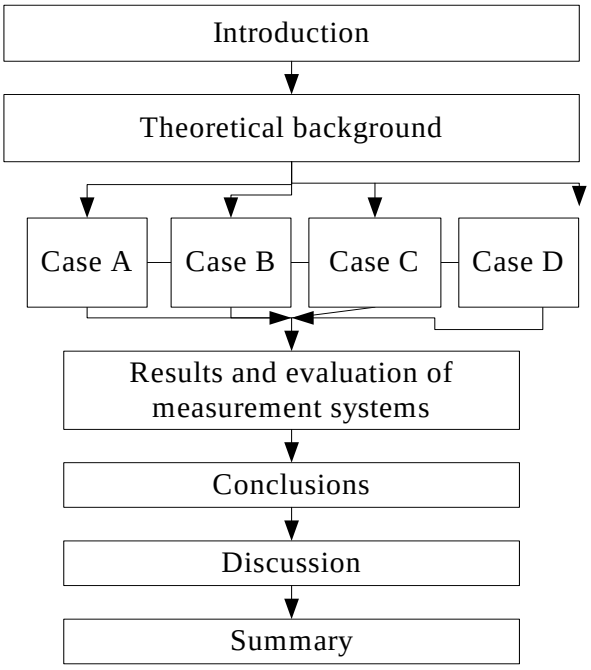

Figure 8 Structure of the dissertation.

2 Theoretical Framework

This chapter introduces the theoretical framework of this dissertation by giving four propositions for management in knowledge work context and outlines the theme of the cases. Theory looks at the main components of performance measurement in knowledge work context separately, i.e. the approach to contemporary organisation, concept of management and it's contemporary applications, nature of knowledge work, and the issue of performance and performance measurement. The chapter ends with a synthesis of theory concerned in order to be applied in the cases. However there is no certain theoretical construction to be tested. Theoretical analysis is conducted by defining tools for the case studies. Moreover, coherence between theory and empirical findings are tested in the practical sense and by using the market tests (Kasanen et al 1991, 1993a) (cf. 4.1.2). To put it briefly this chapter introduces some central elements for contemporary working organisation, raises critical points and offers a proposition to solve the problem of manageability in knowledge work context. To make contribution it is important to delineate the environment, to which the results are aimed. Since knowledge work and knowledge worker organisations are different from the manual work setting, to achieve the goal set for this study some classics are revisited and examined along the notions of contemporary views. This chapter also synthesises the theory of managerial tools that are supposed to be used in the cases.

In this dissertation the theoretical delineation is to justify and ground the propositions**.** The role of the propositions is to point out the researchers prior knowledge and assumptions and major findings from the theory of organisations, theory of management, theories of knowledge work and theory of performance management. Organisation theory is important as it helps to understand how organisation and performance are tied together. The theory of management can be considered as a cornerstone for this dissertation, as the main task is to define the implications of performance measurement in the knowl-

edge worker context. Theory of knowledge work is examined to point out the main features of research object, knowledge worker. Theories of performance management, in this study performance measurement and knowledge management, serve the research by offering the set of tools required in the empirical part of this dissertation. To sum up: In this dissertation the theory helps to build up the constructions in the case studies and justify the practical work. The path is straightforward as the theoretical elaboration leads to the synthesis of performance management in the knowledge worker context.

2.1 Contemporary organisations

Proposition 1: *Modern organisation has in general become obsolete serving its purpose as an environment of knowledge work. Therefore, attention should be paid to the ideas of postmodern organisational features i.e. new organisational imperatives, which attribute 21st century organisation. In knowledge work the organisation can be seen as the frame of doing, not as much a working apparatus as it is in manual work.*

In order to understand the special features of contemporary organisations a brief outlook to organisation theory classics is necessary. Modern organisation i.e. organisation for industrial society is a metaphor of a machine. Smith, Marx and Weber employed the machine analogy. By using those three classics an outline of a generalisation is made.

The nature of organisation has changed from modern time to postmodern time. Yet Weberian organisation theory needs to be re-visited, as organisation plays important role as work is discussed. In order to understand contemporary organisations as being opposite to modern organisation the nature of ideal modern organisation needs to be enlightened. Moreover, in the ideal sense the organisation has the same attributes whether it is more or less modernistic or postmodernistic.

Industrialisation started as craftsmen gathered together to constitute communities in the late 18th century. The level of collectivity was still low as the work was very labour intensive and need for machinery low. One of the founders of modern economics, Adam Smith approached such a community from the perspectives of co-operation and division of labour. The starting point for analysis was the notions of economies to a scale gained from physical proximity, division of labour and specialization. Without such community the economies to scale could not be achieved.

The importance of division of labour is indisputable, as by specialization resources are better allocated than without specialization. Especially, when large quantities of goods are manufactured, organising and specialization are needed in order to avoid problems in coordination of the parallel processes (Smith 2001, 37). By doing so, better allocation and exploitation of resources are possible. Even if Smith's notion of a factory was a community of craftsmen, i.e. mechanisation of work and use of machines were low, synergies and economies to scale were possible by gathering people together to work. Even in agrarian communities such benefits were gained by co-owned equipment. The same rules still apply, even if the premises of conducting the have changes drastically.

The well-known example of economising production is the needle factory example by Smith (Shafriz ja Ott 2001, 29). In an essay by Adam Smith titled "Of the Division of Labour" (Smith 2001, 37-39) economies of scale and specialisation are illustrated in pin manufacturing. The phases to produce a pin are cutting thread, sharpening the pin, attaching the pinhead, etc. If all of those phases are performed by the same person, the productivity is lower than in the case of different individuals specialising in a certain phase and working in serial. According to Smith a factory is an ideal way to produce e.g. needles, thus there is need for formal organisation. By binding organisation and production together, Smith was to explicate new industrial virtue, i.e. organisation of tasks and people. The rationality of arranging any production in organisation still holds, but the nature of such arrangement needs closer examination.

2.1.1 Rationality of bureaucracy

Organisational ideal as presented by Weber, i.e. bureaucracy, is the model of modernist organisation. There have been bureaucracies throughout the human civilisation, however alongside with the industrialisation emerged the need for an organisation, and bureaucracy seemed a suitable form (Shafritz ja Ott 2001, 32). Bureaucracies should be examined at least from two perspectives. The key attributes should be defined in order to make it possible to examine the functionality of a bureaucracy. In order to justify bureaucracy, the efficiency of the organisational form should be examined.

Bureaucratic ideal presented by Weber (1991) is based on definition of attributes for such organisation. Ideal bureaucracy is an abstraction, yet it contains necessary conditions for viable bureaucratic structure. Firstly, there are fixed jurisdictional areas ordered by administrative rules. Secondly, the rules are explicit. Thirdly, position in organisation is based on certain vocation to entitle to hold a position. Fourthly, bureaucracy separates work and leisure time. And fifthly, also work and capital assets for work are separated.

The structure of bureaucracy ensures partitioning of tasks, and therefore makes every "bureaucrat" replaceable. There must be a distinct hierarchy of authority and clear division of tasks. Bureaucracy has the shape of a pyramid, hence the person on the top of it has authority over everyone else below. The chain of command is also an important feature; there should be undisputable relationships of authority. In bureaucracy every layer is subject to those above and ruler for those below. Therefore bureaucracy is autarchy, which is ruled by a single person. The person on the top is independent, yet it still needs subjects to have position. (ibid.)

Explicit i.e. written rules are used for assuring accurate conduction of the task (ibid., 197). As long as there is documentation of the procedures, it is always possible to check from the manual. On lower levels it is almost impossible to run foul by mistake, as long

as one is aware of the contents of rules. The following of the rules is monitored by supervisors (cf. scientific management), thus the responsibility of the errors is easily transferred to the next level. The level of interpretation increases the higher the level of hierarchy in which one is positioned. This may come an issue especially when justification of actions in a certain situation is evaluated.

Organisational position designated by education or profession is condition for organisational survival. The position has an assumption of career and possibility for promotions and advancement (ibid., 198). The distinction between work and leisure arises from the emergence of office hours – bureaucrat serves the needs of the post on for certain time every day (ibid.). Distinction between work and capital assets rises from the same source. Bureaucrats are not tied to their work as artisans or farmers. The distinction is important in the sense of power. It is essential to keep possession of assets and position in organisation separate, thus it is possible to control both from the outside.

Central proposition by Weber was flawless actions of ideal, bureaucratic machine. Bureaucracy also assures completion of the tasks. The proposition is rationalised by efficiency arguments (ibid. 214-216). According to Weber bureaucracy is especially suitable in organising vast groups of people. The first efficiency argument is that even if strict rules restricts individual in organisation, those same rules ensure consistent action. Consistency is desirable in bureaucratic sense because no decision should be made on impulse or by a twist of fate. Consistency is established on the separation between planning and doing as individual decisions should or could not change the outcome.

Second and third efficiency arguments relate to distinction from the surrounding world. Bureaucrats possess absolute competence over the domain of their position. Therefore they are experts of their field when compared to those outside. The third efficiency argument states that holding a position is full time work hence the risk of corruption or discrepant interests becomes lower. If a bureaucrat has no fiscal power, then outsiders have no incentives to affect him. Fourth efficiency argument is transparency. People are

elected to positions in transparent processes and every decision is transparently argued, hence people are able to know the premises of decisions.

According to efficiency arguments, there is nothing arbitrary or unforeseeable caused by human actions in bureaucracy. Therefore bureaucracy is considered the ultimate form of organisational rationality. Organisational efficiency determines organisational attributes of bureaucracy. Weber (ibid., 214) lists the following: accuracy, definiteness, awareness of the rules, continuity, authority, integrity, strict chain of command and low unit costs. Since bureaucracy is defined by strict rules and the personal interest of bureaucrats are diminished, the attributes defined by Weber are a set of necessary rules for efficient organisation. However, these rules can be relaxed if the organisational efficiency is not the ultimate goal. The weberian organisation is referred to as iron cage due to uncompromising rigidness. In the sense of performance, the organisational efficiency is sort of meta-performance, i.e. performance that prepares the way for the "true" performance (cf. pp. 66-67).

There are several lines of development for bureaucracy, which occur in their pure form only in formal, large and rigid organisations. Clegg (1990, 38-40) lists four lines. Firstly, specialisation, authorisation, hierarchy, i.e. strictly defined tasks, jurisdiction over defined tasks, and organisational position based on assignment. Secondly, contractuality, jurisdiction defined by position, certain career paths and layers of authority. First and second lines of development emphasise dependency on regulating rules. Moreover, people are motivated by a career as it is the only way to improve ones position. Thirdly, bureaucracy is defined by orderliness, formality and integrity. Everything is predetermined, thus there is no chance for serendipity or evolution. Fourthly, as the power is organisational attribute, there is need for the centralisation of power, legitimatisation of actions, connection of power and position, impersonation of organisation, and definition of sanctions. Bureaucracy emphasises organisational power, which is detached from persons making decisions.

Putting the lines of development together with the ideal organisation defined by Weber is machine like. Weber, and other classics too, represent willingness to define and steer human actions and behaviour. Weberian organisation is unemotional and unable to change preset patterns defined by rules. The weberian model is a model for scientific public sector management. Compared to scientific management, i.e. taylorian ideal, weberian model does not allow incentives unless avoiding negative sanction can be comprehended as such (cf. 2.2.1). It is possible to evaluate actions afterward, but finding and explicating suitable targets for bureaucrats is considered difficult.

Weberian contribution to organisational and managerial theory is explication of human machine i.e. bureaucracy. Modern conceptions of organisations were hierarchies, where separation between thinking and doing was defined in order to gain efficiency and to avoid any mistakes. Strict division of tasks requires control. The right way to perform is defined by the supervisor, thus a subordinate has only the responsibility to obey. Distinction between thinking and doing holds still in manual work, however most employees have the right to think themselves. This is very important notion as the organising and managing knowledge workers are considered.

2.1.2 Postmodernity: organisational freedom of choice outside the iron cage

Discussion on organisation is strongly influenced by the heritage of Max Weber since the proposition by Weber is a starting point in discussion or it must be taken into account at some point. Conceptualisation of organisation includes a wide range of minor concepts such as social relationships, social capital, productivity or company, which are a starting point for discussion around organisations. Organisational reality is defined by general level, considering structure or performance, and individual level considering individual competencies or social skills (e.g. Sayer and Walker 1992, 53; Hall 1991, 48-51).

Especially the classics of social sciences e.g. Smith and Marx, have an important role in the discussion on efficiency of production, division of labour and capital or intra or inter

organizational relationships. Taking different ways to organise activities and approach organisational structures the discussion on organisations has different and richer form. Modern organisation was seen only as a place for work. Yet, organisation has a wider meaning for its members; it is a part of the member's social network and life. Modernism specified terms of efficiency and division of labour. Postmodernism also added to the list intellectual capital accumulation, learning and human like rational organisation (cf. Sveiby 1997). Postmodernism should be comprehended as what comes after modern (Berqvist 2001, 477). It is not same as not-modern, moreover it is a mixture of different influences and acceptance of different values and forms to operate. In this study postmodern refers to the evolution of productions setting, to say adaptation of the most efficient and feasible ways to arrange value-creating activities.

According to Weber, bureaucracy is an optimal way to organise tasks and make sure the completion of them. However, bureaucracy emphasises managerial control-function. Every level in organisation has certain freedom, responsibilities and supervisor. The iron cage of organisation makes sure there will be no uncontrolled slips. Organisational reality in bureaucracy is more like an archetype, thus there has been stricture (and praise too) towards it as a model of contemporary organisation (Gerth and Mills 1991). Attention to the weberian model has ensured practical evolution as attention has been paid to different aspects of model. One might suggest that pessimism towards necessary rationalisation and bureaucratisation has been out of focus. However opposite to weberian assumption the most rationalised and well organised form might not be the most efficient and best way to organise all activities.

As stated above, the attributes of modern organisation are specialisation i.e. division to special roles, standardisation i.e. uniformity of rules, formality i.e. number of written instructions and operation models, centralisation i.e. concentrating decisive power to the upper part of hierarchy, setting up chains of command, setting up different roles and the use of support personnel. Change from industrialisation and especially change in working life have also affected by changing the expectations and demands towards organisa-

tions (Whitaker 1992, 184-185). The needs in individualised postmodern society are different in many ways if compared to modern mass-society.

Composing organisation structure i.e. specialisation, standardisation and formality are strongly co-dependant. The level of co-dependency correlates to the size of an organisation and number of routines. The higher the number of people the more defining the structure needs to be in order to maintain manageability. Centralisation is opposite tendency to specialisation, yet they affect on different levels. Moreover, centralisation increases co-dependency between different parts of organisation. Also, if operating environment is unforeseeable and there is technological uncertainty, more control and supervisor-subordinate – relationships are needed.

One reason for bureaucratic triumph was the efficiency as bureaucracy mechanises organic. A group of individuals are turned into machine-like entity with high foreseeability, accuracy, clearness, coherence and functionality. As bureaucracy in a monocracy, the whole entity is managed by a single person. However, there are several problems caused by rigidness and lack of sensitivity. Those attributes make bureaucracies strong, but also form most of the threats for existence of bureaucracies. Rigidness makes bureaucracy foreseeable, but agility is lost as big ships turn slowly. The lack of sensitivity is endogenous because faceless bureaucracy apparatus has no incentives for creativity or breaking patterns of organisational behaviour, i.e. breaking the iron cage.

Power is a central attribute in organisations. Power emphasises control over valued resources e.g. financial capital, competencies, information, ownerships and networks. Without control, organisation is arbitrary and unsteady. So the only way to increase coherence is to make distinction between top and middle management and workers or take supporting or expert functions separate from core activities. This argument rises from the notion of weberian ideal emphasising monocracy, i.e. absolute power. Postindustrial ideal also emphasises relative power, power in organisation. Taking stakeholders and the power related to them, the organisational power network evolves and becomes compli-

cated. As the structure of power is complex, it also makes operating environment complex. In order to meet the challenges of complex operating environment companies and other organisations have changed the way they are structured. There are several cultural, historical or geographical reasons for organisational diversity. However, the only motivation to embellish it is to form a strong, adaptive and efficient unit.

Economic activity is formally rational as it is based on the best technology or solution on a basis of accurate calculations (Clegg 1990). Another way of rationality is substantive rationality, which is ambiguous, but it asserts as activities are goal orientated and those goals have a role as determinants of such action (ibid.). Economic activities are genuinely rational as they are lead by a clear and explicable goal, e.g. vision. That goal should be set upon other goals and lower goals should be subordinate to that. However, genuine rationality is often loosened by the fact that different stakeholders have contradictory wants. Therefore the organisation must adapt activities to serve the best solution. Strict genuine rationality is often substituted by rationality set by stakeholders. In knowledge worker context the work setting is affected by several non-parallel goals.

Modernistic organisation is defined by two isms – bureaucracism and taylorism (cf. 2.2.1.) In modern organisation the role of a human is to complement the deficiencies of the mechanical construction, i.e. to create some kind of fuzzy logic for the machine. As there is a distinction between planning and doing employees should adapt the technological demands in order to maintain high productivity of the capita. This leads to low rate of specialisation, i.e. there is low job rotation, strict demarcation, i.e. grouping by tasks, and de-skilling i.e. personal skills of an employee are not important only the ability to quickly adapt performance of difference phases. (Glegg 1990, 177-178.)

Modern organisation is insufficient for a postmodern environment, thus there is a need for postmodern organisation as a form of information age organisation. The postmodern organisation could be understood as an opposite to modern organisation. The central element of the postmodern organisation is de-differentation alongside task specific special

competencies. De-differentation is reverse to specialisation, hence de-differentiated staff enables dynamic and adaptive organisation (Clegg 1990, 180). Postmodern organisation is an extension of the socialist ideal of man – fisher in the morning and poet in the evening. Analogically postmodern organisation emphasises multiple competencies. More different competencies are available, stronger the organisation as its adaptability is better.

If modern organisation represented rigidness, postmodern organisation is flexible. As the modern organisation is based on technological determinism, postmodern organisation has the ability to adapt and mix new technologies and concepts as soon as they are available (ibid. 181-183). Especially increasing number of information technology drives further away from technological determinism at the expense of mechanical technology. In postmodern organisation work requires multiple skilled personnel who have the ability to discern ones' position and tasks in an organisation (e.g. Juuti and Lindström 1995, 32). Only that ability enables successful working. The ability to use technology and skills of organisational analysis are considered determinants of knowledge work (cf. Blom et al 2001).

Kaplan and Norton (2001; cf. Kaplan and Norton 1992, 1996) define contemporary organisation as strategy focused, which raises from same origin as seven organisational imperatives defined by Clegg (1990, 184). Organisational imperatives are necessary conditions for efficient organisation, therefore goals, strategies and central functions must be clearly articulated. Core functions must be arranged. Coordination and control mechanism must be recognised. Measurability and different roles must be defined. Institutionalisation of planning and communication should be established. Performance and reward systems are connected to each other. Emphasis is on functional leadership.

Postmodern organisation is rather based on persons and their personal competencies than tangible capital (cf. Gergen 1992). This concludes in notion of shift from managing physical assets and tangible production to managing and leading intangible assets such

as people and organisational culture. Postmodernity increases individual freedom of choice. However, it also shifts responsibility to individuals, too. Postmodernism represents independence of certain values, thus organisation has no tight bonds to certain set of values. Moreover, organisational values and organisational culture are developed via central individuals. Postmodern organisation setting also suggests importance of every individual. As general competencies are also emphasised, there are very few, if any, invaluable persons[7].

Emphasis on intangible asset has drawn attention to impersonal capital assets such as social capital and structural capital[8], which are linked to the way the organisation operates and its relation to the operating environment (e.g. Sveiby 1996; Edvinsson and Malone 1997). Postmodern capital is, by its widest definition everything that can be evaluated and valuated, therefore breaking away from restrictions of physical assets. This is an important notion, when society is shifting from industrialisation to informationalism and most economic activities are based on knowledge work, services and information.

The contemporary world is much more complicated than the one perceived by present day scholars. However, the economic laws are still the same, yet emphasis between them has changed. Conceptions of contemporary organisation have met drastic changes, like the change from industrialisation to informationalism and the change from masses of people to individuals. Even if modern management ideals are agonising to apply, they have lot to offer in pure form as a base for developing organisations' own management

[7] In this section the nature of work and it's connection to organisation is not discussed. Further elaboration on the subject is done in subchapter 2.3.2.

[8] As a conceptualisation intellectual capital presents all intagible assets of an organisation. A classification by Roos et al (1997) suggests two main components for intellectual capital. Firstly, human capital consisting of competence, attitute and intellectual agility as manifestation of competence. And secondly, structural capital consisting of relationships, organisation and ability to renew and develop as manifestation of organisational attributes and assets. Moreover, social capital, i.e. more or less institutionalised relationships and mutual aquitance and recognition should also take in account. (Yli-Renko 1999). Thus emergence of intellectual capital can be condensed to four phrases: know-what, know-how, know-why and know-who.

paradigm. In the sense of general idea of management, those lessons are valuable, but not applicable per se.

Industrial management has taught many important lessons, but the change in organisational reality must be taken into account when concerning organisations and the people in them. Hoefling (2001) states that work is becoming more people-centric than place-centric, thus the performance of basic functions, such as buying, selling, working, researching, sharing information and communicating, are independent of a certain place, i.e. workplace. If a postmodern organisation is to be flexible, de-differentiated, de-demarcated and multi-skilled, information society must add better performance through virtuality and other new ways to conceptualise the working environment. If, and only if, effectiveness, in the sense of getting things done, is the main goal of an organisation, then the ideal weberian model is the best way, because it has inbuilt mechanisms for avoiding mistakes. However, demand for economic efficiency, even in the public sector, has opened slightly the door of iron cage.

Whitaker (1992) states that there is need for variety of flexibility. This notion suggests importance of organisations as adaptive systems. One approach to such is using different networks as extensions of physical organisation. Virtual organisation is a certain organisational form. Still, it has many features of postmodern organisation. The phrase 'virtual organisation' stands for a task, a project or a permanent organisation which is decentralised and independent of any spatial connection (e.g. Fisher and Fisher 1998; Hoefling 2001). The characteristics of a virtual organisation are: dispersion, empowerment, restlessness and interdependence (IMPACT programme 1998/2001; Jackson 1999c). Dispersion means that there are at least multiple locations and, moreover, multiple local cultures and languages. Empowerment refers to the division of responsibility across the network. Restlessness denotes the acceptance of change in organisational practices and customs. However, the most important characteristic of a virtual organisation is its interdependence as individual members (persons or organisations) of a network must cooperate in order to gain synergy benefits. Forms of interdependence vary. It could be forged

in the shape of a strategic alliance, a partnership, value chain or outsourcing. Figure 9 describes a typology of virtual organisations.

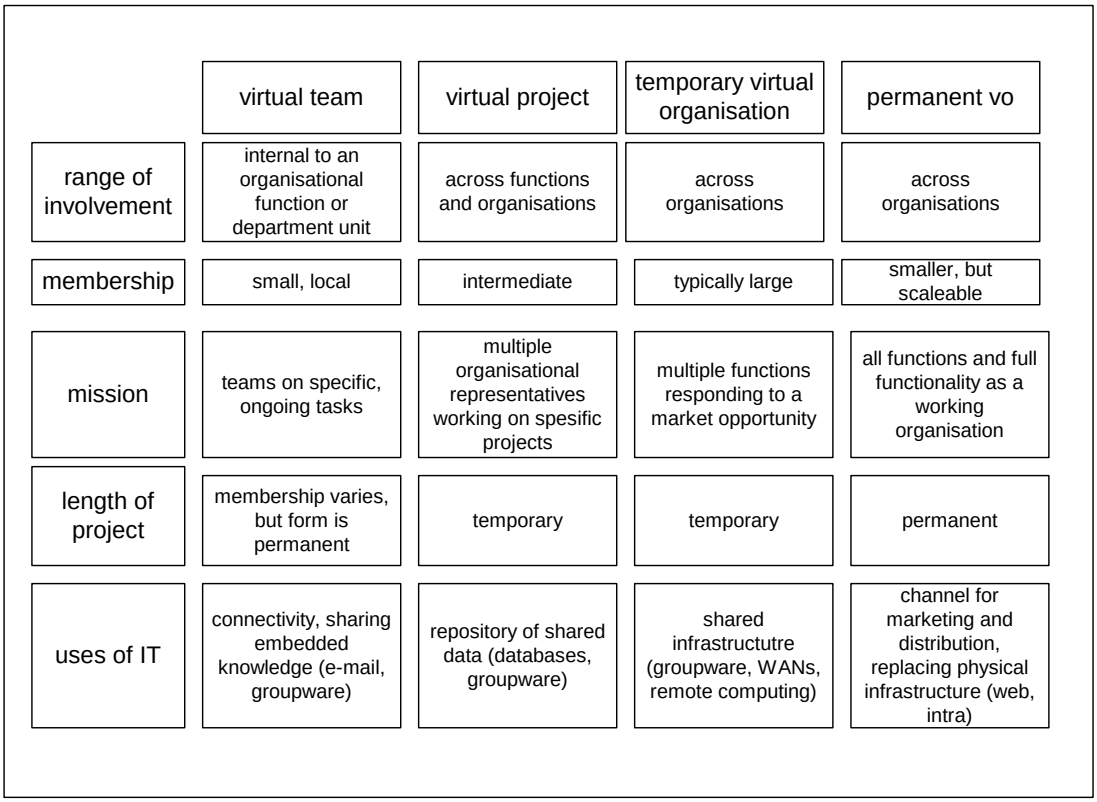

Figure 9 Typology of virtual organisations (Palmer and Speier, 1997/2001).

The simplest form of a virtual organisation is a virtual team, which is a local team utilising technology in order to ensure better connectivity, shared knowledge and lower costs. The difference between a regular and a virtual team is its spatial, and in some cases chronological, dispersion. A team is still formed to perform a common task, but people do not have to be in the same place. Virtual teams are suitable, e.g. for R&D projects and teleworking. The opposite of a virtual team is a temporary virtual organisation, which is temporary and entails a large network of people, based on voluntary membership, and aiming to perform a specific task. For instance, software companies have a large network of beta testers, i.e. people who test their products and thus are part of a development project. As a large network is not easily managed, the entry into and exit-

ing from a network should be made as easy as possible in order to maintain its functionality for the duration of a task. A virtual project exacts a temporary organisation for a certain task, which has a beginning and a designated end. A virtual project reflects the idea of virtual working as it is established to be virtual, and thus network externalities and benefits from synergy are gained. A virtual project can also mark the origin of a permanent virtual organisation if a project is successful. There are, therefore, no significant differences between a virtual project and a permanent virtual organisation. Blackler et al (1999, 13) state that innovation intensive organisation is task and service orientated, there is dialogue and questioning within and between the team. Besides, the organisation is an institutional framework for trust and competition is rather focused on external world than internal.

As a conclusion, it could be stated that contemporary organisations are more dependant on the workers' competencies than on the physical assets, i.e. employees represent one of the most important assets. This notion leads to emphasising the competencies and stability, i.e. low personnel turnover, in order to maintain knowledge in the organisation. By setting up a network, it is possible to perform tasks, which were earlier unprofitable or impossible to perform. Virtuality seems to be a suitable way to organise knowledge work, because it is not very dependant on the spatial restrictions. However, taking the aspects of e.g. social capital, social needs, organisational learning etc. it is almost critical to have at least some contact with other employees. Networks challenge both managers and employees. As operating environment is the stage of continuous change, the only solid base are the people in the organisation, thus the competencies of personnel are the most valuable asset[9]. Therefore intelligent persons are rather socialised and raised to be

[9] This notion refers to strategic thinking and Resource-based View of a Firm (RBV) or Knowledge-based View of a Firm (KBV). RBV considers an organisation as a sum of different resource that are utilised in value creating processes (Wernerfelt 1984; 1995; Barney 1991; Priem and Butler 2001). The approach is holistic, and therefore unpractical, but it still it draws attention to issue of source of organisational advantege on the market. As an extension to RBV the analysis of organisation was lead to emphasises human capital and human competencies (Wright et al 2001; Prahalad and Hamel 1990; Kaplan et al 2001; Sveiby 2000; von Grogh and Grand 2002). KBV approach affects quite much how performance of an organisation is defined, i.e. in the context of this study it forms a base for defining performance of knowledge work organisation.

members of an organisation than forced to give their creativity and other capabilities to serve faceless organisational goal.

In the knowledge work context organisational form has an effect on workflow, but organisation is merely a framework of conducting tasks. The workflow is iterative, as ideas, findings, and results are iterated until the outcome meets the set requirements. Postmodern organisation opens up possibilities, whereas rigid organisational form restraints. Therefore, organisation should be planned and utilised from the perspective of knowledge work.

As described above, the modern way of organising tasks does not serve best the purposes of knowledge work due its shortcomings, or its completeness, as it seems to lack flexibility and innovation. The attributes of postmodern organisation add something to modern organisation, thus organisation along that ideal can be considered more suitable. If there is an idea of right setting or frame for conducting the task, attention should also be paid to managerial issues. The following section takes that under consideration.

2.2 Management

Proposition 2: *If organisation has abandoned the weberian ideal and adopted a postmodern one, then the management system must be open, transparent and conversational. Hence it must be based on dialogue.*

2.2.1 Modern management – lessons by Fayol and Taylor

The first person to conceptualise the principles of management by defining a covering theory on factors affecting organisation and management was Henry Fayol (Shafritz ja

Ott 2001, 31). According to Fayol the conceptualisation is generally applicable to all organisations as six basic functions, i.e. technical, commercial, monetary, security, accountable and managerial, are considered and last one is emphasised (ibid.). Emphasis was on management because other functions are dependant on a tangible world and therefore dependant on technological determinism (Fayol 2001, 48).

Fayol (ibid., 48-49) described fourteen managerial principles. Firstly, the division of labour which refers to specialisation. Division of labour aims to higher productivity with the same input (cf. Smith or Weber). The main argument for division of labour is efficiency, as an employee can concentrate on fewer tasks and increase productivity. The second principle is authority and responsibility, i.e. main attributes of a manager. Authority is managerial power to give orders and expect obedience. Authority is according to the manager's position in the organisation and according to the manager's personal characteristics. Authority brings along responsibility for decisions and subordinates. Responsibility is emphasised when any sanctions, positive or negative, are used. Then responsible authority is expected to be fair towards subordinates (ibid., 49.) The third principle is discipline, which is central attribute of employees (ibid., 49-50). Discipline is the source of obedience. It does not matter whether the source for discipline is mutual understanding, formal agreement or implicit assumption of action. Discipline is primus motor in all organisational levels. According to Fayol (ibid.) functionality of authority and discipline is dependant on competent management, clear and just agreements and sanctions (cf. Gulick 2001, 83-84).

The fourth and fifth principles are connected to unity i.e. unity of command and unity of direction (Fayol, 50-51). The unity of command means that every employee has only one superior to give instructions. The unity of command is important in avoiding contradictions in the case of deviant instructions. Unity is enabled by establishing an unequivocal chain of command. The principle of unity of direction refers to the way objectives are supposed to be gained only by one way at a time, in order to avoid misunder-

standings. The unity of direction is the responsibility of top management; middle management is responsible for the unity of command.

Sixthly, individual pretensions are subordinate to general interest (ibid., 52). Subordination increases organisational cohesion (cf. unity of direction). However, there might occur problems such as ignorance, ambition, selfishness, laziness etc. Yet as organisation consists of humans, any human feature or ambition can, and usually will, cause distraction and general interests are replaced by individual ones. The conflict between general and individual interests can be diminished by the example of superiors, fair agreements and, of course, constant supervision and control.

The seventh principle is the compensation system, or according to Fayol (52-55), remuneration to personnel. Compensation consists of wage, social benefits and non-monetary rewards. A compensation system has an influence on employees, thus it is one of the critical factors in employment. Moreover, compensation must be fair, encouraging and reasonable. It should also be noted that, what is suitable compensation system for employees must be different when applied to managers. For employees, it is possible to apply time, job or piece rates, for managers those are inapplicable as different compensation systems have different effects on motivation and performance. Different bonuses, profit sharing schemes and non-financial incentives should also consider employees. More abstract the task, e.g. management, there are more difficulties to evaluate productivity and quality in short period, therefore management should be encouraged by compensation, which is connected to profit.

Eight and ninth principle are centralisation and scalar chain i.e. degree of autarchy and monocracy (cf. bureaucracy; Fayol 2001, 55-57). Centralisation is dependant on the nature of tasks, the size of organisation and manager-employee –relationships in organisation. In large organisations centralisation is more difficult to gain as there isa risk of long and distractive chains of command. The chain of command relates also to scalar chain i.e. top-down chain of command. In scalar chain individuals have one level above

and one level below them to communicate with. In the bureaucratic sense, scalar chain is an extreme. (cf. Weber). In the chain, the structure disables the influence of organisational static disturbing the communication by minimising the distance between sender and recipient.

The tenth principle is material and social order i.e. in an organisation there is a certain place for tangible assets and capital. Moreover, there is a place for persons too. Through material order it is possible enable efficient use of assets as long as personnel are well informed about the arrangements. Social order refers to optimal organisation and suitable competencies. Optimal organisation is one based on planning and managers' ability to build organisation. Suitable competencies refer to optimal allocation of personnel. Fayol uses English dictum "The right man in the right place" to describe social order. (ibid., 57-58.)

The eleventh principle is equity (ibid., 58). Equity is manifestation of managerial ability to evaluate employees and place them to positions, which match their competencies. Yet equity takes into account equality between peers, therefore it is also equality. Equity serves indirectly the good of the organisation as equality decreases conflicts in the peer group. Twelfth principle is stability of the tenure of personnel i.e. stability of positions (ibid). Stability increases coherence of an organisation by decreasing tendencies of change and personnel turnover.

The thirteenth principle, initiative is the key success factor to both employees and management (ibid. 59). According to Fayol, intelligent individuals are satisfied, if ones idea is accepted and gains success. In all organisational levels employees are supposed to be encouraged by the notion of permission of being creative and initiative. It is demanding for managers to maintain a milieu, which accepts new ideas. Managers must be discreet and not to extinguish creativity.

The fourteenth principle is the power of organisation or esprit de corps[10]. As organisation should be more than the sum of its components i.e. there should be synergy, organisation must be a tightly knot unitary entity (ibid., 59-60). According to Fayol, divida et impera or divide and rule is not a suitable way to rule (i.e. manage) an organisation; it requires just the opposite. Co-operation and acknowledging members of an organisation motivates people. Furthermore, motivated people are interested in mutual goals and seeking understanding on shared issues. As command should be unite, the personnel must be also. Unity of command also requires the scalar. Therefore instructions, which are open to interpretations, should be avoided.

The principles of management are a checklist to be used in managing modern organisation. Fayol assumes work mechanical capital-management-labour –relationship. Hence management is located in the centre between capital and work as a medium of instructions and command. Fayol does not say which is more important – to motivate and guide or to instruct and command – role of management. Therefore interpretation of Fayol founds on the structural mechanisms in organisation that enable achievement of goals. At least part of management has a role as employees, the role of control is emphasised to some extend. However the notion of just, fair, equal and encouraging compensation ties also personnel to organisational goals.

As hierarchical, segregated and engineered organisation was the modern ideal of working organisation, and there was also awareness of its functionality as mechanical and social apparatus, interest was aimed to increasing the productivity of a system (Shafritz ja Ott 2001, 31). Productivity is by its definition the ratio of outputs and inputs. Productivity can be improved by affecting inputs or make processes more efficient. The father of scientific management Fredrick W. Taylor paid attention to the more efficient use of labour by making labour intensive processes more efficient (ibid.). Scientific management is also called taylorism.

[10] esprit de corps (French) consciousness of and pride in belonging to a particular group; the sense of shared purpose and fellowship.

Taylor based taylorism on the belief that every employee, 19 out of 20 to put it exactly, is maximising their compensation in relation to the work they are doing (Taylor 2001, 61). If workers have no incentives or they cannot affect the compensation they are minimising the effort given to organisation. This was considered a central problem and there was need for change in both practical and mental levels (ibid, 64). The principles of taylorism are the same as the ones introduced by Fayol, but taylorism emphasises different aspects. Fayol emphasised management of people (leading people), but Taylor emphasised managing process (managing things). The distinction is not vast, but Fayol considered people as individuals and Taylor took them as a machine or parts of a machine. Taylorism taught that human beings can be also tuned up to increase output, i.e. increase productivity of labour by applying certain gimmicks on individuals (Frost and Osterloh 2002, 147).

Principles of scientific management are simple and straightforward. By increasing productivity of labour both owners and employees are supposed to benefit, owners by higher returns and employees by higher wages (Taylor, 64-65). Increase in productivity is an issue commencement from management, who collects and analyses data on the phases of working processes. By analysing process it is possible to point out the most efficient way to perform a task (ibid, 65). That is of course possible in manual work, not in knowledge work. Because the rationalisation is a project of management, individual employee seldom has a possibility to affect it or its outcomes. Rationalisation is based on simplifying, partitioning and quantifying, thus it is mechanical and does not take into account individual differences. Taylorism is thoroughly scientific by ideas and methods. Everything is supposed to be predestined by a set of possible acts and sets of rules (cf. Weber). Tayloristic development is developing employee by scientific standards and modifies her or him to suit the task as a productive worker. (ibid., 66). Development is supposed to be conducted by rewarding increased productivity; hence Taylor named it mollycoddle scheme (ibid).

The most interesting, and still applicable, lesson by Taylor was the emphasis on shared responsibility and co-operation (ibid, 66-67). Reallocating tasks between employees and management is in practice reallocation of responsibility. The responsibility of planning the process is on managers, employees are responsible to follow given instructions and inform management about deficiencies and problems. According to Taylor interdependency between managers and employees increases mutual communication, advances development and thus increases productivity.

Tayloristic formula is applicable at least in manual routine work. As the work itself becomes more complex and abstract, the task of partitioning, measuring and optimising usually fails. The more complex the work is, the harder it is to find the true essence of work or affect it. Taylor had no answer on how productivity of managers can be enhanced. Therefore at least one unanswered question remained: How to increase productivity of white collar workers?

The control paradox (Figure 10) is a phenomenon linked to taylorism (Frost and Osterloh 2002, 147-148). The paradox of management is in the effect on motivation and satisfaction. If control is increased it leads to lower work satisfaction. Low work satisfaction leads to low motivation i.e. willingness to perform reduces. Reduced performance of workers leads to reduced efficiency and realized production. As a counter effect to that management increases control etc. Control paradox is an example of bad management, when control is only used to evaluate productivity afterwards by using strict control of outputs. Such behaviour by managers leads only to a so called vicious circle[11].

[11] Vicious circle refers to state when one action leads to worse and by reacting to new situation things go even more wrong. Vicious is opposite to positive circle where improvement leads to new improvement.

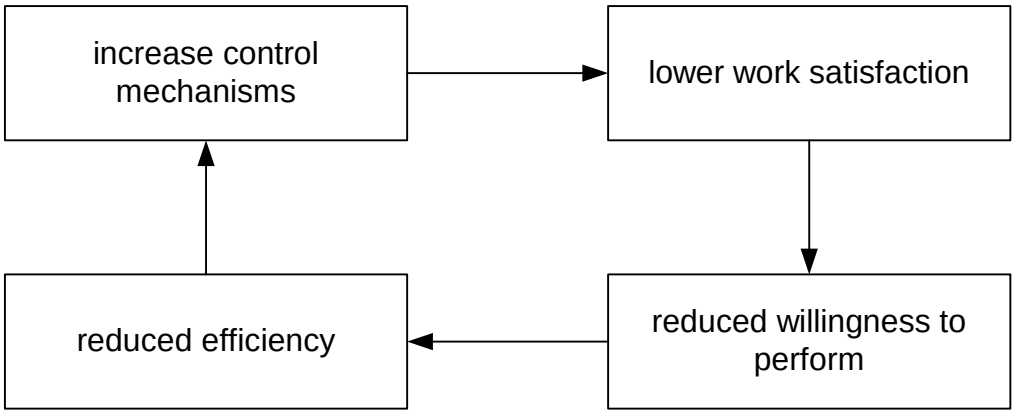

Figure 10 The Control Paradox (Frost and Osterloh 2002, 149)

Taking the managing an organisation under consideration, Fayol represents the school of persuading as innovativeness and development are virtues, and human is the central element. Taylor represents the school of forcing as scientifically defined objective must be achieved in order to avoid sanction. Putting these schools along with post-weberian idea of organisation, the managing an organisation is management of people. In knowledge work, modern management methods are insufficient. Firstly, tayloristic and fordistic idea of process like work flow, strict division of labour and replaceability seem to be the opposite of contemporary ideas of management. The dissertation by Fayol has some constituents of applicable management recipe, but not all parts of it. The idea of putting individual in the centre proposes that leading people is more important than managing things, therefore following subsection takes suitable managerial practices under consideration. Nonaka and Takeuchi (1995) suggest middle-up-down management to be suitable management model for knowledge work organisations as there is need for interpreter and communicator between top-management and employees. Middle-up-down management represents contemporary ideas of organisational dialogue. The dialogue is established as middle managers have active role in organisational communication.

2.2.2 Leadership and management by objectives

Management and leadership are considered different things. According to Sydänmaalakka (2003, 38) management has function in providing order and consistency to organisations i.e. planning, budgeting, organising, staffing, controlling and problem-solving (cf. Fayol). The primary function of leadership is to produce change and movement. This means building visions and strategies, aligning people into optimal teams, communicating, motivating and inspiring. Management is about the search for order and stability, whereas leadership is the search for adaptive and constructive change. In a dynamic environment distinction becomes useful when thinking how people are managed. Sydänmaanlakka (ibid.) cites "Managers are the people who do things right and leaders are the people who do the right thing". Management tries to improve the operation of an organisation (Sydänmaanlakka 2000).

The distinction between management and leadership is not clear, as a manager can be a leader and vice versa. The essence of management seems to be the awareness of organisational restrictions and organisational ability to achieve objectives. According to Maslow (2001, 176), the needs of an individual determine the motivation and, therefore, also the performance is determined by the needs of an individual. If a person has satisfied basic needs, different ones replace them. It seems to be also the case in working organisations. If people are working on manual or routine work, they have motivation to improve external conditions of working environment. In white collar, the work setting itself is a secondary issue, therefore knowledge workers are motivated to influence the contents of the work. Goal setting is one of the most valid ways to motivate employees (Latham 2000, 107).

Properly conducted management requires balanced stress on objectives in order to rule out the common art of management by crisis (Drucker 1993[12], 125-127). If motivation is one of the essential conditions for performance, then commitment is an essential condition for goal setting (Latham 2000, 109). Drucker (1993) states that management by objectives is a principle of giving full scope on individual strength and responsibility and at the same time giving common direction of vision and effort as individual goals are harmonised with common ones (cf. Fayols unity of direction). Therefore management by objectives makes organisational goals shared goals and it substitutes the control from the outside with stricter and effective control from the inside. If the goal setting is missing, given feedback has no effect on performance, because it is merely information without context (Latham 2000, 109). On the contrary, significant increase in performance occurs when feedback is given in relation to set goals (ibid). Taking two contemporary activity systems described by Blackler et al (1995), knowledge work organisation should be based on leadership of teams, tasks allocation should be flexible. Moreover, there is need for supra-disciplinary groups, as the matrix of different stakeholders strengthens the ability to perform.

Management by objectives was introduced as a new managerial paradigm in 1950's. It was supposed to strengthen the role of leadership, not to replace it. Idea of management by objectives origins the theory of motivation, because it deals with the issues considered important to the employee. Simply stated, management by objectives is setting objectives for the individual or groups derived from organisational strategy (Humble 1972). The idea of balanced performance measurement is derived from the same origin as management by objectives, as also in it the use of reports and procedures has an important role in supporting the management process (Drucker 1994, 133). It could be stated that balanced scorecards are blueprints for management-by-objectives-machine as balanced performance measurement is implementing organisation strategy in the same

[12] Original work by Drucker dates to 1954. Drucker is considered the pioneer of management by objetives, yet Henry Fayol delineated the principles in 1916. However, the ideas of Fayol were supposed to suit modern organisation as Drucker discussed the rise of new group of workers, i.e. knowledge workers, who needed different guidance and motivation through management.

way as management by objectives implements the goals derived from strategy (cf. performance measurement in Subsection 2.4.).

In motivation, the role of empowerment is significant. Empowerment, i.e. enabling, implies creating conditions for higher motivation through developing individual sense of personal power and meaning related to tasks (Conger 2000, 137). Empowerment is the result of communication i.e. changing information, as it has an important role in decreasing uncertainty and increasing order (Juuti 1999, 143). Power refers to an intrinsic need for self-determination (Conger 2000, 138). The very essence of management by objectives is giving sense of power to the employee via participation of decisions concerning oneself. Self-motivation does not rule out the meaning of extrinsic motivation, i.e. acts of managers or peers, but intrinsic motivation has an exquisite effect on performance. In this sense, management by objectives integrates extrinsic and intrinsic motivation together by unifying directions of an organisation and employee communication (Humble 1972, 33-38).

Enabling dialogue on objectives and work itself Frost and Osterloh (2001) suggest a positive circle of improvements. In Figure 11, the path of management by objectives is described as the human relations approach. The human relations approach consists of personality development, stimulating work, recognition, responsibility and participation, which are relevant factors of a workplace.

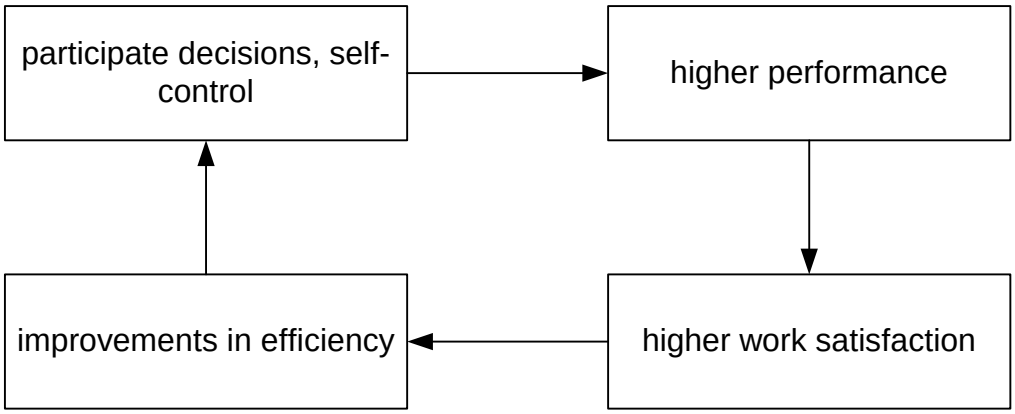

Figure 11 Human relations approach (Frost and Osterloh 2001, 150)

Positive circle of improvement starts from participation in decisions and goal setting, which makes people more motivated in achieving them. Motivation leads to higher performance. If better performance is communicated to personnel it leads to higher work satisfaction. The positive benefits of goal setting diminish without proper feedback (Erez in Latham 2000, 109). Moreover, higher performance and work satisfaction are drivers of better efficiency. The notion of high performance and efficiency and good work satisfaction encourages personnel to participate in decision-making and self-control. Managing knowledge workers requires human relations approach. Moreover, the idea of management by objectives as a way to use communication and mutual agreement, instead of commanding and controlling, emphasises that approach. Transparency is the main driver for positive circle, as it consists of shared consciousness on goals and mutual understanding on the proper ways to achieve the goals.

In an organisation that is based on individuals rather than physical assets, the management of organisation is more an issue of communication than organisational engineering. In knowledge work organisation such notion leads to applying the human relations approach described above, as the most crucial managerial issue is to motivate people to maintain the unity of direction. The maintenance of good performance in changing environment can be considered to be the main issue of management. Therefore management system requires tools of communications. In knowledge work context such tools can

help those responsible of achieving the set goals to communicate with people in organisation. The following section takes attributes of knowledge work under closer examination in order to explain proposition 2 and proposition 3 more thoroughly. The discussion above raised also the demand for openness and transparency as the key attributes of managerial system. That can be easily justified by adapting the human relations approach.

2.3 Knowledge work

Proposition 3: *Knowledge work is more about personal skills and knowledge, i.e. competence, than performing tasks that are strictly instructed by management. Therefore management must not disturb performance of the task itself, yet the management system must be transparent.*

2.3.1 Knowledge work and knowledge worker

Informationalism has affected the content of work and increased the meaning of knowledge and expertise. Knowledge work is defined by the knowledge intensiveness of work and exploitation of human and social capital beheld by individuals and organisations. Human capital refers to knowledge, which is accumulated through education. Social capital is more context related, it is accumulated via learning by doing and imitating, and it is bounded to relationships between individuals. To aggravate, the most important feature in knowledge work is to recognize the problem and to use personal competencies to solve it.

Fathers of the concepts knowledge work and knowledge worker are Fritz Machlup and Peter F. Drucker as they were the first to identify the concepts (Cortada 1998b, xvi, 4). Machlup (1962) is among the first scholars to emphasise the importance of intellectual capital accumulated in the personnel of companies in United States. Blackler et al (1993) state that knowledge work is a phenomenon of post-industrial society (cf. Bell in the Introduction). Knowledge work is neither a simple set of tasks that is something non-

manual work, nor creative problem solving by using only a very high level of abstraction. In Figure 12 a continuum of work is presented. The continuum has two ends: manual work and somewhat creative or problem orientated knowledge work. Most tasks are located somewhere between these two extremes.

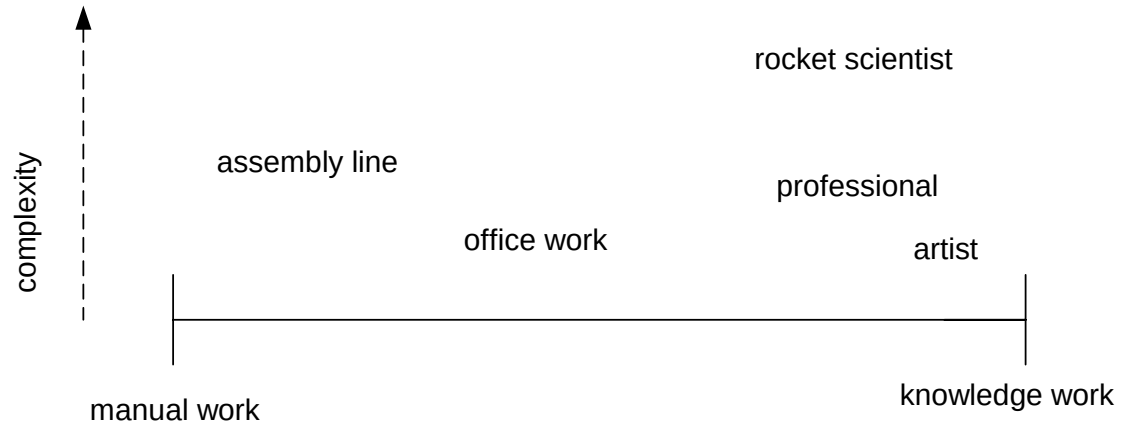

Figure 12 Continuum of work

In the continuum, the rate of manual work is a determining factor, but also the complexity of the task must be taken into account. In Figure 12, five exaggerated examples are employed to describe the meaning of the axis and to describe general ideas of knowledge work. Firstly, assembly line refers manual work, which requires technical skills and ability to read blueprints or other written instructions. However, work on assembly line does not require creativity or problem solving, in most cases it is strictly forbidden to make own decisions. Secondly, office work refers to work in a contemporary setting and it can be considered knowledge work. It is white-collar work, which has features of manual (routine based) work and yet there is freedom to improve workflow and processes. In office work, information and communications technology have a significant role in the work processes, as the workers are the users of that technology. Office workers are usually experts in a certain field. Often the complexity of work is lower than in industrial setting, since it requires more social skills than technical skills. The third,

fourth and fifth type constitutes the right hand group of workers: rocket scientist, professional and artist are all knowledge workers. The rate of manual work required is the same, but they are all still very different compared to each other.

Taking the group of three as a set of experts, the nature of knowledge work can be discussed to some extent. The work in this group is abstract, non-routine symbol analysis (Rifkin 1997). The artist is a knowledge worker with expertise in a certain field, which is used in the creative process along external stimuli to create new unique tangible or intangible products. The rocket scientist is the master of symbols i.e. work requires abstract problem-solving, constant innovation and expertise grounded in theoretical education. Rocket scientist is an academic who is determined on making and writing science. Professional is a subtype of artist and rocket scientist. The professional usually seeks solution to real-life problems, yet the work requires symbol analysis as it is mostly done on a conceptual level. There are several categories of professionals varying from academics to artists. Also, the rate of manual work is different in professions (cf. technologist). There is no certain point where being a knowledge worker starts and being manual worker ends, but as a generalisation, knowledge work is described best by the nature of symbol analysis i.e. utilising lore to solve a problem. Hakkarainen et al. (2002) suggest knowledge work to be the process of acquiring new knowledge to support an existing one and using this capacity to seek and solve problems or to innovate.

Castells (2000) defines symbol analytic work process by five features. Adding value is conducted through innovations. Innovations depend on potential to find and apply new knowledge. Performing the task is more efficient if routines are standardized and there are feedback-effects. Adaptability and external flexibility are important features of a knowledge intensive organisation, therefore an employee should also be flexible in making decisions and be able to conceptualise the whole of the task. Information technology is important, as it is the infrastructure for the process.

Some authors, e.g. Kasvio and Sipilä, separate knowledge workers into two categories (Kasvio 1994, 65-66; Sipilä 1996,15). First, the production related work, i.e. research and development, is seen as an individual part of the industrial process. Second, knowledge work is defined by different professional groups, which establish their own profession e.g. lawyers, medical doctors or engineers. Another separation is done by the incidence of customers and by the rate of manual work included. Drucker (1999a, 88) approaches knowledge work by the concept of a technologist, a person who applies knowledge of the highest order. A technologist, e.g. a medical doctor, has both knowledge and manual skills (i.e. competence) to serve patients (ibid.) The technologist can interact with the customer, but it is not necessary for the productive process, thus by definition also the computer-operator is a technologist. For different groups of knowledge workers, such as lawyers, direct contact with a customer is needed and customer has an active role in production process.

Sipilä (1996) describes knowledge work and knowledge work organisation. The knowledge worker is an expert of her/his field. Expertise is intangible, thus knowledge work is usually service production. Expert service is primarily a piece of advice or a plan. However the knowledge can concretise in a physical form, for example in a computer or other device, which represents cumulative knowledge, and on the other hand it is a compact package of expertise. Knowledge per se is the essence. As long as there is asymmetry in knowledge, there is demand for knowledge work. The demand for expertise is thus due to incompetence of a client, not due to convenience and ease, nor to a will to reduce costs. Hence, it is not possible to substitute the knowledge of an expert by the client's own effort, as usually the client cannot solve the problem.

Knowledge workers work in different sectors of economy. For example health care, legal and financial services, research and development and the information industry are typical ones. Typical knowledge work organisations are universities, research institutes, R&D departments, planning departments and offices, law offices, IT-companies and departments, auditing companies, banking, insurance and finance experts, hospitals, con-

sultant and education organisations and companies, advertising and PR companies, and public sector expert services. The central notion is that all the mentioned organisations are based on a certain profession, e.g. engineers, lawyers, medical doctors etc. A profession is entered after formal education and gained by certain professional skills required. Requirements for formal education vary between strict criteria for medical doctors and lawyers to very loose criteria for IT-workers. (e.g. Cortada 1998, Sipilä 1996, Drucker 2000, Hall 1994.)

Knowledge workers work in different sectors of the economy, for instance, in health care, legal and financial services, research and development and information industry. Moreover, knowledge workers represent their profession, which is acquired through a certain education and skills required (e.g. Hall 1994). The demands of jobs for formal education and skills vary from medical doctors and lawyers to people working in the information technology industry (Drucker 1999).

There is a distinction between a knowledge worker and a skilled worker as knowledge worker is actively seeking for new solutions to certain problems. Skilled workers are not presumed to develop new methods to do the work (e.g.. Blom et al. 2001, 36, Castells 2000, 258) Knowledge workers are expected to seek new solutions and alternative ways to do tasks. Take, as an example, comparison between engineer and welder. Even if a welder is a competent worker, usually he is not considered a knowledge worker. The engineer is a knowledge worker when he explores new ways to do the job, even if his skills as a welder were non-existent compared to the craftsman. In some professional groups ones position in a profession is legitimated by meeting the formal requirements of education; in others knowledge and skills are emphasised more than a certain degree of education.

Knowledge work is strongly influenced by the interaction with and between different stakeholder groups. Especially if the product is a piece of advice, the client has an active role in solving the problem. The client’s role consists of specifying the problem and

commenting and iterating the solution. A good example of such an active client-role is managerial consulting. As an opposite, basic-research in public funded organisations could be taken. The client is not easily defined, as it could be whole national economy or an even larger entity, moreover the contribution to science is still significant even if the results might seem somewhat trivial to the public as there is lack of commercial success or the utilisation of the results is not noticeable. In basic research the work is often done without direct contact with the client or public, but to be legitimate science the results must be published and be subject to criticism of other scientists. The refereed academic journals are an example of this.

The most important attribute of knowledge work is to know something. Sipilä (1996, 19) defines knowledge worker or an expert as follows. Knowledge worker has an accumulated source of absolute knowledge, i.e. knowledge worker has unique body of personal competence. Knowledge worker has relatively high amount of human capital based on certain education. Knowledge worker should be considered a source of academic or practical knowledge, and yet knowledge workers are able to explicate it. The nature of knowledge work is creative, i.e. it should be comprehended as identifying and solving problems. However, some knowledge workers do not create unique solutions, but recognising problems linked with their professional knowledge. Knowledge workers also have relative knowledge, which is the base of distinction in the peer group.

There is duality in the competencies of a knowledge worker i.e. in the expertise. Expertise could be divided to two categories, absolute and relative expertise which depend how an organisation is examined (Okkonen 2002a). Taking external perspective the expertise is absolute, i.e. the knowledge worker has more knowledge on a certain issue. Absolute knowledge is the base of customership. Authority over customer relates to absolute knowledge, as customers are looking for advice and expert has normative power. Relative knowledge refers to intraorganisational relations between knowledge workers. Even if individuals have similar education, their personal interest, career history and such, affect their body of knowledge. Relative knowledge is also manifested in seniority

as superior ability to perform (Hakkarainen et al 2002). Relative knowledge is the base of an knowledge intensive organisation, junior-senior –relationship and allocation on personnel. Relative knowledge is expressed in ones ability to know something others do not know. Considering relative and absolute competence together, as organisation is based on different kinds of experts, they all have absolute knowledge compared to outsiders.

As there are several types of organisations in general, and furthermore, several types of knowledge intensive organisations, it is almost impossible to make an exhaustive list of features of a knowledge work organisation. Knowledge work organisation has its own special features (Sveiby 1990, 40; Kasvio 1994, 65, Sipilä 1996, 23). Firstly, the value of an organisation is equal to, or higher than, the combined knowledge of its employees. They are highly educated, and they perform tasks that involve complex problem-solving. Secondly, the proportion of human capital is dominant and organisations are person intensive, so the knowledge in the organisation is linked primarily to its personnel whose experience and learned skills are even more important than their formal academic knowledge. Thirdly, the personnel of the organisation tailor the product to meet the clients' special needs. Also, as the proportion of absolute knowledge is relatively high disposability of personnel is low.

All other features, except the first one, are agreeable. The first could be criticised by economies to scale and benefits gained from synergy. Economies to scale occur when several different problems can be solved in an organisation by a group of specialists from different fields and they have chance to reflect their thoughts on others' opinions. Working in organisation is presumably more efficient than if the same people were performing the tasks individually. The effect of economies to scale can be appreciated as goodwill in the balance sheet of an organisation, therefore the value of an organisation is higher than the value of its components. Synergy is by definition the potential ability of the individual, organisations or groups to be more successful or productive as a result of a merger, i.e. something has a better performance together than individually.

Knowledge worker represents her/his profession, which is achieved by certain education and skills required. Demand for formal education and skills vary between medical doctors and lawyers to people working in information technology industry. Hall (1994, 44 – 45) gives five key attributes to professional work. First, a profession must have a research-based, systematic theory. Second, a profession's practitioner must have authority over clients. Third, a profession must have formal and informal community sanction. Fourth, a profession must have a code of ethics. And fifth, there must be a professional culture. The first attribute is obvious. The second describes the relation between a professional and a client. Sanctions refer to licenses given by officials or professional association. A code of ethics is related to sanctions as violating the code leads to sanction. Professional culture separates one professional group from other groups. Knowledge work has similar attributes as professional work, but it is, by definition, planning and utilization of information and knowledge. Knowledge work emphasises asymmetrical information and skills, as a client has to believe the results given by the expert (Lash et al. 1994, 100-109).

2.3.2 Enablers of knowledge work

Yli-Renko (1999) states that knowledge work is dependant on the social capital of the worker. This notion is raised from the Bourdieuan idea that social capital is the sum of different resources accrued by the individual or organisation (cf. management concept of human capital e.g. in Hannula et al 2002). New structures and processes, e.g. inter-firm collaboration, flexible working, team working, knowledge management and organisational learning, characterise new organisations and new ways of working (Jackson 1999a; Jackson 1999b). According to Jackson (ibid.), there are three reasons for this. Firstly, the demand for more flexibility by individuals, combined with improvements in technological capabilities and cost effectiveness will make new working arrangements viable and attractive. Secondly, the need for improved innovation and organisational learning demands new knowledge management systems to help an organisation acquire,

accumulate, exchange and exploit organisational knowledge. And thirdly, as access to, and transfer of, knowledge and expertise will increasingly take place across boundaries (both organisational and spatial), internal networks, dispersed project groups and inter-firm collaborations will become more and more common.

However the phenomenon of intellectual capital should be considered more comprehensively than just examining the manifestations of it. As conceptualisation, intellectual capital presents all intangible assets of an organisation. A classification by Roos et al (1997) suggests two main components for intellectual capital; firstly, human capital consisting of competence, attitude and intellectual agility as manifestation of competence, and secondly, structural capital consisting of relationships, organisation and ability to renew and develop as manifestation of organisational attributes and assets. Moreover, social capital, i.e. more or less institutionalised relationships and mutual acquaintance and recognition should also be taken into account. (Yli-Renko, 1999). Thus emergence of intellectual capital can be condensed to four phrases: know-what, know-how, know-why and know-who.

Defininition by Ståhle and Grönroos (2000) raises the issue of intellectual capital as an organisational attribute. They divide intellectual capital into intangible assets, i.e. those appreciated in the balance sheet; organisational competence, i.e. individual competencies and organisational performance; and organisational renewal, i.e. potential for change and strategic ability. The trichotomy by Ståhle and Grönroos suggests the same as the dichotomy by Roos et al and the concept of social capital put together.

There is also rationality to see action, i.e. making conscious or unconcius acts according to intellectual capital, as ultimate expression of knowledge. Blackler (1995) gives attributes to active intellectual capital. Knowing is mediated, situated, provisional, pragmatic and contested. Blackler (ibid.) also suggests equivalent categories for knowledge, which could be attached to forms of intellectual capital. Embrained knowledge is knowledge about, i.e. know-what. Embodied knowledge is knowledge how. Encultured knowledge

is shared understanding, thus it refers to both know-how and know-why. Embedded knowledge is systemic attribute, hence it is attached to recognition of structures and action according to them, i.e. know-why and know-who. Encoded knowledge is information attached to signs and symbols, i.e. know-what. Embrained and encoded knowledge have the nature of human capital, yet knowing what is not sufficient. Hence human capital also requires embodied knowledge. Social capital is encultured knowledge. The role of embedded knowledge lies between social and structural capital as it is attached to persons and structures. Quinn et al (1996) approach intellect of a knowledge worker from the same perspective. Intellect is cognitive knowledge (know-what), advanced skills (know-how), systems understanding (know-why) and self-motivates creativity (care-why). In some sense knowledge work can be considered successful if knowledge worker causes action by possessed and acquired knowledge.

Taking human capital, social capital and structural capital as different forms of intellectual capital, a rough explication could be made. Human capital consists of personal competencies and skills i.e. explicit and tacit knowledge. Structural capital consists of organisational intangible assets and structure. Social capital is intra- and interorganisational relationships. By making distinction between personal, organisational and the interpersonal level, the management of components is set in context according to the object of managerial process.

Knowledge work is somewhat paradoxical; it is as tightly managed (or even tighter) as manual work, but knowledge workers are presupposed to be independent and self-assessed (Blom et al 2001, 210). Moreover, knowledge workers are hired to solve unique or non-routine problems, thus management has very few points in the work to ‘manage’. According to Blom et al., the management is connected only to goals and profit responsibility (ibid.). Knowledge workers must therefore have more freedom in the tasks and more influence in goal-setting. Suitable management paradigm for knowledge workers is to manage them by objectives, as it is essential to admit that creativity cannot be forced or bought (Blom et al 2001, 38). For knowledge workers there are

many other values in their work, thus the material ones can be diminished. Knowledge workers define the organisation, as the structure is dependant on the nature of the task. In Figure 13, the manageability gap is introduced. It suggests the idea of putting together high level of independence in work and complexity in tasks as a gap emerges. The gap is due to the fact that managers no longer plan the actual work (cf. taylorian difference between planning and doing). Moreover, knowledge workers have autonomy on deciding how the work is conducted and how the set target is achieved. Newell, Robertson, Scarbrough and Swan (2002, 98-99) suggest the same as they state that the power is devolved down the hierarchy, giving more autonomy or empowerment in their work.

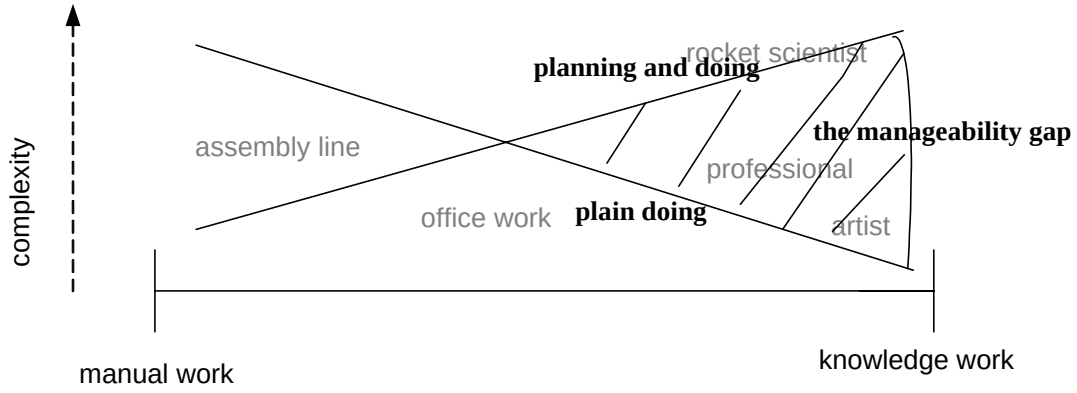

Figure 13 Planning and doing: the manageability gap

The manageability gap is due to the loss of control. In manual work managers can give precise instructions about the work-flow, i.e. to manage it. The more complex the work is, and the more it is planned and done by individuals, the significance of the manageability gap increases. As the management gap exists, the autonomy gains importance. Managerial actions should not consider the utilisation of knowledge in work. Moreover, management has a significant role as they are experts on meta-knowledge, i.e. knowledge on how the organisation works and what limitations are set by legislation or professional organisational rules. Managers should facilitate knowledge workers by their expertise, not interfering with the processes.

The concept of knowledge work folds round the concept of human competencies[13]. Abstract working process, i.e. symbol analysis, is done in the minds of knowledge workers and management has practically no way to affect it externally. As Davenport et al (2002) state, three major factors act as determinants of knowledge worker productivity – management and organisation, information technology and workplace design. The conceptualisation is exhaustive, yet vast. Therefore, this dissertation aims to explain the effect of management and organisation, especially how one organisational process, i.e. performance measurement, has an effect.

As there is a need to define knowledge work, for the purpose of this study the following definition is made. Knowledge work is non-routine work that consists of problem solving in a certain context. The very essence of knowledge work is absolute and relative competence. By that, knowledge work is the process of recognising a problem and finding a suitable solution in right scale. Knowledge work does not necessarily require creation of new knowledge; however, innovation is an important part of knowledge work. Knowledge worker is by definition a person who applies personal competencies of definite or indefinite problems that are abstract, yet a solved problem can have its manifestation in tangible good, too. A knowledge worker's competency is based on formal education and/or experience and it equals human and social capital. The following definition is also used when the cases for this study are chosen, as there is need for coherence on the features of the nature of the organisation to enable sufficient analysis and theory formulation. Moreover, as discussed in the two previous subsections about organisations and management, the essence of knowledge worker management is guidance, i.e. managers have critical role in facilitating the process of problem solving, yet they are not able to exactly say what to do. Therefore, the organisational planning and management system should be constructed according to the features of knowledge work. Following section considers balanced performance measurement as a suitable way to manage such organisations.

[13] Cf. the Knowledge-based View of a Firm –approach. As this dissertation is a study of applying certain managerial paradigm, KBV-approach is implicitly taken in account.

2.4 Managing performance

Proposition 4: *Performance measurement frameworks emphasise organisational dialogue and communication. Measurement is a suitable way to manage knowledge workers as long as the measurement system is acceptable throughout the whole organisation.*

2.4.1 From productivity to performance

Productivity[14] is defined as a relation between output and input in a certain process. In the context of knowledge work, productivity is a valid concept, but it is too general, thus concept of performance is used. The concept of productivity does not take into account the nuances of knowledge work (Drucker 1999a). According to Beer (2000, 370-271) business performance[15] consists of coordination between functions, businesses and regions, commitment to stakeholders such as customers, competence available, communication to enable dialogue, and creativity and innovation. In the context of knowledge work, the productivity, and its measurement, has been a current issue since the introduction of the concept of knowledge work. Davenport et al (2002) refer to the mysterious art and science of knowledge worker performance.

According to Sink (1983, 36), overall performance of a firm (or an organisation) is constituted on seven criteria: 1) effectiveness, 2) efficiency, 3) quality, 4) productivity, 5) quality of work life, 6) innovations, 7) profitability. The criteria are cornerstones of

[14] Definition of productivity by Hannula and Lönnqvist (2002) is the ratio between the output and the input. Output refers to quantity and quality of tangible and intangible products produced in a production process. Input refers to the type and quality of inputs used for producing the output. By this definition productivity also take into account the quality of outputs.

[15] Definition of performance by Hannula and Lönnqvist (2002) is the ability to achieve set objectives or results. Performance is the ability to perform or fulfil a task, or the manner in which a mechanism performs. Similar concepts for performance in certain context are e.g. efficiency, effectiveness and efficacy.

functional organisation, thus productivity as an overall concept also contains productivity in quantity (Hannula 1999, 24 – 25). The criteria are necessary conditions for performance and the lack of even one decreases the overall performance. Performance is a preferable concept when examining the process, as an output/input –ratio is not very informative. Criteria by Sink can also be applied to work process or even to an individual worker.

Drucker (1999a, 83 – 84) gives six factors to determine knowledge-worker productivity: 1) Knowledge-worker productivity demands that we ask the question. "What is the task?" 2) The responsibility for their productivity is on the individual 3) Continuing innovation is a part of the work and the workers have the responsibility of it 4) Work requires continuous learning for product improvement 5) Productivity consists of both quantity and quality, emphasising quality 6) The worker is an asset not a cost.

Ojasalo (1999) has made taxonomy of traditional manual production and service production differences. The differences are exaggerated, yet characteristics of services are at least valid. In Table 4 these characteristics are compared.

Table 4 **Differences between the assumptions included in the traditional concept of productivity and the characteristics of services and service production (Ojasalo 1999, 59)**

traditional productivity	characteristics of services
- tangible input and output - outputs and inputs are homogenous and output quality is constant - production and consumption are separate - customers do not participate in the production - productivity is measured apart from sales, a constant amount of outputs can be produced	- output and input are more or less intangible - outputs and inputs are heterogeneous and customized - Production and consumption are partly simultaneous - customers participate in the production - productivity ratio measures actual sales, because services cannot be inventoried

The concept of traditional productivity is somewhat dubious, but it can be considered as representing modern conception of production. Contemporary products can be at best like services, only the characteristics of inventoreability holds. The differences in these characteristics are useful to understand in order to define components for performance. Combining performance and knowledge-worker productivity criteria, seven criteria of knowledge-work performance area defined and explained by Drucker's productivity concept. Firstly, effectiveness means having the right solution on the right scale to a problem defined by a customer. Secondly, efficiency should be understood in its economical sense, i.e. a solution is produced with a minimum of input. Thirdly, quality refers to the accuracy of a solution. Fourthly, productivity equals the number of the output of accurate solutions. Fifthly, the work should be performed under such conditions, which help and encourage workers to do their best. Sixthly, innovations are guaranteed in a state where workers aim to construct new and better solutions to problems rather than mechanically apply old ones. And seventh, profitability means that revenues must exceed costs. These are the necessary conditions of performance and the failure to meet even one of them could have a negative influence on performance.

Network organisation or other new forms of organising work do not require re-defining the concept of performance, since it is still applicable. Some criteria of performance are emphasised as far as different organisation forms are concerned. Effectiveness for a networked organisation means independence of time and place; thus the network is available to a larger extent. Efficiency is the optimal allocation of resources, i.e. any resource is available, but used only if needed. Quality is ensured by the optimal allocation of competencies. A large network facilitates the evocation of responses to new ideas. This way, virtual organisations, if large enough, can be more innovative than conventional organisations. Ideas, at least, are delivered more effectively in a network. Nevertheless, if there is a lack of personal contacts at work, there is a risk of alienation from set goals and the co-operation between individuals might suffer. It could be said that virtuality presents a challenge to human resource management. Profitability seems to be the

reason why virtual organisations work, for, due to synergy, profitability increases and new possibilities open up. From the profitability angle, virtuality makes it possible to adapt new products or business ideas, which were, earlier, unprofitable.

2.4.2 Performance measurement

Measurement of performance is the essence of management. There are several ways to measure the performance of an organisation or individual worker. Traditionally used methods such as organisation's balance or profit account or calculated statistics for organisation, department, team or even individual worker, give information only from one viewpoint. Thus there is need for systems of several views. The goals of knowledge work organisation or knowledge worker could not be set only on financial criteria. At least as important criteria are co-operation with stakeholders, improvement in internal and external processes and maintaining and accumulation of intellectual capital. Since there are several success factors, the measurement system should also take these factors into account. In 1990's, many performance measurement system frameworks were introduced in order to contribute to the need for better and precise measures of organisational (or even individual) performance. Since 1992, after Kaplan and Norton (1992) published their Harvard Business Review article "The Balanced Scorecard – Measures That Drive Performance", there have been vast masses of research on the topic. As delineated in Chapter 1, there will not be an analysis on performance measurement as a tool. This subchapter merely introduces the general idea and points out the idea of appli-actions.

The principles of performance measurement are stated by Kennerly and Neely (2002, 145). Firstly, individual measures are for quantifying efficiency and effectiveness of actions. Secondly, a set of measures, i.e. measurement system, combines different measures as a whole for examining organisational performance. And thirdly, supporting infrastructure enables data to be acquired, collated, sorted, analysed, interpreted, and dis-

seminated. The basic elements of performance measurement are in every performance measurement system. There are several different approaches to performance measurement, yet measurement framework does very little itself (Bourne 2001, B1). Every organisation has its own context; therefore some frameworks are more suitable than others.

Performance measurement framework is supposed to help managers to construct a system which reflects the best the situation in organisation. Kennerly and Neely (2002) define six characteristics of performance measurement framework. Firstly, measurement provides a balanced picture of organisations state. Secondly, measurement points out the most important facts by simplicity and easy logic. Thirdly, frameworks are aimed to result in a multi-dimensional measurement system. Fourthly, measurement should be comprehensive in focusing the critical issues. Fifthly, measures should be integrated across functions and through hierarchy. And sixthly, as there is logic in the measures and they are connected to each other, measurement points out cause and effect. In order to enlighten the logic of performance measurement the two frameworks are briefly introduced.

Balanced Scorecard by Kaplan and Norton (1996) “links strategy into action.” It has four dimensions, which represent different aspects of organisation and its stakeholders (see Figure 14). In the Balanced Scorecard framework, connection to time is via the aspects from past to present by the methods used to measure the system. The measures are derived from the strategy. The critical success factors and performance drivers depend on the goals and the vision and the strategy of the organisation.

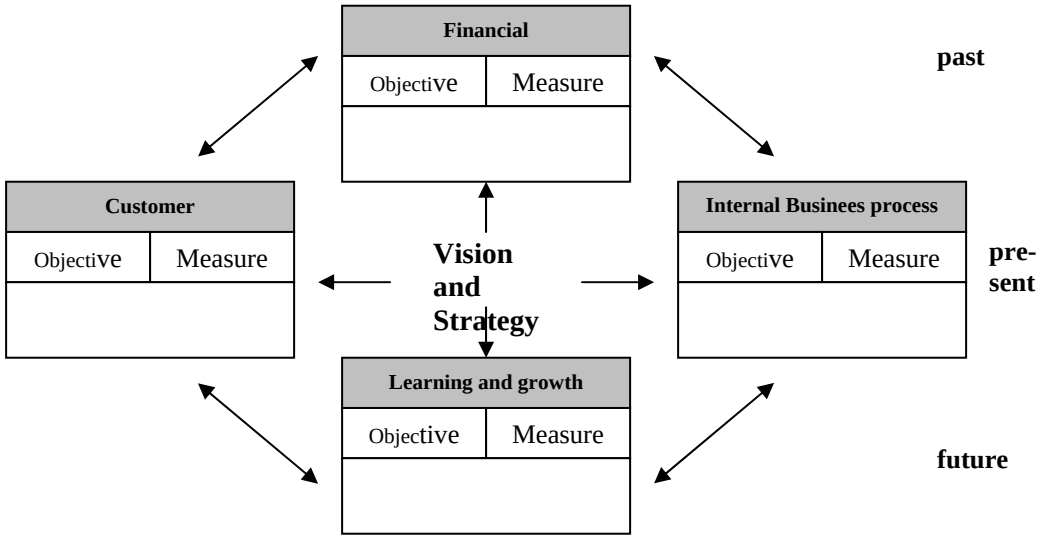

Figure 14 Balanced Scorecard -framework (Kaplan and Norton 1996, 9)

Performance Prism by Neely and Adams (2001) starts with stakeholders, not strategies. It differs from Balanced Scorecard, since Balanced Scorecard owners are the most important stakeholder group by default, but in Performance Prism the positioning to stakeholders should be made before setting any strategies. The key question is, what strategies the organisation should adopt to satisfy the stakeholders' wants and needs. Successful organisations, in the long term, do have a clear picture of who are their key stakeholders, what they want and, what it is that the organisation wants from its stakeholders. They have a clear business model and understanding of what constitutes and drives good performance of the organisation.

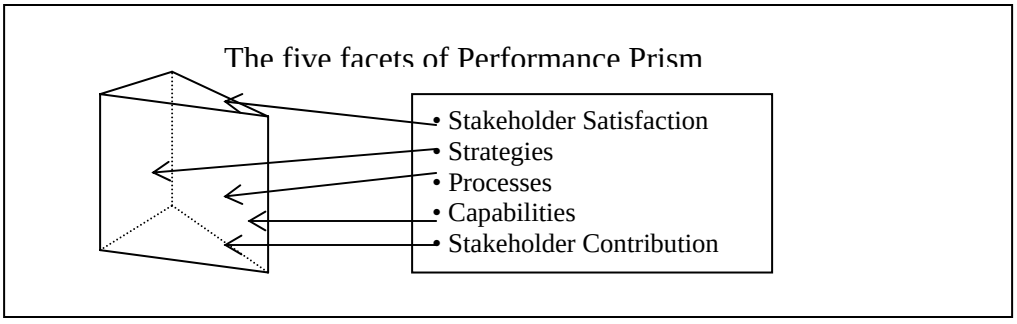

Figure 15 Performance Prism Framework (Neely and Adams 2001, 3)

Performance Prism has a descending order of facets of the prism, from stakeholder satisfaction to stakeholder contribution. Strategy is an instrument of pleasing stakeholders. Processes are derived from strategy and they are dependent on capabilities and stakeholder contribution (see Figure 15). Also, if one wants to use the Performance Prism for operative purposes, measures should be defined in order to construct a measurement system. Implementing the prism is somewhat analogical to implementing any other balanced performance measurement system. However, the use of the Performance Prism starts from the strategy formulation process, and is thus a suitable analytical tool. In this context, it means that after the five facets are articulated and strategies defined, the measurement system implementation enters phases similar to those of the Balanced Scorecard -system or equivalent (see e.g. Hannula et al 2002; Toivanen 2001).

Both frameworks are good for performance measurement in services and other human intensive work. Both are applicable for knowledge work, too. Frameworks are built for organisations, but it is possible to make a balanced scorecard or a prism for an individual worker or a project. Balanced Scorecard is a popular framework, and there are several applications to both the private and public sector information intensive organisations. Performance prism is useful also in strategy process, as using it is more comprehensive than using Balanced Scorecard. However, despite of which framework is used, the result, a balanced measurement system, emerges. The cases in this dissertation employ the idea of performance measurement framework based on the structure of Performance Prism and general idea of Balanced Scorecard. However, in each case a unique solution is suggested as the context is different. The premise is that there should be several perspectives to performance, but the measurement system must still meet the requirements of sound measuring[16].

There has been much research on different performance measurement frameworks and applications in performance measurement systems. The research has focused especially on the designing of measures, the process models and how the measures are laid out in

[16] The measures are evaluated by the criteria of validity, reliability, relevance and practicality (see 4.1.2)

the most informative way (Toivanen 2001, Hannula et al 2002, Kennerly and Neely 2002, Kaplan and Norton 1996). There are four aspects to approach performance measurement (see Figure 1). The same aspects are used in the research of performance measurement. However, implementing performance measurement system requires a totally new approach to the issue. Chapter 3 approaches the designing and implementation of performance measurement systems in the cases, but containing an implicit assumption that performance measurement is a valid tool, which does not require studying from the perspectives mentioned above.

2.4.3 Knowledge Management

Knowledge management seems to be quite a hyped management fad of the new millennium. As the academics and business consultants have adopted the concept, there are several ways to define and understand knowledge management. To its widest extent, it is the management of the intellectual capital and information flows of an organisation. To its narrowest extent, it is only a system or a tool for managing information and knowledge inside an organisation. Definitions vary according to the perspective from which knowledge management is viewed.

Nonaka and Takeuchi consider knowledge management the management of the dynamic processes of knowledge transformation (1995, 124). They state that any form of knowledge in an organisation is manageable, and that the highest form of knowledge is tacit knowledge. Tacit knowledge can be achieved by the internalisation of explicit knowledge, i.e. learning. The context for Nonaka and Takeuchi is the innovation process in Japanese companies. Thus, taking this perspective, knowledge management is the art of management in a dynamic environment.

Kiianmaa (1996, 51-53), takes the same approach as he describes the importance of gate-keepers in knowledge-intensive creative organisations. Hence, it could be stated

that gate-keepers are mediators of knowledge between persons, and especially between different organisational levels. They are persons who know the right sources of particular competences. The same notion is used by Harryson (2000, 194-196), who states that the essence of effective knowledge management is to break free from rigid organisational restraints to ensure the free flow of information, ideas and knowledge; hence the idiom, “know-who based company”.

A contemporary Finnish classic in the field of knowledge management, Dynamic Intellectual Capital, by Ståhle and Grönroos (2000), defines knowledge management as a set of tools used in the process of managing knowledge in organisations. Another definition by Ståhle and Grönroos (1999, 209) gives knowledge management a broader content, such as the methods for managing the human capital and intangible assets of an organisation. The use of these tools is governed by the intellectual capital management, placing knowledge management as a sub-concept of intellectual capital management.

Leonard-Barton (1995, 5-11) conceptualises knowledge management as knowledge creating and diffusing activities. These activities are contained in operating environment levels, importing knowledge, and implementing and integrating knowledge in an organisation. In time, the present – future time division, the activities involve problem-solving and experimenting. This notion originated from the same concepts worked out by Nonaka and Takeuchi or Kiianmaa.

In the glossary of Mastering Information Management (Marchand et al. 2000a, 349-350), knowledge management is defined as a concept which includes the efforts to maximise organisational performance by creating, sharing and leveraging knowledge and experience from internal and external sources. Boshyk (2000, 51-52) lists seven attributes of knowledge management. Firstly, the basic resource is absolute knowledge in finite scope. Secondly, it is targeted to accumulate knowledge. Thirdly, it deals with present knowledge. Fourthly, it aims to manage, administer and maintain the knowledge. Fifthly, it considers knowledge to be an asset. Sixthly, it is easiest implemented into

knowledge-intensive organisations, e.g. in R&D. Seventhly, it includes the aggregation and dissemination of existing knowledge, education, copying and learning by doing. Actions in the knowledge management process, therefore, entail the management of explicit knowledge.

Davenport and Marchand (2000, 165-169) suggest that knowledge management is the management of information as companies manage a mixture of information, knowledge and data. The essence is to see the difference between information and knowledge. It depends on the nature of the work, whether the information management system is applicable to knowledge management, too. Hence, if information is processed in an organisation, then the information management system is applicable to the knowledge management. If the work has a different nature, such as that of R&D, the information management system is lacking in effectiveness as a knowledge management tool. As knowledge is a human attribute dependent on the people who create, use and share it, knowledge management is the management of people at least as much as that of information and IT.

According to Wah (2000, 308-309), the essence of knowledge management in organisations is to prevent the waste of resources by seeking the best practices and by not reinventing the wheel. Knowledge management objectives then to capture, store, retrieve and distribute tangible knowledge assets, e.g. copyrights, patents and licences. Secondly, it aims to gather, organise and disseminate intangible knowledge, e.g. tacit and explicit knowledge and information. And thirdly, those activities are used to create an interactive learning environment where people transfer, and share, their knowledge, and apply it in order to accumulate new knowledge.

Thierauf (2001, 97) states that the essence of knowledge management is knowledge discovery, knowledge organisation and knowledge sharing. Knowledge management is a process ruled by a knowledge management system, which is designed to improve corporate efficiency by providing a framework, tools, and techniques for re-using captured

intellectual assets. For performance enhancement by applying knowledge, a knowledge management system needs capturing, integrating and disseminating functions (ibid., 105).

These definitions imply that knowledge management is more than a system or a tool. Knowledge management is a managerial philosophy, which is perceivable in the practices of different organisations. Knowledge management is not an ultimate tool that solves all information and knowledge transfer problems. However, utilising knowledge management, better performance can be achieved by interaction between individuals or groups. Moreover, to be efficient, knowledge management requires storage for its information, which is open to organisation members for searching critical information or the best practices. Thus knowledge management is the learned methods for knowledge sharing and interaction and, furthermore, knowledge management clarifies which way to operate. The greatest benefit gained through knowledge management is that it aims to save the most important asset to contemporary organisations, the time people have.

Knowledge management is considered to be an organisational process, which is used to achieve better performance due to effective knowledge sharing and organisational learning. The IT tools of knowledge management are also important, but they are not the essence of knowledge management. In knowledge work context the understanding of the criticalness of knowledge leads to notion that knowledge management is complimentary to other managerial processes. The following section takes unified use of performance measurement and knowledge management under consideration.

2.4.4 Knowledge management and performance measurement

Performance measurement simply considers the act of measuring various factors affecting and resulting from business, e.g. financial and non-finacial factors, and then using the measurements in the managerial processes. Knowledge management is about various

activities and tools, e.g. knowledge surveys, document databases, reporting policies, etc.), which are used in order to improve employee competencies and to make the use of information more efficient also in the organisational context (see e.g. Cortada and Woods 2000, Ståhle and Grönroos 1999). Okkonen et al (2002) examine the connection of knowledge management and performance measurement as follows.

Firstly, performance measurement can be used as a tool to analyse the effectiveness of knowledge management activities. Secondly, sometimes performance measures provide the information needed in knowledge management activities. Actually, measuring employees' competencies can be called either knowledge management or performance measurement. Moreover, someone might consider the analysis of employees' competencies an internal business intelligence activity. Thirdly, a business intelligence process may be the same process that provides the necessary data for the calculation of measurements. To boot, the process of formulating and implementing measures or indicators may be regarded as the analysis phase of a business intelligence process. These three examples illustrate that using the tools may mean different things in practice and yet, because of their relatively loose definitions, the tools may be overlapping in some situations. (Okkonen et al 2002)

The strategy process of an organisation effectuates yet another way of examining the tools. The strategy process lays down the formulation, implementation and control over the realisation of the strategy. Performance measurement deals with all of the phases of the strategy process. Firstly, by assigning measures for strategically important success factors, employees are guided to implement the planned strategy. Secondly, the monitoring of measurement results provides information regarding the success of the implementation of the strategy. Thirdly, double-loop learning may be used to analyse and question the validity of the strategy. This analysis may be used in formulating new strategies. As measurement somewhat emphasises control, it should not be the main point of the using it. Moreover, it is suitable way to evaluate organisational processes and results gained. Thus control should be comprehended as leading organisation on the right path.

Also, knowledge management can be used to support the strategy process. For example, an organisation's core competencies can be identified by analysing employees' competencies. Sometimes the strategy is formulated around the core competencies. On the other hand, knowledge management activities can be used to implement strategic objectives, such as the decrease in costs by more effective knowledge sharing, or the gain in new know-how among the employees of the organisation.

The primary reason for using performance measurement or knowledge management is to manage and improve the performance of an organisation. Effective knowledge management needs performance measurement. Firstly, in order to know its current position, an organisation should conduct a competence survey to identify core competencies and major competency gaps. Secondly, in order to improve performance, there should be a plan for competency improvement. The plan should be implemented by defining target levels for subsequent competency surveys in the desired areas.

Measurement is used for continuous improvement as an organisation sets and resets target levels as it advances. The use of the performance measurement tool makes knowledge management more efficient. The use of performance measurement and knowledge management is an internal process, which is iterative, and both components are dependent on each other. The overlapping in measurement and target setting is avoided as performance measurement and knowledge management are in simultaneous use. Knowledge management is used to manage the present competencies in an organisation. Definitions for critical competencies are derived from strategy. Knowledge management communicates with strategy; however, competencies are very important when performance is evaluated, thus knowledge management is also connected to strategy via performance measurement. Performance measurement and knowledge management are complements, thus an exhaustive definition of one includes many features of the other.

Table 5 **Rationales of performance measurement and knowledge management at the operative and strategic level (Okkonen et al 2002).**

		The main rationale for using the tools
Operative level, i.e. short period	PERFORMANCE MEASUREMENT	Motivation, control and guidance of employees, quality management, etc.
	KNOWLEDGE MANAGEMENT	Effective knowledge sharing between employees. Management knows the organisation's knowledge level.
Strategic level, i.e. long period	PERFORMANCE MEASUREMENT	Implementing strategy and receiving feedback for strategy formulation.
	KNOWLEDGE MANAGEMENT	Developing employees' competencies according to strategy.

2.4.5 Conclusions about Management by Performance Measurement

Savage (1996) gives the attributes for new managerial challenges caused by changes in the business environment, e.g. the globalisation of markets, ever faster technological developments and the increased importance of knowledge-based assets. These attributes are: How do we move beyond the fragmentation of companies? How is accountability maintained in flat, dynamic network organisations? How are the focusing and coordination of multiple cross-functional task teams supported? How to incorporate the capacity for continuous learning and quick market responsiveness in an organization's structure? As a partial solution, Savage suggests an increased flexibility by building co-operative networks, in which different organisations and organisation members could learn from each other and gain positive network externalities[17].

[17] Network externality, i.e. synergy, refers to the economical concept of external effect, which affects organisations or individuals and causes economical gain or loss and is not compensated. Positive externality is an economical benefit, which comes from outside the organisation and is free for any individual or organisation.

Hannula (1999) states that performance measurement is a tool for the entire personnel, not only managers. Using performance measurement personnel is able to participate in the improvement of their work. The use of performance measurement as a managerial doctrine could be divided to four sub-phases. There is close connection to strategy as the main rationales for using performance measurement can be articulated as follows:

There are organisational differences affecting the use of performance measurement. However, most organisations have an explicit goal to achieve. For a business organisation the objective is very often to create economic value to owner. For a not-for-profit organisation there may be several objectives set by its main stakeholder groups, yet there is also an explicable, ultimate goal which is superior to the other goals. For the organisations considered in this study the goals are explicated in economic success or the target is set by certain result criteria. Those objectives are explicates in perspectives of results. Therefore, it could be stated that there is no difference if organisation is based on manual or knowledge activities – there will be a certain ultimate objective.

The organisations in the cases differ in main functions, processes and organisation. Because of the diversity, the perspectives of processes and stakeholders are not considered. The common nominator for each case is the knowledge intensiveness. Two out of three had a main product, which is knowledge or wisdom. In the case of the software company the products represent concentrated competence of innovating, creating and putting it in practice. Measures related to knowledge intensiveness or personnel are in focus.

Performance measurement is considered as an application of ideas of management by objectives. It is based on the same ideas of motivation, guidance and dialogue. Performance measurement helps dialogue, since as a process it is continuous and planned. If dialogue between management and employees were spontaneous, there might be some issues forgotten or left out. As a structural dialogue performance measurement helps to pay attention to critical issues. The use of performance measurement to structure organisational dialogue has several advantages.

Firstly, from the perspective of management and employees it is simple to take set of certain steps and follow them. Secondly, the process of performance measurement has role in organisation communication, i.e. communicating objectives and receiving feedback. Thirdly, there are several non-specific factors in knowledge work, thus there is need to gain mutual understanding on the contents of success factors by mutual approval. Fourthly, performance measurement has a systemic approach, thus objectives, measures, target levels and measurement results are collected to one document, which is communicated through organisation. One could state that it also helps e.g. persons who are responsible for going through the development discussions with employees. And fifthly, as management has seldom idea of true content of processes and working habits of personnel or they have only few possibilities to gain it, managers also need constant feedback to avoid making critical mistakes in the way they act and lead the organisation.

2.5 Synthesis on performance management in knowledge work context

By putting together propositions for knowledge worker management, this chapter summarises the theoretical background for the case studies. The synthesis does not compose one single construction to be tested and validated in the cases. Moreover, there is no organisation similar to others. Therefore the design of the performance measurement system for managerial use is always tied to the organisations context. Propositions for knowledge worker management are:

Proposition 1: *Modern organisation has in general become obsolete serving its purpose as environment of knowledge work. Therefore, attention should be paid to ideas of post-modern organisational features i.e. new organisational imperatives, which attribute 21st century organisation. In knowledge work the organisation can be seen as the frame of doing, not as much a working apparatus as it is in manual work*

Proposition 2: *If organisation has abandoned the weberian ideal then the management system must be open, transparent and conversational. Hence it must be based on dialogue.*

Proposition 3: *Knowledge work is more about personal skills and knowledge, i.e. competence, than performing tasks that are strictly instructed by management. Therefore management must not disturb performance of the task, yet management system must be transparent.*

Proposition 4: *Performance measurement frameworks emphasise organisational dialogue and communication. Measurement is a suitable way to manage knowledge workers as long as the measurement system is acceptable throughout the whole organisation.*

The four propositions above suggest that knowledge work is more about recognising problems and solving them through innovation and ability exploit human capital, therefore management seldom has the ability to guide the knowledge worker through the process itself. Management in knowledge work organisations has an active role in communicating the goals and objectives and in controlling the achievements. Moreover, management must have a clear idea of the factors enabling performance of the act of being an expert or using knowledge. Thus performance measurement has at least potential to help the organisation to discuss the objectives and drivers and enablers towards them.

In the knowledge work context performance management should have at least two components – performance measurement and knowledge management. The performance measurement system serves as a means of strategy implementation and tool for management by objectives. Knowledge management has a role in enabling the development of critical competencies. The performance of a knowledge work organisation is distinctively dependant on the individual in an organisation (Figure 16). As Drucker (1994) states, the change in the productivity of new work forces, i.e. knowledge workers, will drastically affect total productivity. By dividing organisational performance, i.e. ability to be productive, to individual performance two levels of measurement are suggested.

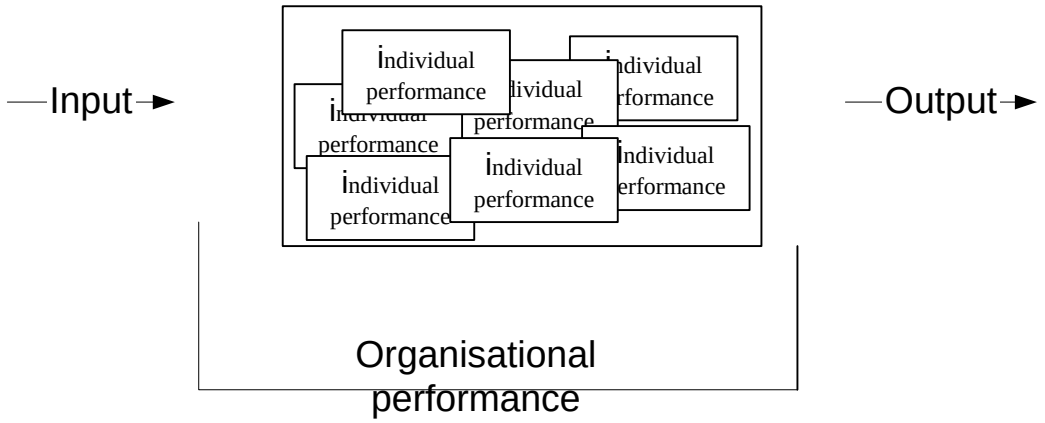

Figure 16 **Overall performance and individual performance, a black-box analogy of a knowledge work organisation**

Organisational performance (organisation approach) requires identifying critical success factors, i.e. outcomes or drivers, on an organisational level. The organisational level is general and therefore it takes into account factors determined from the outside. Organisational level is the domain of management. Issues related to results, infrastructure and other enablers are considered. Organisational level is the level of strategy therefore every scheme must be implemented by setting operative plans or goals. Individual performance (performance driver/competency approach) takes into account the individual features of personnel. The level of individual performance is the level of leadership or applying the idea of how knowledge workers are supposed to be managed. What indicates the performance criteria in knowledge work is the question to be answered by applying the theory of performance measurement and ideas of knowledge management. Moreover, the cases are for general contemplation of the use of performance measurement. What are the implications of mixing managerial accounting with knowledge management? Does it provide a way to approach the mystery of knowledge worker productivity?

Taking the issue of management system, i.e. the system that is aimed for management of a system (the black-box in Figure 16) based organisations' tangible and intangible assets, as the central theme of the empirical part of this dissertation. The particular part to

be studied is performance measurement system. The theoretical analysis and researcher's prior knowledge on the issue of knowledge worker management can be summarised as follows: The theories on the conventions and the actions of performance measurement are very general, thus they are suitable in any context. However, there will be difference as those theories are put in action. In knowledge work context the setting of measurement is different and therefore it is worth of studying.

As discussed above, the management of knowledge workers seems to be problematic. As Austin and Larkey (2002) have summed it up, the point is not on the measures, but rather on the use of them. Austin and Larkey (ibid.) also sketch a research gap or some challenges on the field of research. The delineation for this study is justified as follows: the existence of manageability gap requires bridging it by a suitable tool. The issue is not the system or the measures, those are granted by taking the required steps in designing and implementation process. The issue is the applicability. The following chapter examines those applications.

3 Practice of performance measurement in the knowledge work context

This chapter consists of the empirical study. The cases are an essential part of this dissertation, as the propositions brought forward are put into practice. Because of the constructive approach, there is no actual hypothesis to be tested, yet propositions have such a role. As propositions are the result of a conceptual analysis and prior knowledge, the cases are employed in this dissertation to construct a norm or recommendation based on the propositions.

The criteria, according to which the case organisations were chosen, were knowledge work, suitable size, accessibility and industry. The criterion of knowledge work is obvious. Every case must represent non-manual work with a high level of symbol analysis. The criterion of suitable size was due to the limited resources. It would have been impossible to conduct action research in large multi-level organisations, as there was limited time to consume. Moreover, keeping the cases small enough the simplicity helped to make clearer and more accurate observations. Accessibility is simply willingness to participate in an action research project. Because the contribution of this dissertation is applicable in general, the cases were chosen from several types of organisations. Cases represent public sector organisations, not-for-profit organisations, companies and not-for-profit companies. As the cases are different by the essence, examining them outstrips the answer to research problem. The criteria used in this study are comprehended also as Agrawal, Manyika and Richards (2003) point out that knowledge workers are crucial employees in complex services, complex networks and not-for-profit organisations. According to them knowledge workers are crucial in complex production (ibid.). The scale of this study ruled out such organisations.

All four case organisations match the criteria of knowledge work as defined above in subchapter 2.3. Knowledge work is non-routine work that consists of problem solving in

certain context. None of the cases were based on manufacturing or using pre-designed solutions. In all the cases the knowledge work was based on absolute competence, since there were certain clientele, and relative competence, as organisations were comprised of individuals with different competencies. Those competencies were complementing to each other in the organisations, i.e. there was a certain amount of specialisation. In all the cases knowledge work consisted of recognising a problem and finding a suitable solution in right scale. In cases A, C and D knowledge work did not necessarily require creation of new knowledge, even if the innovation is an important part of knowledge work also in these organisations. Especially in case B, creation and dissemination of new knowledge was emphasised. According to the definition a knowledge worker is a person who applies personal competencies of definite or indefinite problems that are abstract, yet a solved problem can also have its manifestation in tangible goods. In cases A, B and D the outcomes of knowledge work could be considered a piece of advice or knowledge. In case C the code of the software represented concentrated knowledge, thus the main outcome to a client in this case was the software with value adding service.

3.1 Research process

Research strategy in this dissertation consists of the approach to the research problem, i.e. the set methods and presumptions behind them and the process of acquiring data and analysing it. This dissertation employed the idea of action research, i.e. the idea of close co-operation with the research subject in order to solve practical problem and accumulate scientific knowledge. In subchapter 1.3., action research was discussed in general, thus there is need for closer discussion of action research. The process of managerial action research described by Gummeson (2000) is set in the context of this study.

Action scientist takes action in order to have an active role of a change agent. In the cases the researcher had a role of facilitator in the process of designing the measurement systems. This implies at least two things. The researcher had no prior knowledge of the

organisational situation in each case. Had the case been opposite, the designing phase could have been conducted without active participation. The personnel in the cases had no prior knowledge of the process of the measurement system design or extra time to learn it, thus they needed a person with the knowledge and ability to set the right steps in the process. The active role was limited to the design phase, as the implementation requires organisational agreement on the measures. After the design phase, the role of researcher changed as the implementation is the task to be done by the people who use the measures. Besides, it is the organisation that uses the system; hence the researcher is at least partly an outsider.

Action research has dual goals: both to contribute to the client (an object or unit of a study) and to contribute to science. In action research the first goal enables access to process, thus it enables the collection of the data. The latter goal is subordinate to first, as actions research relies on the practical approach and effectiveness of the research process. In the sense of taking action and contributing to the object of the study, there is no action research that does not change the object. Moreover, as action research is applied in order to gain new knowledge it also affects the knowledge of a researcher and later also the body of scientific knowledge.

Action research is interactive; it requires co-operation between researchers and clients' personnel. The process of action research also requires continuous adjustment to new information and new events as interpretation leads to conclusions and recommendations that in turn lead to decisions and action in iterative, cyclical process. The process nature of action research is typical to constructivism – in the beginning of the journey the destination is not clear; and of course the route is full of surprises. The interaction between actors emphasises the co-dependency in the process, both researcher and research object affect the outcome of the process as the outcome is the mutual goal. Moreover, as the goal is mutual and the benefits are mutually agreed the motivation for participation is, at least partly, granted.

The understanding developed during an action research project aims at being holistic and recognising complexities. Since in this dissertation the data was acquired by actively participating in the process, there were lot of information, which became understood and embodied during the process. As the researcher also needed insight into the knowledge work, too, the only possible ways to gather such knowledge was by being close to it. Other ways of inquiry (e.g. survey or non-participant methods) filter reality. Outside observer has only moderated observations. Therefore involvement was considered better way to make valid observations. Moreover, by using a survey a great body of knowledge is missed, since hypothesises to be tested are biased by interpretation of a researcher. Therefore, the phenomenon was approached in natural environment. Consequently, for the purposes of this particular study action research was an obvious choice. Action research is applicable to the understanding, planning, and implementation of change in organisations, thus acting as a facilitator the researchers are able to gather information from several perspectives.

It is essential to understand the ethical framework and the values and norms within which action research is used in a particular project, as the action research does not focus necessarily per se on solidarity between individuals. The action taken in research process affects the organisation by causing a change in it. For that reason, the moves of a researcher should be planned and conscious. The ethical dimensions are discussed later, yet it must be underlined also in this part that action research required mutual trust and trustworthiness. From the perspective of the researcher, trustworthiness is the only way to conduct the process, yet trust is required as without it the validity would be low. From the perspective of research object, trust is required as organisational change is a delicate issue. Trustworthiness is a central issue concerned as ethical aspects of action research are considered. Especially in this study, the ethics of doing research is emphasised because interventions were done in someone’s work setting or business. In addition to regular issues of ethics, the issue of confidentiality was also considered.

Action research requires total involvement of researcher, regardless of how the data is generated or collected. Actually the process of action research requires temporarily taking off the spectacles of a researcher and instead putting on the lenses of research object. In the cases involvement required understanding and learning the situations – contextualising oneself. The preunderstanding on conditions of business and on organisational environment and culture is essential as researcher intervenes, takes action and gives advice. Moreover, as every case has some distinct features the adaptation to them required much effort.

As the cases considered managerial norms and implication management action research was conducted in real time. The management paradigm requires its own quality criteria as scientific and practical results are equally important. The validation of research results was done by accepting the suggested constructions. Acceptance was considered a weak market test, yet a stronger test is implementing constructions in several cases. The strongest test would have required the continuous presence of the researcher and longer time to evaluate the effects, thus the weak market test is sufficient for the scientific purposes (see 4.1.2. for further discussion)

3.1.1 Process of acquiring data

There are several scholars who have examined generally the factors affecting the process of performance measurement system design (see e.g. Globerson 1985, Maskell 1989). Also quite a number of methods for designing a measurement system are defined (e.g. Brown 1996, Chang and De Young 1996, Hronec 1993, Institute of Management Accountants 1998, Kaplan and Norton 1993, Kaplan and Norton 1996, Kaydos 1998, Lynch and Cross 1995, Neely et al 1996, Olve et al 1999, Toivanen 2001, Hannula et al 2002). These all have at least two common features. Firstly, they all describe in practice the same process – starting from strategy, going through critical success factors and end-

ing with a set of measures. Even if there are some distinctive features, e.g. in the number of required phases, methods and tasks, the similarity of the processes is distinctive as they are, in general, the same. Secondly, common feature to all, except (Hronec 1993, Toivanen 2001), is the limitation to the design phase. There is lack of a process for implementing the measurement system. This is also the notion in Bourne et al (2000) and Neely et al (2000). Hannula (1999, 110-112) discusses the implementation process in the case of productivity measures thoroughly emphasising also the meaning of measurement culture and organisational awareness.

The similarity in the design phases reflects the unanimity between scholars. The theme has had a lot of attention in research and development, thus one might suggest that the good practices are found. However, the practicality and functionality of the methods is still unresearched. The method by Neely et al. (1996) is evaluated in Neely et al. (2000) and Neely et al. (1997). Also the methods and tasks needed in the design phase, except Hronec (1993), Neely et al (1996) and Hannula (1999), lack research.

Bourne et al (2000, 757) identify three main phases in the performance measurement system development: design, implementation and use. Implementation starts as measures are designed. Bourne et al (2000, 758) define implementation as a phase when required methods and systems for systematic gathering and analysis measurement information are defined. The definition is rather technologically orientated and it does not take into account the people in the organisation. The definition by Bourne et al. needs augmentation with factors affecting the social side of performance measurement. Complementing parts are added in order to enable the use of performance measurement in motivating, guiding and controlling. Implementation of the measurement system has three main tasks: Firstly, the task of defining and describing everyday measurement procedures; secondly, the task of creating (or implementing) the systems for measurement information collection, handling and reporting; and thirdly, people in the organisation must agree on the new measurement system. In addition to the third task, people must be willing to use the system as a part of everyday work.

How to measure, i.e. what are the actual procedures when generating data, has been discussed widely (e.g.Chang and De Young 1999, 66-70, Hronec 1993, 201-204, Neely et al 1996, 65, Olve et al, 229-252, Uusi-Rauva 1996, 34, Hannula et al 2002). Procedures must be clear at least in the issues concerning responsibility and the act of measurement, reporting the measures, how and by whom the targets are set, and the frequency of measurement and reporting.

The systems related to performance measurement concern, for example, issues of integrating measurement to existing systems, development and updating them and developing reporting systems (e.g. Institute of Management Accountants 1998, 44-46, Kaydos, 100-103, Olve et al. 1999, 229-252, Hannula et al 2002). However, from the perspective of the managerial science the discussion has been on the general level. This is apprehendable, as managerial science does not cover the field of computer systems except it has a role to describe the functional points of the system; the rest is for those who execute the programming. Traditional ways to report measurement, e.g. bulletin board, do not require advanced technical skills. Hacker and Brotherton (1998, 22) emphasise the role of standard reporting conventions and illustrations to the learning by analysis of measurement data and disseminating it through the organisation. Moreover, standardised reporting diminishes the waste of time when the results are analysed.

Performance measurement and changes in measurement are issues concerning the people in the organisation. The act of performance measurement should take into account the social and individual aspects, too. Performance measurement is an organisational process with certain intention. Performance measurement should be connected to the reward scheme in the organisation or at least ensure there is no conflict between a reward system and objectives of measurement. Also other human obstacles, for example the lack of support from management and different forms of resistance, must be overcome. (see e.g. Hacker and Brotherton 1998, Institute of Management Accountants 1998, Sandison and Gooderham 1999). Sandison and Gooderham (ibid., 28) compare implementation of performance measurement system to any other development project

in organisation. However, one distinct obstacle to success is exceptional; probability of total failure is equal to one, if there is no correlation between the strategy implementation and measurement. Hronec (1993, 75) emphasises the problems in implementation by stating that people are most susceptible to how they are evaluated and measured. Measures concerning personnel, and especially change in them, cause tensions in the organisation. Therefore, people involved in the developing the measurement system are under pressure through the process.

Argyris and Kaplan (1994, 83) state that as there is a long tradition of researching the management of change, the resistance is often explained narrowly by resistance of technological change, thus that explanation should be extended. Argyris and Kaplan (ibid) suggest three processes to overcome the resistance to change in implementing a new management accounting system. Firstly, the model must be proven internally and externally valid. Secondly, managers must support the implementation with training. And thirdly, individuals must be motivated to adopt new ideas and to behave according to them. Motivation is built by internal commitment to change.

In the cases of this study the process model employed was somewhat simple, yet there are sufficient components as a measurement system is expected to result. The idea for the process was born along the ideas of the process described in Hannula et al 2002, thus that process is the base for the process model applied for this study. The process model applied in the cases was an interpretation of different models. The model was generated from the practical perspective, as there was a need to describe the case-projects to research objects. The process had three distinct levels: meta-level i.e. planning the process, strategic level and practical level. The meta-level concerned issues of getting acquainted and constructing mutual, coherent insight as to what performance measurement is all about. The strategic level concerned formulating and re-visioning of strategy. Moreover, the very essence of strategy was supposed to be explicated here. The practical level concerned the measurement, i.e. how critical success factors are operationalised, how meas-

ures are defined and how data is gathered and reported. These three levels were operationalised to a thirteen step –process as described in Table 6.

Table 6 Thirteen steps of the measurement system development process in this study

1. Founding the project
2. Training for basics of performance measurement
3. Project plan and timetable
4. Checking the vision and revising strategy
5. Definition of critical success factors
6. Definition of measures and setting target levels
7. Deriving the sublevel success factors and measures
8. Documentation of expected causal relations
9. Definition of data sources, measurement and reporting
10. Documentation of measurement system
11. Testing the measurement system
12. Implementing the system
13. Revising the measurement system if necessary

The first step was founding the performance measurement development project. It was done in a workshop. In the workshop the research partner was introduced to the members of the organisation or at least to project personnel. One main task in the first workshop was to name the person who is responsible of the project on the behalf of the organisation. It is important that the responsible person is from the organisation. There are issues of trust and acquaintance that intimidate it, as facilitator who is an outsider does not have enough information on intraorganisational issues. The objectives for measurement were also discussed at this point. When planning the project, it is also important to identify possible problems and set explicit objectives. At this point, too, persons are nominated to project group.

The second step was the training of performance measurement. This step consisted of workshop or group discussion on the nature of performance measurement. This step was introduction to issues of connecting strategy and operative measurement. Moreover, this step was one less structured. In the cases persons involved had very inconsistent levels of prior knowledge on issues on performance measurement, therefore this step was conducted along the level of lowest knowledge.

The third step was the definition of the project plan and timetable. As there are several people involved an explicit project plan helps to keep up to date what is going on. An accurate timetable was of course very difficult to make, thus at this point it is sufficient to make a draft of it. In the cases the timetable was a one week schedule, i.e. there were certain check-points for the steps. Scheduling was also necessary so that the project group could set meetings, i.e. it helped them to plan their own work.

The fourth step, revising the vision and strategy was important for both organisation and researcher. All the cases had some explicit strategy, yet in some cases it was out of date or too general. Revising strategy has great value for the researcher in getting into the core of organisation. By taking part in strategy process the researcher gained priceless knowledge on organisational issues. As performance measurement is derived from the strategy it is essential to have an up to date strategy. Moreover, as further steps are based on strategic issues, it is also important to have the strategy clear in the minds of the project group and the facilitator.

Revising the strategy consisted of interviews of key personnel and group-work. In the group unanimity of vision, strategy and critical processes are constituted. As the cases employed Performance Prism –framework, one basic task was to define the objectives of the main stakeholder groups and put them in order. The stakeholder approach was also used in defining the perspectives of measurement, as objectives of main stakeholders define also objectives of organisation. By defining the perspectives of measurement a skeleton for the measurement system was built. After that phase, strategic objectives

were defined for each perspective, i.e. sub-objectives were derived from vision and strategy.

The fifth step was to define critical success factors, i.e. definition of factors that have most influence on realising the strategic objectives. In certain perspectives definition of the success factors were easy, yet more abstract issues were concerned, more it was difficult to define a few accurate and unambiguous success factors. This step was important for the measurement itself, as success factors are the medium between strategic and operative level, strategy and measuring it. Defining success factors was done in several workshops. This was the most time consuming step, yet as the meaning of it was even overemphasised, the time spent was not wasted.

The sixth step, the definition of measure for each success factor was conducted with the project group also. As the success factors often had wide content, this step condensed the idea. The meaning of the measure is wide. In the economic perspective some generally accepted figures were used as the measure. Quite often those measures wholly covered the range of the success factor. The more abstract the success factor is, the more difficult it was to define covering measure. Measures were also often defined by a result of survey or similar indirect measurement. Moreover, as the coverage of measure was incomplete, it often was a choice between compromises. The definition of measures was sometimes hard, as it is an inductive process and it requires exactitude. Along the measures target levels for each measure were also set. Setting target levels has a significant role as without it the measure is on a hollow number, a statement without content. As some case organisations had several organisational levels also deriving success factor and measures for each level was required which was **the seventh step**.

When success factors and measures were defined, they were tested with heuristic method of describing the most probable causal relations between measures. In **the eighth step**, putting measures in order according to perspectives and drawing the most important connections between the measures describe the relations. This was considered

as test, as if there were any lonely measures, an analysis of loneliness was required. In some cases there are measures that seem somewhat unattached, but in those cases there is logical explicit justification for such measures. For example, if there is a certain important development project in the organisation, controlling the advance of it might be important.

The ninth step was definition of data sources, measurement principles[18] and how measures are defined. The data was collected, if possible, from existing sources. In many cases available data required some processing. Moreover, the nature of knowledge work required several subjective[19] measures, in which the data is collected by survey or equivalent. In this phase the methods of indirect measurement were also designed. As stated before, the reporting is not considered an issue. In the cases each organisation had a chance to implement a basic reporting tool called Mirax (see Lönnqvist, Jungman, Okkonen, Leinonen and Mettänen 2002). In this phase also the scorecards for each measure were introduced (see Appendix 2). The systematic documentation helped the beginning of the implementing, as a document is a manual for each measure (cf. step 10). At this **tenth step** along the data sources, a person responsible was also defined. Also decisions of the abandoning of measures were usually done at this step. If there is no available data source and using the measure does not fulfil the requirement of practicality, the measure should be reconsidered and maybe replaced. Also new measures could come along at this phase as the need for complementing measures emerges (cf. step 7). At the tenth step the measurement system was documented. Each person responsible for a measure filled a scorecard for each measure (see Appendix 2 for details).

The eleventh step is to test the measurement system in practice, i.e. measure, analyse and report the system. From this point the process of development as defined in this study is over, as performance measurement system is designed. However, it does not

[18] Expression measurement principles refer to issues concerning the act of measurement.
[19] Subjective measures are measures that are generated by self-evaluation. The subjective measurement is indirect. It is applied when direct measurement are inapplicable or trivial. See Kemppilä and Lönnqvist 2003 on subjective productivity measurement.

mean that the measurement system was ready or that the work was done. The action research phase in the cases was concluded here, and active participation was ended. The successful implementation requires at least one re-visioning and decision to approve the measurement system. **The twelfth step** is the actual decision to implement the measurement system. **The thirteenth step** is actually a new process, as the measurement system is iterated. Measures are discarded, added and complemented according to practical issues raised in the use of measurement system.

3.1.2 Explanatory and analysis model for cases

The explanatory model in this dissertation consists of different layers, yet it is not triangulation[20] in the purest form of methodological triangulation. Triangulation is by definition an alternative to validation. It combines multiple methods, data, or perspectives on a single study (Guba and Lincoln 1994a, 2). Triangulation is taking several perspectives in the issue. Janesick (1994) points out four ways to triangulate: data triangulation, investigator triangulation, theory triangulation and methodological triangulation. In this study data, investigator and theory triangulation are the ways to make sense on practical and scientific levels, moreover to attain better validity of research results. Data triangulation is to have observations of the process and context of measurement to support the analysis of primary data, i.e. the measurement systems as outcomes of the processes. Investigator triangulation consists of having other researchers participating in the development process. The cases were conducted with other researchers from the Performance Measurement Team. Moreover, researcher triangulation is also considered when sense was made in project groups. The outcomes were results of extensive group work in project groups in each case, thus validity of outcomes and objectivity was maintained by their

[20] Triangulation is term used in geometry. It is a method of surveying in which an area is divided into triangles, one side (the base line) and all angles of which are measured and the lengths of the other lines calculated trigonometrically, i.e. the fixing of an unknown point, as in navigation, by making it one vertex of a triangle, the other two being known

attendance. Theory triangulation in this study means at least taking perspective of sociology and management science; hence the two disciplines supported the analysis. The theory triangulation consists of contextual approach and practical approach. As the theoretical part of this study points out, both disciplines support the propositions and this study.

A case is the source of different data and it is analysed on different levels. As cases were selected by certain criteria, they all represented knowledge work organisation. Even as developing performance measurement in the cases was based on theoretical propositions, there were no actual hypotheses to be tested. Therefore participant observation was the key to analysis. The analysis relies on two factors, firstly, analysis of the observations in the process as a way of constructing the meaning about organisational reality. Secondly, as the process of performance measurement development leads to a certain outcome, there is analysis of measurement systems as explicated artefacts. The artefacts are considered organisational consensus of the nature of knowledge work in a certain context. The artefacts are also used in analysing the use of performance measurement by factist and interpretative perspectives.

As a case study, the explanations for the phenomena and constructions appear and are derived from the natural environment. The data appears as it is, not filtered through a survey. However, the perceptions are always explained through the researcher, thus explanation is relative and interpreted. The explanatory model consists of following components: where, what, how and why. The question of where answers to problem of the nature of knowledge work as it sets the organisations in the contexts. What answers the question of how the performance measurement system is constructed? How to take constructions**,** i.e. artefacts, as representations of the nature of knowledge work and management of it? Why are the intentions connected to the use of performance measurement in the management system? In the constructions a causal rhetoric is applied, as informants define themselves causal relations between success factors, measures and performance.

Case description is an analysis of the context, i.e. definition of the organisation and the nature of tasks. The analysis of the components of performance, i.e. success factors are described as an organisational consensus of the nature of tasks. For each case an exploratory analysis is done in order enlighten how performance measurement is applied in the cases.

The second level of analysing artefacts is the analysis of knowledge work orientated measures. In this phase, success factors and measures concerning knowledge work are taken under closer examination. This is due to the fact that in each organisation, despite the level of knowledge intensiveness, there are objectives, which do not depend on the nature of knowledge work. Analysis of knowledge work orientated measures is done from the factist perspective as explicit intention is examined. Taking the interpretative perspective, the tacit intentions are examined. Explicit intention refers to the content of a success factor, i.e. how the measure is defined according to it. Tacit intention refers to the content of measure, i.e. how the measure covers the success factor and is there a conflict between the success factor and the measure.

3.2 Case A –the first attempt

Case A is part of a larger, partly EU-funded, programme. The task of case A is to operate venture projects as a medium between starting companies and venture capitalists or to incubate new companies. Its product is knowledge on financial, general and technological management for companies admitted to the programme. Case A is now a five-year virtual project consisting of 15 core experts in venture capital projects and an advisory board of 55 persons; 22 corporate finance experts, 16 experts in the management of company growth and 17 experts in technology (situation in the beginning of the year 2002). The aim of the programme is to incubate companies and to make a successful exit after a period of three years. A successful exit means either the founding of a new company, which is ready to cope on its own but still has a limited ownership, or a new public

company which is listed, e.g. in Helsinki Stock Exchange, HEX, and therefore is acknowledged.

Case A's products are knowledge and contacts, i.e. human and social capital. Its customer start-up companies have believable business plans, but they lack capital, and/or knowledge of managerial issues. As a mediator between ventures and capital, case A plays the role of catalyst. It's most important task is to generate venture capital funding for customer companies or generate fundable ventures for venture capitalists, it acts as a V2C operative[21]. Its secondary task is to give advice on economical, managerial and technological issues, i.e. act as business consultant. The core of the organisation plays an active role in solving problems.

Case A is built up as a virtual project. Its virtuality is perceived through its practices. The people in the core group of the company have permanent positions and established status. The advisory board is more flexible. The people in the core group work with each other whenever possible, as their tasks are partly similar. Most of the time, the core group is consumed by customer service. If a customer's problem cannot be solved by the person him/herself, s/he starts actively to seek a solution in the whole organisation. If the problem still remains unsolved, s/he refers the customer to an outside consultant, and thus out-sources problem-solving.

The advisory board is designated to help the core personnel in customer service and, at present, they are the primary source of knowledge on legal, managerial and technological matters. The advisory board plays a central role in evaluating new customer ventures and making contacts with investors. Advisory board members do not necessarily collaborate closely with the core personnel, but they are available if their special knowledge is needed. The use of the advisory board encourages organizational learning, as the core personnel is able to be "mentored" by the network of experts.

[21] Concept of V2C refers to venture-to-capital –activity. (for detailed description of phenomena around it and discussion on it see e.g. Rasila, Seppä and Hannula 2002, Jungman, Okkonen, Rasila, Seppä 2002 and Rasila and Okkonen 2003 or Jungman, Okkonen, Rasila, Seppä 2004.

By arranging the case A organisation in a virtual form, large economies of scope in comparative advantage are gained. The comparative advantage is based on and relative competence of the personnel throughout the organisation. Firstly, absolute competence is external and brought out by the fact that case A has more knowledge and information than its customers have; customership is thus based on asymmetrical knowledge. As the customers are not able to cope with their growth on their own, there is a market for case A competencies. Secondly, relative competence is internal and perceived in the positions of the personnel. Every member of the network has a substantial amount of knowledge in his/her field of expertise, but there is always a person who is more competent in other fields. By summing up all personal competencies, synergy emerges, thus giving the organisation its form.

3.2.1 Measurement system

The performance of case A could be viewed from two perspectives. Firstly, as a project it has explicit goals to achieve. Secondly, performance is the key factor to reach those goals, thus drivers for strategic goals should be defined. In very knowledge-intensive and customer-orientated cases, the role of personnel is emphasised. As case A is very dependent on its current stakeholders, performance should be measured by a performance measurement framework, which emphasises the perspective of the stakeholders.

The work in case A is very knowledge intensive, thus performance should also involve the competencies in the organisation. Especially, the competencies of the core group are a key success factor for the organisation. Competence evaluation should be part of the performance measurement system and it should be grounded on two premises. Firstly, the stakeholder perspective should articulate what the critical competencies for successful accomplishment are, i.e. the network should cover as large a proportion of different types of knowledge of business as possible. Secondly, competencies required must accumulate, thus performance evaluation should take organizational and personal learning

perspectives into account. Moreover, every person in the core group must have an opinion on personal strengths and weaknesses, and they should develop both.

By applying the Performance Prism in this case, the following steps were taken to accomplish the measurement system development process: The analysis of the organisation's current stage; stakeholder analysis contributing to the formulation of an action plan for the organisation and definition of the perspectives of the measurement system (cf. Balanced Scorecard); the definition of the critical success factors of each perspective; defining the measures of each success factor. As an iterative process, critical success factors and measures of the measurement system were defined as illustrated in Figure 16. The process reflected the one described in Table 6.

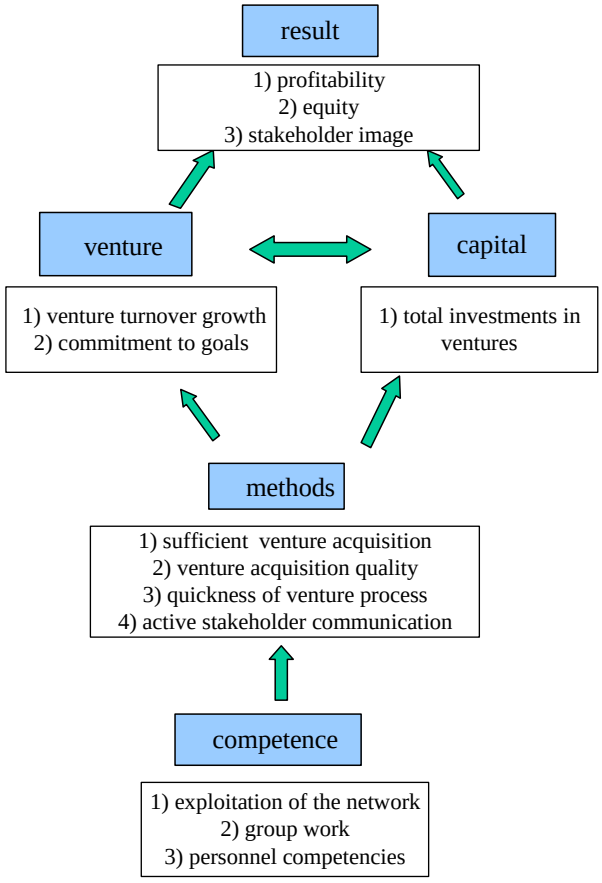

Figure 17 Perspectives of measurement and success factors in case A

The result perspective contains success factors derived directly from the vision. Profitability and equity accumulation represent the owners. Stakeholder image looks upon case A as a recognised actor in the field of venture capital. And moreover, as it is part of a larger programme, it is essential to have the status of a desirable partner.

The venture and capital perspectives are both customer perspectives, as mentioned above. There are two success factors for ventures. The ventures should grow, thus leading to growth in turnover. The second one is the company commitment to venture capital projects. Very often a project is a matter of mutual trust, thus a venture has at least to be committed to the project. The capital perspective is unambiguous, as it represents the trust of venture capitalists and thus also the quality of work done in case A.

The method perspective reflects the quality, effectiveness and efficiency of internal processes. This perspective covers the whole process. A sufficient amount of raw material is needed. As ventures require a great deal of preparatory work, venture acquisitions should also be fruitful. The process should be quick, as the spinoffs are eventually the key to earnings. In order to maintain a good image, communications are needed for quality acquisitions and capital, but also to keep other stakeholders informed about the state of case A.

The competence perspective represents the essence of case A as a whole. As it is partly a virtual organisation, the utilisation of the network is the key to performance, but instead of using outside consultants case A prefers to form partnerships. Group working is the device for knowledge sharing and organizational learning. It also emphasises the transformation of tacit knowledge. Personnel competencies are evaluated and developed, as they are a critical asset.

Most of the measures are easy to comprehend and the data generation is also easy. However, there are some measures which are abstract and need some explanation. Firstly, from the result perspective, the stakeholder image index is generated by a web-based inquiry form which evaluates both the external quality of case A as perceived by the

stakeholders and the degree to which it is known. As a good image is important in venture capital operations, and case A has goals set by the public sector, image is measured against result.

From the venture perspective, the commitment to mutual goals between venture and case A is evaluated by an evaluation form filled in by the personnel of case A. Points of evaluation are, e.g. How does the co-operation work? Is everything done in time? Have the bills been paid? Is there active participation in the process? Are there subjective feelings about the case? etc. The evaluation results in three possible outcomes: not committed, requires active action and committed. The results are for internal use, but the use of the results could be extended to the case, too.

The quality of acquisitions is evaluated from the perspective of set internal standards by which each offer is judged. On the other hand, the external measure of quality is the ratio of ventures that are funded by venture capitalists. The most abstract measure is the communications index, which is based on the matrix of stakeholders and communication activities. There is comprehension of what a sufficient level of stakeholder communications is and what the suitable media for each stakeholder group are.

The competence perspective measures emphasise the aspects of knowledge management, i.e. knowledge sharing, both individual and organizational learning and continuous improvement of competencies. The outsourcing ratio has a dual meaning. On the optimal level, there is enough critical knowledge at the core of case A, but the network is used for such knowledge accumulation as well as for maintaining the dynamics. Personal progress is evaluated on the basis of a mutual development plan. This plan is one of the topics of semi-annual personal discussions. Table 7 is a summary of the measurement system designed for case A.

Table 7 Measures for success factors in case A

Success factor	*Measure*
result	
Profitability	profit / employee
Equity	free own equity
Stakeholder image	stakeholder image index generated by an image inquiry
venture	
Venture turnover growth	turnover growth %
Commitment to goals	commitment index generated by an evaluation form
capital	
Total investments in ventures	€
methods	
Sufficient venture acquisition	number of ventures with business plan
Venture acquisition quality	number of offers of ventures meeting requirements
Quickness of venture process	%-ratio of ventures which did not gain capital in a certain period
Active stakeholder communications	number of communication actions (index)
competence	
Exploitation of the network	the rate of cases which are outsourced by less than X %
Groupworking	number of cases worked on by less than four people
Personnel competencies	the ratio of personnel who have met the set goals for internal and external education and training

3.2.2 Concluding remarks

The case A can be summarised in three points. Firstly, the public goals set for an organisation define the result perspective in addition to internal goals. Secondly, in this kind of unambiguous network, it is essential to set clear, ultimate goals and not mix them with secondary ones. And thirdly, knowledge work should be approached from the competency perspective, as the core personnel and network competencies are the keys to success. Network performance is a portal to organisational performance in the case of a virtual organisation. However, it is very difficult to measure each member of the network commensurably, thus network performance should be evaluated via results and internal

processes. As the learning and growth measurement applies only to the core group, it is not possible to use such management and motivation methods for others.

The case increased the understanding of the issue of knowledge work and it challenged preunderstanding on the issue. However, the development process itself was not a success, as the measurement system designed was not implemented. There are several reasons for the failure, yet the main reason was the resistance for development and anomalies in the management system. For the research project, the case still has great value, as it turned attention to several critical points as measurement in knowledge work context was concerned.

As an outcome of the performance measurement development process, measures and indicators for organisation were designed. From the perspective of knowledge work measures for exploitation of network, knowledge sharing and personnel competencies were taken into account. By taking managerial perspective when defining measures the organisation, especially the virtual part, was seen most difficult to manage. There were found only arbitrary possibilities to manage the advisory board, thus it was taken more or less for granted and the focus was on the core personnel. By focusing on the core, management actually gives responsibility of achievement to core personnel instead of the whole organisation.

In the case A **knowledge management** was one of the most critical factors. There are at least four reasons for this. Firstly, as competencies are essential they must be quantified and also developed. Secondly, there are large masses of explicit information on the to-be-customer and customer companies and venture capitalist involved in the business of case A, thus an effective information management system is required for personnel to cope. Thirdly, the amount of tacit knowledge is also vast. As core personnel, advisors and customers interact new ways to do things, new knowledge and ideas emerge. As transformation of such knowledge is somewhat problematic, it is important to increase

the proximity of people. And fourthly, the social capital, i.e. know-who and contacts, is not transferred explicitly thus there is need for co-operation to encourage networking.

There arose several **problematic points** in the discussions. Firstly, there are vast distinctions between tasks in the projects, thus management of those individuals is almost impossible. The responsibility of keeping up with one's work of the individual and thus management should be very close to every situation. This emphasises the notion of low hierarchy or no hierarchy at all; only separate tasks. Secondly, the distinction between the core personnel and the network was seen problematic. However, the network of the experts has support function to the whole organisation, thus if the organization is considered as whole, then the network should be seen complementing entity. Thirdly, according to project group the management of information and knowledge is difficult when competencies are differentiated, especially in virtual organisation, but efficient knowledge management was also seen as a key to success. Fourthly, sharing information and knowledge was considered as the main source of organisational and individual learning, but facilitating such a process was considered difficult. And fifthly, from the process perspective, the virtuality affects ambiguously, as it expands the sphere of knowledge and helps acquisitioning it. However, as the process itself is not clear, the contribution to process of core personnel, advisory board member or even customer cannot be unambiguously defined, thus optimal allocation of resources was seen difficult. The most important outcomes were concerning the form of the work on the individual level. The obscureness of processes, tasks and goals are considered somewhat distracting by both management and employees.

As **performance measurement and knowledge management** were used in juxtaposition, complementing each other, it is not easy to define which is which. The role of performance measurement in knowledge management context was to bring out metrics for critical knowledge management practices and, thus make intangible assets manageable. For performance measurement knowledge management is actually integrated part, as in the perspective of competencies both explicit and tacit knowledge were taken into ac-

count. Actually, the difference comes up only when the intentions for the use of performance measurement are examined. Only by asking, for example, why it is important to quantify and develop personal competencies, the answer reveals intention.

By setting up a **network,** it is possible to perform tasks, which were earlier unprofitable or impossible to perform. Virtuality seems to be a suitable way to organise knowledge work, because it is not very dependant on the spatial restrictions. However, taking the aspects of organisational learning it is almost critical to have at least some contacts with other employees. Virtuality challenges both managers and employees. Reflecting this notion to the operating environment of case A, attention is drawn to dynamics in economics. As operating environment is the stage of continuous change, the only solid base are the people in the organisation, thus the competencies of personnel, and in this case also advisor board, are the most valuable asset.

Performance and performance improvement are two of the central interests of business management. By adopting new organisational structures or new ways of practising business, organisations are able to generate revenue from new sources. However, networks are not easily put into formal organisational charts, nor apprehended. The context of knowledge work is complicated, because it is very abstract. Yet absolute and relative competence should be taken into account when organisation and knowledge workers are considered, for it is the key to understanding knowledge work. Organisational virtuality should be considered at least from two perspectives. Firstly, from the perspective of competencies and how competencies could be developed through organisational learning even in networks. And secondly, how knowledge is gathered and disseminated evenly in an organisation.

The comparative advantage is based on **absolute and relative competence** of the personnel throughout the organisation. Firstly, absolute competence is external and brought out by the fact that case A has more knowledge and information than its customers have; customership is thus based on asymmetrical knowledge. As the customers are not able to

cope with their growth on their own, there is a market for case A competencies. Secondly, relative competence is internal and perceived in the positions of the personnel. Every member of the network has a substantial amount of knowledge in the field of one's expertise, but there is always a person who is more competent in at least other fields. By summing up all personal competencies, synergy emerges, thus giving the organisation its form as network of personal competencies and contacts, and moreover network of organisational interaction.

The work in case A is very knowledge intensive, thus the competencies of the core group are a key success factor for the organisation. Competence evaluation should be part of the management system and it should be based on two premises. Firstly, the stakeholder perspective should articulate what the critical competencies for successful accomplishment are, i.e. the network should cover as large a proportion of different types of knowledge of business as possible. Secondly, competencies required must accumulate, thus competency evaluation should take organisational and personal learning perspectives into account. Moreover, every person in the core group must have an opinion on their personal strengths and weaknesses, and they should develop both. If personnel are able to recognise strengths and weaknesses the organisational ability to perform well is higher. In the eyes of both ventures and capital, the achievements of company are essential.

The **value of this case** is threefold. It was a test of the process model. The test was passed, as the process model contained sufficient components for developing measures. However, the process model itself needed iteration and further development in order to be more applicable in further cases. The nature of a contemporary work setting and knowledge work was discussed thoroughly in the case, thus it enlightened the nature of it and helped to see the essence of knowledge work in this setting. The case was an important lesson as a failure. The developed measurement system was not implemented, as there were some problems in the implementation phase. However, the case taught important lessons on organisational dynamics and change in organisation.

The designed measurement system was not implemented, because the ownership of the project was unclear. During the measurement development process the case A was sold and it changed the situation in the organisation. Primary reasons for the failure were: change in organisation, resistance to change in managerial system, contradictions in the project group and 'I know better' –mentality. The nature of the dysfunction should be approached through the primary reasons.

The first and most important reason was that the development process was started during the change process in the organisational structure. The change prevented functionality of the project group as there was a chronic lack of time. Also the obscureness in managerial responsibilities, lack of support from CEO and his absence had dramatic effect. However, there might have been a chance for successful implementation, if the suggested measurement system had been taken in test use, which never took place.

The second reason for failure was the resistance to change in the managerial system. The people in the organisation had been working in their work setting for sometime, thus seniority and habitual customs increased general resistance against implementing the measurement system. Moreover, the lack of goal orientatedness also had effect. The case A had no tradition of using different parameters, thus trying to implement a whole set of them was a difficult task from the start.

The third reason was that there were contradictions in the project group as some of the time was consumed on the comprehensive issues, such as the vision, even if there were explicit vision and strategy discussed in the beginning of the process. Moreover, as personnel in the project group represented different disciplines and body of experience, some time was also spent on picking on each other. This picking did not exactly improve necessary conditions for a successful development project.

The fourth reason was that there were changes in the project group too. Because the owner of the development process was changed, willingness to accomplish the measurement system was replaced with the 'I know better' –mentality. The person who took

over the development process was very experienced. Therefore new ideas concerning the measurement system were blocked and excused with long tradition of doing things differently. The reason for that was low practicality (see. 4.1.2.), as use of designed measures would have required more effort than the use of more traditional measures. Because active handling of the development process was lost, the failure in implementing reared its ugly head.

Lesson number one: When applying performance measurement the obstacles for process must be removed. Performance measurement development requires organisational maturity, yet it is applicable for implementing changed strategy. Moreover, as discussed above there are several things that might go wrong. The motivation for accomplishment is central contribution from each person taking part in the process, thus engagement is required.

3.3 Case B – weak market test passed

Case B is a Finnish university department with two duties, research and tuition. There are ca. 30 persons employed in the department, some of them are part-time teachers or researchers. To put the department in the context of the university, it is medium size department with three professors. The situation in the case B was different from case A, as the outlining of the organisation was very clear. As universities are state organisation, organising tasks unequivocally is a certain form of art. The organisation has distinctive features of bureaucracy, yet it is conscious as it seems to be only way to operate the entire of university with diminishing risk of errors[22]

[22] In this case errors of course do happen, yet bureaucracy enables corrective mechanisms such as responsibility and control over the tasks are divided in a suitable way. It could be stated that university is an archetype of a modern bureaucracy.

In Finland debate on different roles of universities and especially the results of those roles has been active since the early 1990's. Demand for good results and performance emerged at the same time. Universities have dual role. First one is to educate students to meet requirements of surrounding society. The second is to perform research. As a university has several stakeholders, such as the state, staff, students, employers etc., the opinions of good performance vary significantly. Measuring performance in academic context is considered difficult. For example, in Finnish universities results are evaluated by using quite mechanic result evaluation system that is used by the state to allocate financial resources to universities. The system is considered an insufficient way to approach the complex phenomena of academic performance. In the university where case B is, a little more sophisticated a result point system is applied. The result point system used in case B makes different outputs commensurable. However, as evaluation of academic output is the problem of counting apples and oranges, it requires drastic simplification to make it possible to compare different outputs. In the performance measurement system developed for case B, the result point –system was the premise of measurement as the perspective of output was derived from the system of result points.

3.3.1 Measurement system

Performance measurement system was developed along the strategy process of case B, therefore Performance Prism was applied as an analytical tool. The main phases were conducted according to the process model. Firstly, the analysis of the organisation's current stage was conducted to set objectives and resources in context. Secondly, stakeholder analysis contributing to the formulation of an action plan for the organisation and definition of the perspectives of the measurement system was conducted after formulation of an explicit strategy. Thirdly, the definition of the critical success factors of each perspective. Fourthly, defining the measures of each success factor. As an iterative process, critical success factors and measures of the measurement system were defined as illustrated in Figure 18. Fifthly, the system was implemented by defining the necessary conditions for measurement.

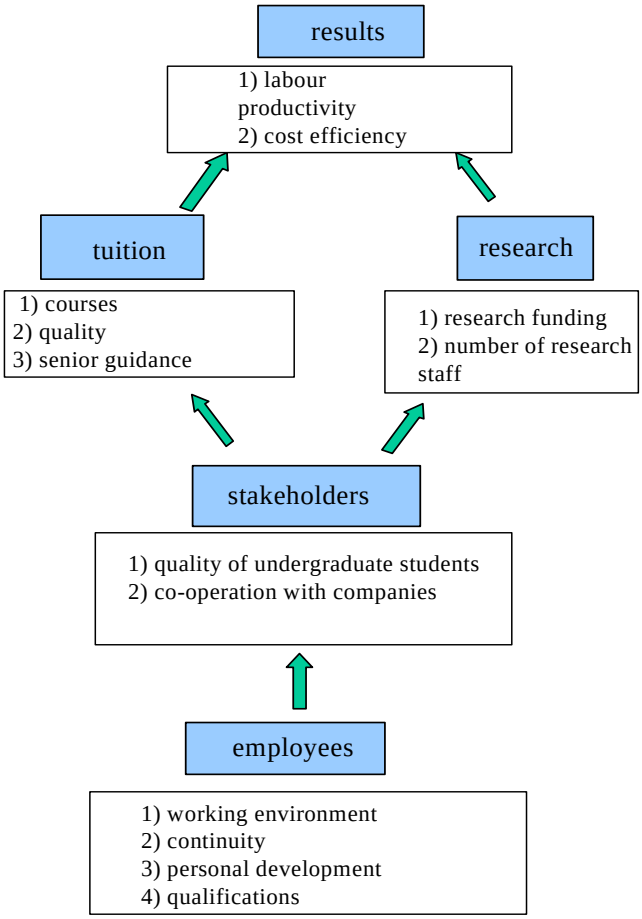

Figure 18 Perspectives of measurement and success factors in case B

The measurement system is presented in Table 8.The perspective of results is the operationalisation of the available result point system. Because case B operates in the field of human sciences, the physical assets are not so important for performance. Therefore critical success factors in the result perspective are labour productivity and efficiency. Labour productivity is measured by the ratio of the total number of result points and number of labour years. Cost efficiency is measured by average cost per result point, i.e. taking the sum of yearly funding and dividing it by total result points.

The perspective of tuition consists of critical success factors considering one of two main tasks of case B. Critical success factors are courses, quality of tuition and senior guidance for graduate thesis. The first success factor is measured by the number of credit points of courses available for students. The second success factor is the quality of tuition. It is measured by a course feedback system, which is part of services aimed at developing tuition in the university. The measure is the average of student feedback for each course. The third success factor is senior guidance for graduate thesis. This is also quality measure and it is aimed at those leaving academia. It is measured by the average of student feedback collected during the process of graduation. The fourth success factor is the progress of post-graduate studies, which is measured by credits per post-graduate students per year. Because post-graduate studies are tailored and differ widely by each case, usually the only progress of them is practically measurable.

The second main task of case B is to conduct research. Success factors for research are outside funding and research staff. These success factors are enablers of conducting research, as results and quality are evaluated in academic criteria and reflected in result points. The first success factor is outside funding for research, which is measured by the proportion of total budget. The second success factor in this perspective is the number of research staff measured by the ratio of labour years of research staff and total labour years. This measure is raised from the notion that research is necessary condition for tuition, thus both are needed. However, tuition is public task for academic units and its resources come from the basic funding of universities.

In the perspective of the stakeholders, two main stakeholder groups for case B were considered. Success factors in this perspective are high quality of undergraduate students and co-operation with companies. The high quality of undergraduate students is measured by the ranking of the education programme in entrance exam points. There are statistics at university level where desirability of every training programme is ranked by how the entered students meet the academic criteria set. Co-operation with companies is measured by the ratio of private funding and total budget. This is a certain soundness

test for research projects, i.e. only those programs have practical value which outside organisations are also willing to fund. Of course this covers only applied studies, basic research was considered in the research perspective.

The perspective of employees was emphasised in case B as the competencies of personnel are key assets. The success factors in this perspective are working environment, continuity, skill, goal orientationess, personal development and competence, and qualifications. The measure for working environment is the working environment index as a result of working environment survey (see Appendix 5 for details). Continuity is measured by staff turnover percent, i.e. how much competence leaves the organisation annually. Most of the leadership orientated success factors were skills, goal orientationess, personal development and competence which is measured by the ratio of personnel who have met the targets set in semi-annual employee – supervisor –discussion. Qualifications of personnel is the measured education of the staff, i.e. what is the ratio of persons with or without a graduate degree and what is the ratio of persons with post-graduate degree. Table 8 is a summary of measurement system implemented in case B.

Table 8 Measures for success factors in case B

Success factor	***Measure***
Results	
Labour productivity	Results points /number of labour years
Efficiency	Average cost per result point
Tuition	
Courses held	Number of credits from lectured courses
Quality of tuition	Average of student feedback (1-5)
Senior guidance for graduate thesis	Average of student feedback (1-5) credits per post-graduate students per year
Research	
Outside funding	percentage for total budget
Number of research Staff	Labour years of research staff / total labour years
Stakeholders	
High quality of undergraduate students	Ranking of the program in entrance exam points
Co-operation with companies	Private funding/ total budget
Employees	
Working environment	Results of working environment survey (1-5)
Continuity	Staff turnover %
Skills / goal orientationess / personal development/ competence	the ratio of personnel who have met the set in semi-annual employee – supervisor - discussion
Qualifications	education of the staff

3.3.2 Concluding remarks

Case B could be concluded with the first notion of development in the methods of designing the measures and also increasing understanding on the issue of knowledge work. In this case some problematic issues in the development process were avoided as case A had taught some important lessons. Moreover, case B represented knowledge work in its pure form. Work consisted of the process of gathering data and information, processing it, and communicating the result of abstract cognitive process – an archetype of symbol analysis.

Taking the case from **practical perspective,** implementation process was successful, thus the weak market test was approved (see 4.1.2. for more precise definition of testing results of constructive research). As the measurement system was implemented, it was possible to also evaluate factors affecting the implementation process and designed uses of performance measurement.

Implementation was relatively easy as bureaucracy and the infrastructure of university enable implementation of the measurement system. Because of the bureaucracy, lots of data is already gathered, thus it was easy to define suitable data source. Utilising existing data sources also advance implementation, because the actual measurement requires less effort. The act of measuring is not a central item, but analysing the results is. As the structure of university is kept simple, the measurement system is easily comprehended and put into action. In the case the organisation is relatively flat, thus measures were easily implemented through the organisation. Because of the flatness, also personal contributions to results were easily comprehended, thus the measurement system was only an extension of existing arbitrary analysis on such matters.

There were **three uses for performance measurement**. It was used for implementing strategy as measures were defined along the strategy process. This is important purpose of use when tasks are differentiated or an organisation is large enough to have a lack of everyday interaction between managers and employees. Performance measurement en-

ables communication on strategic issues and makes strategic issues apparent (cf. the rationales of performance measurement). Performance measurement had an important role in motivating the employees. Motivation is done by setting goals, giving meaning and content to everyday work, and showing that management is interested in employees and the issues considering organisation that are mutually agreed. Thirdly, performance measurement is applicable to help workers to develop their competencies as achieving results is controlled. Moreover, the employee perspective is in focus, since it pays attention to competency development and competence accumulation. Competence accumulation is approached from the view of standardised skills (i.e. academic qualifications) and utilising achieved competencies. As attention is also paid to working environment, the measurement system emphasises the role of discourse in organisation. Working environment survey is a channel for giving and receiving feedback on issues considering operative level.

Lesson number two: The most important lesson learned from this case was KISS (an abbreviation for **k**eep **i**t **s**imple **s**tupid –principle). Because the work in an academic context is often quite abstract analysis of symbols and most of the work is done individually or in loose teams, the official organisation, i.e. the department, is only a frame for work. Taking this into account, the managerial system must also be non-distracting. In the academic context it is important to allow freedom, but also give feedback. The measurement system reflects the values of case B, i.e. the set of desirable matters and therefore measurement has the role of controlling the realisation of them.

3.4 Case C – conceptualising the system

Case C is an IT service provider whose services include software development, consulting and training. Customer projects range from large-scale system concepts to typically smaller subcontracting projects. The cornerstone operations are technological expertise

in Java and telecommunications. Case C has always been a forerunner in applying the latest Java technologies and software development methods. In the case the importance of continuous learning as well as internal research and development is emphasised. Case C has been able to release several innovative products to enhance the profitability, faultlessness, and maintainability of software development. The company was established in 1996 to provide high-quality software solutions for customers in the telecommunication business. Case C employs almost 60 professionals with university degrees, thus it could be stated that it is a very knowledge intensive company.

Case C is owned by its personnel. The main shareholders are also members of the board. Throughout its operation history, case C has been a profitable company and it has been able to finance its growth and product development solely on cash flow. Case C is a dynamic and growing company looking for new business areas to expand to and recruiting new talented professionals to make the success story go on. Case C customers are typically leading-edge companies with high quality requirements and needing a reliable long-term partner with profound competence in technologies and software development methods.

The scale of services that case C provides varies from large system concepts to typically smaller subcontracting projects. The roles of case C include subcontracting projects in which the main part of the work consists of design, implementation, and testing. Developing large system concepts involves the specification and design phases, as well as the implementation, testing, installation, and - optionally - end user training and know-how transfer to the customer. In large-scale projects, case C has a role to be the integrator and coordinator that take responsibility for the integration and testing of the entire system, and to coordinate and manage the work flow between other vendors and subcontractors.

3.4.1 Measurement system

The performance measurement system was developed along the strategy updating process in case C, but as there was an existing strategy it was possible to quite straightforwardly apply the Balanced Scorecard –framework. The reason for choosing this framework was the framework's tested suitability for use in for-profit organisation with clearly defined major stakeholders. In case C the major stakeholders are the owners, customers and personnel. During the reviewing of the strategy different perspectives were discussed, yet the ones of Balanced Scorecard were found most appropriate.

The main phases of development were conducted according to process model. The analysis of the organisation's current stage and revising strategy was conducted to set and discuss the objectives. Taking the strategy of a growing company, the economic perspective dictated the strategic objectives. In other perspectives the main drivers for such achievements were considered. Figure 19 illustrates the outline of measurement system. The system was implemented in the same manner as was done in the case B.

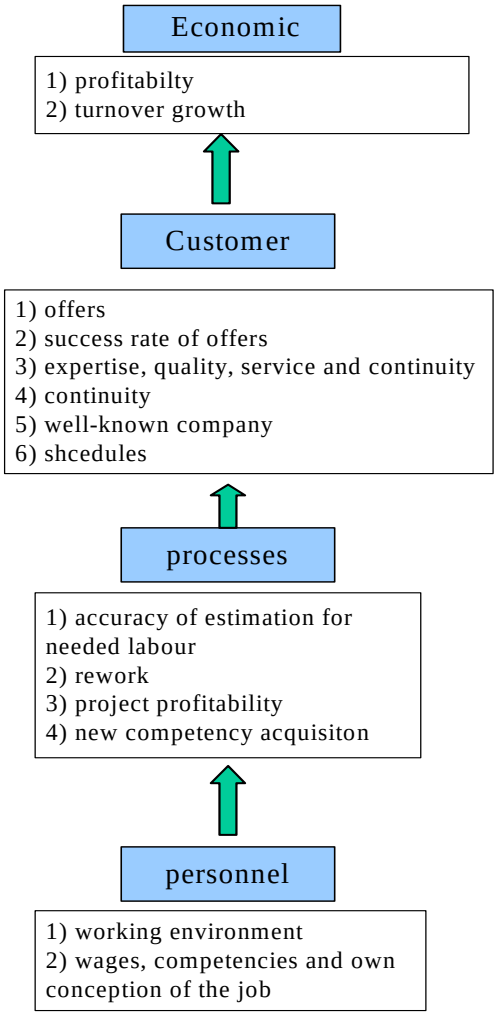

Figure 19 Perspectives of measurement and success factors in case C

As stated above, the measurement system was built on the emphasis of profitable growth. The economic perspective consists of components of it, i.e. profitability and turnover growth. Profitability is measured by business profit and turnover growth by growth percent. These success factors and measures are self-evident operationalisations of the most important strategic objectives of a growing company (see Table 9).

In the customer perspective, the dynamics of industry are taken into account as companies are in constant competition. Because turnover growth is the target, it is achieved by doing business. The number of offers is measured by the volume of offers submitted, as there is certain turnover volume to be achieved. Volume of offers guides personnel in

charge of sales. Also the success rate of offers is critical to turnover growth. It is measured by the ratio of succeed offers and total volume of offers. Because case C operates in the field of software development, consulting and training, expertise, quality, service and continuity are measured by collecting customer feedback. The customer perception of service is essential to maintain customership. Continuity of customership is measured by orders from old customers per total volume of orders. As many projects are sold to new customers, a well-known company, i.e. good and widely recognised image, is important. Well-knowness is measured by the number of relevant stories in professional magazines. As the successful completion of customer project also includes in time delivery, schedules are measured by the ratio of the number of projects completed on time and all projects. The customer perspective somewhat revealed the wretched nature of IT industry, yet it emphasises the meaning of customer. Success in this perspective should result in growth.

The perspective of processes approaches the successful operations from a different angle. One might suggest that this one is more profitability orientated. Accuracy of estimation for needed labour for each project is measured by ratio of projects deviating over 10 percent and all projects. This is an important measure for resource planning, i.e. it is measure for proficiency of project managers too. Re-work hours refer to quality, i.e. how much time is consumed on correcting mistakes. It is measured by the ratio of time spent on re-work and total working hours. Project profitability is the driver for overall profitability. From the standpoint of successful project work new skills are important. In a process perspective new competency acquisition is measured by the ratio of the number of new skills and the number of employees. This is somewhat mechanical, yet it encourages competency accumulation.

As personnel are the main asset in case C, the perspective of learning and growth in Balanced Scorecard was specified as the personnel perspective. The success factor of new competencies would have suited here, too. In this perspective the working environment is measured on the company level and each employee is evaluated on a personal level.

Working environment is measured by a working environment survey similar to case B. The actual measure is the average of all respondents. The second success factor is the wages, competencies and own conception of the job, which is measured by management and measurement is based on subjective analysis done in semi-annual development discussions. In this perspective, subjectivity of individual performance is concerned, as success factors are issues of self and seldom measurable on aggregate level.

Table 9 Measures for success factors in case C

Success factor	***Measure***
Economic	
Profitability	business profit
Turnover growth	growth %
Customer	
Offers	volume of offers
Success rate of offers	succeeded offers/ total volume of offers
Expertise, quality, service and continuity	customer feedback index
Continuity	orders from old customers per total volume
Well-known company	number of relevant stories in professional magazines
Schedules	number of projects completed on time/ all projects
Processes	
Accuracy of estimation for needed labour	projects deviating over 10 %/ all projects
Rework	hours spend on rework / total working hours
Project profitability	(invoice cost - wages)/invoice cost
New competency acquisition	number of new skills /number of employees
Personnel	
Working environment	results of working environment survey
Wages, competencies and own conception of the job	subjective analysis from semi-annual discussion

3.4.2 Concluding remarks

Case C operates in a clearly defined niche as it is a for-profit organisation in a competitive environment. Case employed straightforwardly Balanced Scorecard –framework as it was the apparent solution. However, the content of work is complex, thus it was comprehended by taking the process nature of workflow as denominator of success factors.

Case C brought up the issue of **connection to reward system** in an organisation. The topic was discussed, but no connection was established as there is a certain bonus scheme already that connects the economical success to reward system. In addition to bonus scheme, case is owned by its employees, thus there is already a mechanism for the rewarding of good performance.

Lesson number three: Organisational differences and nature of tasks affect the measurement. In a definite case it is possible to measure unequivocal goals by undisputable measures. As all operations were designed for creating value for owners, also the driving success factors were subordinate to that. Even if the ultimate goal of an organisation is clear, it is not necessarily the case with drivers. Those can also be abstract, and therefore they need additional consideration.

3.5 Case D – applying the lessons learned

Case D is a semi-public company. The main task for it is to manage several programs of technological development and also to manage a large body of real-estate. Case D promotes the development of both beginning and existing high-tech companies. The company produces different services, operations and co-operation concepts for the utilisation of knowledge, expertise and technology in its operating region. It is in charge of the development and administration of a technology centre, a 3000-person concentration of

expertise with 100 000 m² of office space. That technology centre is a home to 150 companies and research organisations.

Case D develops regional expertise and promotes networking and co-operation between companies, education and research. It also boosts the high-tech companies into growth. The Centre of Expertise Programme and the various projects related to it support the development of the competitiveness of companies operating in the operating region of case D. All the development efforts of case D are future oriented and strictly in accordance with the needs of local enterprises.

3.5.1 Measurement system

In case D issues concerning strategic planning were well internalised and there was a tradition of formulation of strategies. Performance measurement development process was done along revising strategy similarly to case C. The idea of performance measurement was grounded on the premises of case D. As the main task is dual, i.e. to develop operating environment of technology centre and maintain certain services, the case lies between for-profit and not-for-profit organisation. The duality does not make strategy formulation nor performance measurement any easier as there are several primary stakeholders, even with conflicting needs. However, since there were no strong tendencies of change, the strategy formulation was easy. The strategy was not crystal clear and some objectives were very general and sensitive to several uncontrollable factors. The aim for measurement was to develop measures according to strategic objectives and finding out what are the drivers of performance in the case.

The main phases of measurement system development were conducted according to process model. Because the revising strategy was an integral part of the measurement design process, it could be stated that these two things were done simultaneously. As case D is a public operator, the measurement system emphasises the general effectiveness of its activities. In other perspectives, the enablers of the active role in regional in-

dustrial policy were considered. Figure 20 illustrates the outline of measurement system. System was implemented by the same manner as was done in the cases B and C.

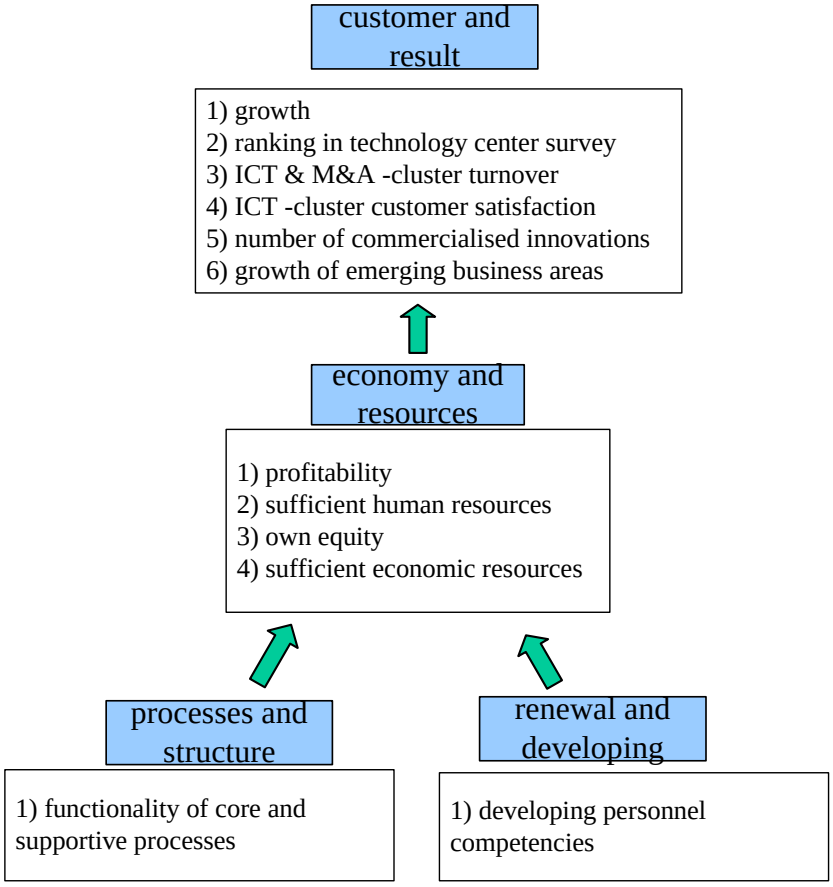

Figure 20 Perspectives of measurement and success factors in case D

The perspective of customer and result gathers up the issues of effectiveness of case D, i.e. how does its actions affect regionally and how its customers or stakeholders gain benefit. Firstly, the success factor of growth is measured by the growth in the area of office space in the technology centre. Measuring growth differently is indistinct for case D. Moreover, growth of space is a matter the case D can affect. The success as desirable environment, say the ranking in technology centre survey is measured by the ranking in national technology centre survey. As the goal is to affect regionally, the evolution of ICT-cluster and machinery and automation-cluster turnover is the central issue. It is measured by turnover growth percent of those regional clusters. The technology centre is

home for ICT-companies and the aim is to inveigle new companies to centre, ICT-cluster customer satisfaction is measured by customer satisfaction survey. Moreover, as the sight of technology centre is in the future, new opportunities are in focus. The number of commercialised innovations is measured by the number of commercial innovations in a year as indicator of evolution. Growth of emerging business areas is measured by turnover growth percent. The perspective of effectiveness contains a certain amount of serendipity, yet if case D puts effort in developing the environment, something will eventually happen.

The perspective of economy and resources concentrates on enablers of effectiveness, moreover it emphasises the role of case D as a regional operator. Because case D is a semi-public company, it must take into account economical restraint i.e. it must have vision of continuity by being profitable or at least to make zero profit. Profitability is measured by operating profit. The tasks are differentiated (cf. case B), therefore resource planning is not considered easy (cf. case C). However, there must be sufficient human resources in order to maintain functionality and reliability. Therefore strenuousness is measured by BBI-index, which is based on survey conducted by occupational health care. Own equity is a success factor because case D develops the environment of the technology centre by building new office space. Free own equity is measured by percentage of it. Sufficient economic resources as a success factor refer to the ability to maintain different activities and start new regional development projects. Sufficient economic resources are measured by current ratio and internal interest rate.

The perspectives of processes and structure, and renewal and developing are perspectives of organisational and personal competency. Functionality of core and supportive processes is essential for performing different tasks set for case D. As organisation has been in a phase of evolution, there is need to develop processes, too. This development is measured by the percentage of processes documented. The measure is a control measure set to ensure that possible gaps and debilities are taken on development agenda. Case D is also very people centric organisation, thus performance is a matter of personnel

competencies. Development of personnel competencies is measured by the realisation ratio of personal development plans. This is a case sensitive measure, as measurement is done by managers in semi annual development discussions. Moreover, managers are also encouraged to go through those discussions as measure is defined as a product of percentage achieved the set goals and percentage of persons who have had the discussion.

Table 10 Measures for success factors in case D

Success factor	***Measure***
Customer and result	
Growth	growth measured in m2
Ranking in technology centre survey	ranking in national survey
ICT & M&A -cluster turnover	turnover growth %
ICT -cluster customer satisfaction	customer satisfaction index
Number of commercialised innovations	number of commercial innovations/year
Growth of emerging business areas	turnover growth %
Economy and resources	
Profitability	profit
Sufficient human resources	BBI-index
Own equity	free own equity %
Sufficient economic resources	current ratio
Sufficient economic resources	internal interest rate
Processes and structure	
Functionality of core and supportive processes	% of processes documented
Renewal and developing	
developing personnel competencies	realisation of personal development

3.5.2 Concluding remarks

Case D was the most challenging, as the strategic goals were general by their nature and causal relations between actions by case D and realisation of goals were only indicative. Causality is indicative, because there are several intervening factors which case D is effete to overcome. As the **tribulations** were recognised the measurement system was designed for measuring the results, but concentrating on the enablers. Those enablers were resources, processes and competencies. In knowledge work context enablers are attached to personnel, thus the measurement system takes those into account also on strategic level.

In case D the **connection to a reward system** was established, as there was need to promote rewarding on achieving strategic goals, but also rewarding on doing things right and achieving certain levels on enablers. The issue of connecting the rewarding scheme and performance measurement is interesting, but out of the scope of this study. In this study the connection, its functionality, and other issues are taken for granted.

Lesson number four: Keep the focus on the strategy during the measurement system development process. In this case strategic objectives were discussed through the actual doing, i.e. how does the organisation work and what factors enable performance.

3.6 Knowledge work related measures in action

The four cases described above were used for studying the knowledge work, measurement system development process, and performance measurement in that context. This part concentrates on the issue of using performance measurement in knowledge worker management. The measures are comprehension of situation in each organisation. The knowledge work was conceptualised through the success factors, but as discussed above,

the goal oriented[23] measurement system takes strategic objectives as primary and enablers of those goals as secondary matters. The enablers of doing work in the organisation were discussed thoroughly. Table 11 collects knowledge work related measures together arranged by the cases. Of course all measures in the cases are related to knowledge work as they are designed for knowledge work organisation, but these measures are aimed to help managers to manage knowledge workers or to conceptualise the issue of knowledge worker performance in each case.

Table 11 Knowledge work related success factors and measures

Success factor	***Measure***
Quickness of venture process	%-ratio of ventures which did not gain capital in a certain period
Active stakeholder communications	number of communication actions (index)
Exploitation of the network	the rate of cases which are outsourced by less than X %
Group-working	number of cases worked on by less than four people
Personnel competencies	the ratio of personnel who have met the set goals for internal and external education and training
Success factor	***Measure***
Quality of tuition	average of student feedback (1-5)
Working environment	results of working environment survey
Continuity	staff turnover %
Skills / goal orientationess / personal development/ competence	realisation of personal development
Qualifications	education of the staff
Success factor	***Measure***
Expertise, quality, service and continuity	customer feedback index
Well-known company	number of relevant stories in professional magazines

[23] In this dissertation goal orientated refers to intentional activity with certain objective. The term does not have positive or negative connotation, i.e. it refers only to intentionality.

New competency acquisition	number of new skills /number of employees
schedules	number of projects completed on time/ all projects
Working environment	results of working environment survey
Wages, competencies and own conception of the job	subjective analysis from semi-annual discussion
Success factor	***Measure***
Ranking in technology centre survey	ranking in national survey
Sufficient human resources	BBI-index
Functionality of core and supportive processes	% of processes documented
Developing personnel competencies	realisation of personal development

The success factors and measures are manifestations of certain organisational fact; therefore they are interpretations of people who know the organisation. However, knowledge work related success factors and measures are the domain of a certain part of organisational or individual performance (cf. Figure 16). In order to analyse knowledge worker performance a re-arranging of measures is required**.** Re-arranging is done due to phenomena success factors are attached to. Those phenomena are productivity, quality, stakeholders, processes, resources, and competencies. This grouping is based on knowledge worker performance criteria described in 2.4.1. The grouping reflects both researchers' notions and information acquired during the processes in the cases. Moreover, the grouping is based on triangulation in and between the cases. The aim for using this kind of grouping is to set a framework for analysis.

Performance measurement can be categorised according to explicitness and tacitness of intentions. In the perspectives of results, intentions are explicit, as strategic objective has rationale that is derived from explicit strategy. It does not exclude possibility of conflict between management and personnel, but at least the intentions are said out aloud. In the perspectives that consider processes or actual doing of the work, intentions are somewhat tacit, yet there are explicit intentions too. Usually the objectives are clear, but the motives of management can differ. In the perspectives of enablers, i.e. perspectives resources and competencies, the tasks and objectives are ambiguous. Due to the ambigu-

ousness, management can seldom set explicit and fully covering objectives, therefore a possibility to conflict between explicit and tacit intentions exists. The conflict does not necessary cause any distraction, but as there are different readings on objective and intentions the risk of distraction remains.

Productivity and quality are in strong interconnection (Table 12). Taking into account the performance criteria, there were several measures for knowledge worker productivity. In case A the effectiveness of knowledge workers were measured by the actual percentage of failures. This measure emphasises both productivity and personnel's ability to conduct work. In case B quality is measured by feedback, yet there are other quality criteria as well. In the result point system different outputs are evaluated, thus it is primary productivity measure, but it also takes quality into account by weighing different outputs by their academic relevance. In case C the quality is part of customer satisfaction and it is measured in customer feedback survey. In case D quality is measured in similar manner to case C. Productivity and quality measures are explicit goal measures, therefore the operationalisation, i.e. the correspondence of explicit and tacit intentions is high. However, the interpretation of measures requires some effort.

Table 12 Measures related to productivity and quality

productivity and quality	
Success factor	***Measure***
Quickness of venture process	%-ratio of ventures which did not gain capital in a certain period
Quality of tuition	average of student feedback (1-5)
Expertise, quality, service and continuity	customer feedback index
Ranking in technology centre survey	ranking in national survey

Measuring stakeholder related issues (Table 13) is important in knowledge work, as there is need to promote absolute competence. As absolute competence is the key to customer ship, knowledge workers and organisation need a way to communicate what competencies are possessed. Stakeholder related measures are unambiguous as they repre-

sent mutually agreed conception of building positive image. In case A active stakeholder communications are used for promotional purposes. In case C the dynamic operating environment challenges absolute competence, therefore keeping organisational image as a competent one there is need for active communications. In the case C the best way to promote the company is to have a positive image on technological and process know-how. These measures and success factors are also coherent, as measures are easily comprehended as operationalisations of a success factor.

Table 13 Measures related to stakeholders

Stakeholders	
Success factor	***Measure***
Active stakeholder communications	number of communication actions (index)
Well-known company	number of relevant articles in professional magazines

In knowledge work context, certain processes or schemes of doing are interesting questions, which require more detailed discussion (Table 14). The role of processes is ambivalent as the idea of knowledge work emphasises freedom and creativity, but efficiency requires structure and rules (cf. manageability gap). The process approach to knowledge work has its value as interpersonal dependency and teamwork are used in tasks. Taking group-working as a typical setting to perform a task, such as in case A, the process is structured by completing one phase of a task and transiting it to another person. By measuring the number of cases worked on by less than four people, the measure emphasises the optimal size of a team. In case C schedules are important as workflow consists of different projects, therefore measuring the number of projects that are completed on time suggests the notion of control over time spent on projects.

In case D measuring the functionality of core and supportive processes raises the notion of need for structure of the work. By documenting processes certain quality criteria of

orthodox performing are created and employees are guided to adapt those practises. This might cause a conflict between explicit and tacit intentions, because documentation sort of denudes employees of the power to decide how to work. Explicit intention is to document processes in order to find good ways to act and help people to see the essence of their work. Tacitly it might also be aimed to increase efficiency, which can be objected by employees.

Table 14 Measures related to process

processes	
Success factor	***Measure***
Group-working	number of cases worked on by less than four people
Schedules	number of projects completed on time/ all projects
Functionality of core and supportive processes	% of processes documented

If performance enhancement is considered, the role of developing processes is a critical point. Process innovations[24] are needed e.g. for creating standards or doing things smarter. In cases C and D the process approach consider partly planning efficient ways to conduct task. Moreover, in the case of software industry some rules are needed for enabling continuous development of products.

In knowledge work context resources usually refer to human resources (Table 15). In the cases, resources were considered from the perspectives of combining different competencies and strenuousness of work. Competence approach emphasises the power of group working. It enables division of duties between individuals, larger body of knowl-

[24] In knowledge work context process innovation is a meta-innovation as it changes the way tasks are conducted, but does not necessarily add value to a customer or stakeholders. Real innovations in knowledge work refer to actual use of expertise to solve a problem.

edge for each customer, and support from a peer group. As a way to organise work of experts in this manner management poses a wish of collegiality.

Table 15 Measures related to resources

Resources	
Success factor	***Measure***
Group-working	number of cases worked on by less than four people
Working environment	results of working environment analysis
Sufficient human resources	BBI-index

Another perspective on resources is taken when employees are giving feedback to management via working environment survey or analysis of work strain. The results of working environment analysis or strenuousness analysis are such feedback. These both rely on subjective analysis by employees. By using such a method it is possible to collect information on an organisation level, which encourages personnel to reply. Moreover, if the results are used in the right way management gives the signal of caring to personnel. If people reply to survey in bona fide and management does not take results into account, there is a risk of decreased performance due to the wrong signal from managers. Subjective measurement includes a risk of conflict between explicit and tacit intention. Explicitly, organising feedback channel is intention of dialogue. Tacitly, such a channel can be used for justifying management's current way to act. This also raises a notion of happiness. One might claim that happy hens lay more and better eggs. It is a source of conflict if it is not said aloud. If there is mutual agreement that there is need for a certain level of job satisfaction to enable motivation to perform tasks or stay in position, it should not be an issue.

The measures aimed for performance enhancement by focusing on competencies were considered key measures in knowledge work context (Table 16). Measures incorporate indirect and direct ones. The range of indirect competency measures is large. Group-working is measure aimed to control learning by doing or learning in group or from peers. That refers to tacit knowledge, i.e. the process of transferring tacit knowledge by proximity of individuals. Continuity, as measured by personnel turnover, has the same background, yet it is for seeing if competencies are lost. In case B qualification was measured by education of the staff. It makes sense in academic context, as many academic activities are connected to possession of certain academic degree.

Direct competency measures were actually measures of competency development. In every case such measurement was arranged in uniform manner, i.e. personal achievement was controlled. Target setting for development was derived from development discussions, thus sensitivity for individual differences is maintained. By adapting the idea of management by objectives, such measurement is possible, as it requires organisational dialogue between employees and management. The cases suggest that subjective measurement of personal development is a somewhat easy way to measure development of competencies and it is the central element of knowledge worker management. However, using such a method management should be aware of what are the critical competencies to develop.

Competency accumulation is also a way of performance enhancement. In the cases of this study, the value of competencies in work was indisputable, therefore competencies should accumulate. Competency accumulation is conducted by increasing proximity between individuals and active development of personnel. Measurement and knowledge enhancing activities meet as achieving development goals are controlled. This benefits both employees and managers. For employees, controlling is a way to point out personal development. For managers, controlling is a way to collect data for supporting the managerial work.

Table 16 Measures related to competencies

Competencies	
Success factor	***Measure***
Groupworking	number of cases worked on by less than four people
Personnel competencies	the ratio of personnel who have met the set goals for internal and external education and training
Continuity	Staff turnover %
Skills / focussedness / personal development/ competence	realisation of personal development
Qualifications	education of the staff
New competency acquisition	number of new skills /number of employees
Wages, competencies and own conception of the job	subjective analysis from semi-annual discussion
Developing personnel competencies	realisation of personal development

4 Evaluation of measurement systems

This chapter evaluates the results of the cases. Evaluation is done on the level of measurement system and on the level of measures. On the level of measurement system the structure of systems is one of most important factors for functionality of a measurement system. As measurement systems are compared, the idea of suitability is discussed. On the level of measures, the criteria of sound measurement are discussed. Attention is also paid to validation of measures. Moreover, ethical issues considering the process are discussed.

4.1.1 Systems built in cases

Basic text-book model of a performance measurement system, the Balanced Scorecard, is directly applicable in cases of for-profit organisations. In the cases of public or not-for profit organisations the measurement system must be tailored according to central issues and stakeholders. In these cases Performance Prism was a more applicable framework, as it requires more analysis on different stakeholder groups, and actually includes the process of strategic planning. In all cases the goal is to develop a performance measurement system with ***n*** perspectives and ***x*** measures in each. As the measurement system is tailored for each case, the objective of a development process is to construct an expedient system for a set of certain tasks.

Selected perspectives in the performance measurement system are a rough generalisation of important issues on performance as explained by several studies of performance measurement. Cases A, B and D employed Performance Prism framework, as it requires more comprehensive analysis on stakeholders and other strategic issues. Case C employed almost straightforwardly Balances Scorecard, as it served its purpose well in for-profit organisation.

When using either framework, the key is building an appropriate success or strategy map linking measures and describing expected causal relations of organisational performance and the specific objectives the organisations is trying to achieve. In practice, either tool can be used to develop such a map. Performance Prism provides an easier and more comprehensive way of building such maps, as it reflects all stakeholders and the processes and capabilities required. However, it has been possible to modify the Balanced Scorecard to make it suit organisations unique criteria. It is to understanding of the causal relationships that a better understanding of performance in composed.

Every measurement system is built to emphasise the expected causality, i.e. how certain competencies or processes help in achieving strategic goals. Moreover, the names of perspectives are trivial, but useful as the measurement system is used in communication. In order to be informative also names of perspectives need attention.

Success factors and measures are issues of strategic management. Therefore the number of them should be kept reasonable, i.e. the measurement system should be understandable. In practice it means that on each organisation level there should be more than one but less than about twenty measures. In all cases there were explicit results, which measured outcomes. Also, attention was paid to critical issues concerning performance with customers or object of service. In cases B, C and D quality was also set among critical factors. As case organisations were chosen among knowledge intensive ones, it was obvious that competencies and competency accumulation and development were among critical success factors. As the cases showed that it is quite difficult to measure what is and happens inside persons' head, the cases employed more subjective approach to competencies.

As discussed above, the interpretation of explicit and tacit intentions helps to analyse coherence of performance measurement system. Usually, the results and success factors, related to results, are easily operationalised as there is a long tradition of measurement in this branch. The more abstract the success factor is, the more there are possible interpre-

tations and the higher the risk of conflict. However, the measurement system is a result of open process as measures are openly evaluated in project group and personnel. Especially in the cases of this study, the development processes were based on participation. The issue of coherence of measurement system and correspondence of success factors and measures were discussed during the process. By way of that discussion, at least some debilities were removed.

Generally, the measurement systems share the logic of balanced performance measurement. As an output of a process measurement system is a result of group-analysis of the essence of organisational existence, measurement systems are manifestations of shared understanding. Moreover, as a measurement system is tailored for certain organisation, the system is applicable only in that case. However, there are some distinctly similar features, thus those can be considered as good practices.

4.1.2 Validity, reliability, relevance, practicality and ethical issues

According to Hannula (1999, 78), the criteria of sound productivity measures are validity, reliability, relevance and practicality. Criteria by Hannula are also suitable in evaluating measures set in a performance measurement system. The criteria of sound measures have strong interconnections. Lönnqvist and Mettänen (2002) have stated that the criteria are sometimes contradictory: when a measure's validity or reliability is improved, its practicality may decrease, or vice versa. In practice, there often have to be made compromises between the measure's criteria. The idea of sound performance measurement requires that criteria must be met by all measures individually, but taking them all together in a system, the economies to scale will occur as measurement system offers more at one peek.

One possible way of prioritising the criteria is to consider the purposes for using the measure. According to Simons (2000, 67), the five main uses for measurement are deci-

sion-making, control, guidance, education and learning and communication outside the organisation. Lönnqvist and Mettänen (2002) explain those four criteria. Firstly, a measure has to be relevant from the point of view of using the measure for at least one of the purposes described by Simons. Otherwise the measurement is not worthwhile. Secondly, when measures are used primarily for decision-making, controlling and communication outside the organisation, the measurements must be exact. In other words, validity and reliability are important when exact quantification is needed. In this sense it is important to have explicable measures that do not require additional analysis or explanation. Thirdly, when measures are used to guide employees, the measurements do not necessarily have to be exact. It is more important that the measure focuses employees' attention on correct matters or it helps to control certain processes, like it is the case when setting certain measures to control progress of development. Fourthly, practicality is the sum of the three other criteria and also other factors. Hannula (1999, 78) states that the criteria of collectively exhaustiveness or mutually exclusiveness are related to measurement system, not individual measure. The practicality of a measure is evaluated by its benefit-burden ratio, i.e., does the effort needed for the implementation and maintenance of the measurement pay off (ibid.). Most relevant benefits and burdens of measures are presented in Table 17

Table 17 Benefis and burdens of measures (Lönnqvist and Mettänen 2002)

Benefit	**Burden**
A) Valuable information - relevance - accuracy (validity and reliability) B) Guiding effect - measuring emphasises important factors	A) Cost of measurement - data collection (manual or automatic) - cost of implementation and maintenance B) Disturbance to employees - active vs. passive role in data collection C) Interpretation problems - difficulties in understanding the measures

Validity may be challenged in the case of qualitative measures, because they often describe only a small portion of the success factor. The cost of quantitative measures is usually low, as data is collected from existing sources or it is otherwise simple. Data collection usually requires little or no participation from employees and thus does not dis-

turb them. Qualitative measures are usually subjective estimations and therefore do not provide as precise results as the quantitative measures.

As different types of measures are evaluated, attention should be paid to development of a measure and use of a measure. Also time is an important factor when measures are evaluated. The development of objective measures, such as ones derived from accounting systems, can be very time consuming and costly. However, those measures are already interpreted and the use of them is often automated and cost efficient. On the other hand, subjective measures, such as surveys, are more easily and cost efficiently put it in practice. However, using them requires the same amount of time and money, as surveys cannot be automated. In longer period, the practicality of objective measures will increase due cost efficiency and practicality in use.

Validity of surveys is often good, because they can be easily designed to include the important characteristics of a success factor. However, there might be several problematic points as the success factor is operationalised to actual questions or factors. Designing surveys and estimations takes a lot of resources and the data collection disturbs respondents. Therefore, they are quite costly as time is spent on designing and responding. In addition, surveys cannot be repeated very often, because respondents may become frustrated or tired of them. Both types of measures may be easy or difficult to interpret, depending on the design of the particular measure. Also the guiding effect can be accomplished using either type of measures (ibid.).

The soundness of a performance measure must be evaluated individually by each measure. The evaluation of measures is done during the development process, as a functional measurement system is the goal of the process. In the cases of this study, the iteration of measurement systems was actually evaluation of soundness. In some cases a measure was removed or replaced because of triviality. In every measurement system the main considerations were the issues related to practicality, especially the actual cost and dis-

turbance caused by measurement. In addition to evaluation of soundness during the development, it is necessary action also after a system is completely implemented.

The role of the researcher in defining success factors and designing the measures affects the validation of measures or the whole measurement system. The effect is twofold, as researcher facilitates the process, but also actively participates in finding a practical solution. In the phase of validation, i.e. choosing the measures, the researcher has at least power to suggest jettisoning a certain measure.

The criteria of soundness were evaluated through the process. The relevance was evaluated, as critical success factors are derived from strategy and measures defined. Relevance is not a critical issue, because it is constantly under evaluation. As each organisation has its own conception of its position and the most relevant factors affecting the position, the relevance rises up with critical success factors. Reliability is evaluated when certain measures are defined. In the cases of acknowledged measures e.g. the ones of results or financial factors, reliability is naturally high. The case is different when more subjective measures are considered. In this study reliability was evaluated in iteration of the measurement system. Moreover, taking several measures and perspectives higher reliability was gained.

Validity and practicality were more difficult issues to evaluate during the process. In the cases practicality was evaluated as measures were defined. The decision on practicality was done by the project group, as they decided what measures to use. The evaluation of practicality is also important issue when measurement system is iterated. The decision whether a measure is practical or not was done when decision of implementation was done. This was also the case when the validity of measurement system was evaluated. As validation of a system is difficult because of the several intervening factors in the short term, one must rely on the validation through acceptance when measurement system is implemented.

The validation through acceptance was done by the logic of market tests, i.e. using the market test generalisation of results arising from constructive research is possible (Kasanen et al 1991, 306). There are three market tests, the weak, semi-strong, and strong market test (ibid.). The weak market test is passed, if construction is implemented in an organisation or there is intention to take it into use. The semi-strong market test is passed, if a construction is implemented in several organisations. The strong market test is passed, if the construction is evidently viable and there is evidence of usefulness. Therefore there should be improved results after implementation.

In this study the process model of measurement system development passed both semi-strong and strong market test, as it was used in several cases and it had effect. Improvement happened at least by the rise of consciousness of strategic issues in the organisation. This suggests that going through the development process something will eventually happen in target organisation. To put it other way, internal validity of measures was high because measures were selected carefully in iterative process. However, external validity of single measure is low. That is due to the fact that measure is in strong relation with certain organisational success factor, thus every measure can be generalised only to similar organisation – which is very difficult to find. External validity of the measurement method is high, as idea of balanced measurement is widely used and there are lot of positive feedback on the effects.

The process spawns a measurement system, yet it must be tested by organisational approval. Moreover, taking the restrictions of the research method the validity rises from the issue of approval. The way in which measurement system is developed is not relevant issue in this context, hence to have measurement system is a value per se. However, the practical issues affect the value of a measurement system. In the cases practicality was considered a central element of measurement system, thus it is also key to pass the semi-strong market test.

In this study the use of strong market test to test measurement system is not necessarily possible, as the process itself affects the organisation and it is difficult to have before-after intervention –comparison. If case organisations have found the process of developing measurement system useful and manifestation out of the process is implemented also the test of practicality is passed. In this study three measurement systems passed the practicality test. In the fourth case some individual measures passed the practicality test, but as a whole, the designed measurement system failed.

The ethical issues considering this study are relevant when measurement systems are evaluated. The role of the researcher is the key to evaluate the value of measurement systems per se and also when the research process is evaluated. In this study the researcher was participant, as the process aimed actively to find solution to a certain bounded problem. The construction that manifests organisational reality is result of the group-work, thus the role of researcher was not over emphasised. However, as the researcher took actively part in the process also personal opinions did count. The active role also raises the issue of moral, as making research and building a construction are in strong interrelation. As the researcher was participant, the primary role was to facilitate the process, not give ready answers. If the case had been the latter, the research arrangement would have been in vain as the results had been manipulated. By choosing the role of facilitator the researcher ensures that the flow of process is within the conditions of case organisation.

Another point of ethics should be considered when access to information and knowledge is taken into account. In addition to artefact, i.e. measurement system, and background information there was also access to knowledge on personal relationships in the case organisations, knowledge on intra-organisational tensions and contradictions, knowledge on delicate or confidential issues, and accidental information and knowledge on customers, partners, etc. It is the very essence to maintain credibility of research setting that this knowledge is not used. Moreover, access to that information required trustworthiness and trust. The ethics of researcher setting are restraining, at least when reporting the

study, as there is a lot of knowledge that is acquired in the process, but is not aimed to be reported. Since the issue of mutual trust is important in action research, the decision to report only items that are mutually agreed was done.

5 Results of the study and conclusions

This chapter gathers up the results that came up in the cases. As stated above, there was no single hypothesis to be tested or single construction to be validated. The research questions set to this study did reflect the prior knowledge and ideas about knowledge work and performance. Moreover, the theoretical propositions were used as a base for performance measurement in the cases.

5.1 Results of the study

The problem was approached from defining knowledge work by identifying the nature of it. The nature of knowledge work refers to the three dimensions of it, i.e. rate of manual or routine work, complexity and regulating rules. Proposition number three was formulated as follows.

Proposition 3: Knowledge work is more about personal skills and knowledge, i.e. competence, than performing tasks that are strictly instructed by management. Therefore management must not disturb performing the task and management system should be transparent.

The role of absolute and relative competence as the main input was emphasised in every case. What employees can and know affects the results of work. Absolute competence is external and brought out by the fact that the knowledge worker has more knowledge and information than the customers; customership is thus based on asymmetrical knowledge. The asymmetrical knowledge comes up as customers are considered; there is demand for their knowledge. Relative competence is internal and perceived in the positions of the personnel. Every member of the organisation has a substantial amount of knowledge in one's field of expertise, but there is always a person who is more competent at least in

other fields. Relative competence was emphasised in cases B and C, as the work required much differentiated knowledge and skills.

As stated in Subchapter 2.4.1, performance was defined in the knowledge work context by the seven criteria. Firstly, effectiveness meant having the right solution on the right scale to a problem defined by a customer or other stakeholder. Secondly, efficiency should be understood in its economical sense, i.e. a solution is produced with a minimum of input or there is no waste of resources. Thirdly, quality refers to the accuracy of a solution. Evaluation of quality was considered difficult, as there is sometimes a lag in effectiveness. Fourthly, productivity equals the number of the output of accurate solutions. Fifthly, the work should be performed under such conditions, which help and encourage workers to do their best. Taking this criterion into account, performance emphasises the knowledge workers role as a key asset. Sixthly, innovations refer to the state the where workers aim to construct new and better solutions to problems rather than mechanically apply old ones. Seventhly, profitability means that revenues must exceed costs. Even in the case of not-for-profit organisations this applied, as organisations were tied to budget restraint. In all cases the performance criteria were identified and performance measurement systems were designed according to them.

Taking the black-box analogy, the role of individual employee was in focus. Knowledge worker organisation is the context of work. It is not only the sum of people, it is also a system that renews itself and guides the personal development of employees. This rises from the notion of social autopoiesis[25], i.e. organisation has ability to renew and reproduce. As the organisation is dependent on personnel competencies and social capital, the synergy exists only if attention is paid to them.

In this study organisation was considered as an open system with certain inputs and certain output, however there is also alternative ways to approach, but it was out of the fo-

[25] Autopoiesis in knowledge worker context is studied e.g. by Maula (1999). Social autopoiesis refers to organisation as environment of certain activity and a forum for individuals.

cus of this study. As organisational attributes evidently affect performance, the nature and role of organisational attributes were also considered. Proposition number one was formulated as follows:

Proposition 1: Modern organisation has in general become obsolete serving its purpose as environment of knowledge work. Therefore, attention should be paid to ideas of post-modern organisational features i.e. new organisational imperatives, which attribute 21st century organisation. In knowledge work the organisation can be seen as the frame of doing, not as much a working apparatus as it is in manual work.

In all cases flat organisation enabled manageability. It was partly due to the size of organisations that dictated it, but it was also a conscious decision. In all cases managers worked near other employees, even conducting the same or similar tasks. For example, cases B and C were more like sets of teams and projects than certain systems based on hierarchical structure.

By adopting new organisational forms or new ways of practising business, organisations are able to generate revenue from new sources. However, networks are not easily put into formal organisational charts, nor apprehended. As case A was a non-traditional organisation it was interesting to see whether performance has a different meaning in such a setting. As transformation of knowledge is somewhat problematic in a network, it is important to increase the proximity of people or give other possibilities to interact. Because social capital, e.g. know-who and contacts, is not transferred explicitly thus there is need for co-operation to encourage networking.

The organisational imperatives described above were also accepted. Goals, strategies and central functions were clearly articulated. This was also reason for implementing a performance measurement system. In all cases the organisation had explicit strategy, which was partly implemented and communicated with performance measurement system. Core functions were arranged and organisation formed either a system of processes or a system of knowledge domains. Processes refer to a setting, where functions were

the base of organisation as in cases C and D. In cases A and B organisations were arranged according to certain competencies or bodies of knowledge.

Performance measurement system served as a coordination and control mechanism, and measurability and different roles were defined. Institutionalisation of planning and communication were established, as no case organisation was totally flat, i.e. in all there were persons in charge. Performance and reward systems were connected to each other in case D, in the other case organisations the need for such connection was recognised but not established. In all cases emphasis was on functional leadership. The managerial systems were based on active communication and evaluation. The use of performance measurement was considered as a complementing component in the managerial systems.

Proposition 2: If organisation has abandoned weberian ideal then the management system must be open, transparent and conversational. Hence it should be based on dialogue.

All the cases were non-hierarchical, thus bureaucratic mechanisms were not suitable in the level of cases. In case B bureaucratic mechanisms were determined by its operating environment. However, the simultaneous notions of freedom and need for controllability was contradictory (cf. notion of control paradox described by Blom et al 2002 and the notion of the manageability gap). In all the cases, there were employees who were seniors in their occupation. For them it was natural to have a certain degree of freedom to plan their work. However, for the juniors or employees conducting more routine like tasks the need for planning was higher. In the cases there was no lack of innovativeness or new ways to operate, but at least to some extended there was the lack of planning and structure. In case C, there was the most advanced setting for creating order in the positive sense. Although the technical complexity of work was highest in case C, the planned processes and criteria enabled manageability. In the other cases the differentiation of tasks and multiple goals would also have required more precise planning of work. In all cases seniors and managers hold large responsibility on planning, as the juniors have more responsibility on accuracy and such.

In the cases openness was considered as shared responsibility of achieving the goals. It consists of communication and feedback. The logic of communications enables motivation towards achievements. The logic of feedback also gives decisive power, thus they are able to affect both the goal setting and planning of the tasks. In cases A, B and D the shared responsibility was most advanced, partly due to the nature of the tasks, partly due to the lack of technological restraints. In case C the role of technology was determining.

Transparency is the outcome of communication and feedback. In the cases the management system was a sort of egalitarian one. Because organisation was flat and responsibilities were shared, there was no sense to build hierarchical structures that would be useful in managing different organisations. Moreover, the principle on transparency dictates how performance measurement system is used and analysed. In cases B and D, there was already a medium for communicating results of measurement. Also A and C were planning to conduct such action. In some sense transparency is also part of organisational culture which encourages people to participate, e.g. to take part in occasions where results of performance measures are analysed, so that can be considered intra-organisational dialogue. As stated above, management by objectives is the suitable way to lead knowledge workers. It emphasises the dialogue between employee and managers and it suits the organisational imperatives.

In the cases, the role of absolute and relative competence was also a basis for regulation. If there is uncertainty of competencies and there is willingness to make processes more efficient, the ratio of regulation should be increased. As the ratio of relative competence is low, more regulation is possible. Relative competencies may also consider social capital, e.g. socialisation to the habits in organisation. As this organisational knowledge and awareness increases less regulation is needed. In the cases A, B and D the role of relative competency was emphasised.

Proposition 4: Performance measurement frameworks emphasise organisational dialogue and communication. Measurement is a suitable way to manage knowledge workers as long as measurement system is acceptable throughout the whole organisation.

One central aim for this study was to discover how knowledge work performance is measured. The cases give a quite simple answer to that, i.e. uniformly to any other contexts. The measures must be derived from strategy. However, knowledge work context draws attention more to competencies and developing them, therefore competencies should be kept on the agenda and they cannot be subordinate to other goals like maximising short term profit. Knowledge workers require constant nurturing. The measurement per se does not differ from the more traditional context, yet knowledge work needs different perspectives and measures.

The performance measurement frameworks like Balanced Scorecard or Performance Prism are also applicable in knowledge work organisations. Because the frameworks are only suggestions as to how measurement should be conducted, there is still a long way to measurement system of an organisation. In knowledge work the role of measurement system development process is significant, because the nature of knowledge work is more attached to certain context than it is e.g. in retail or mass production. The contextuality challenges the measurement system, as there are less ready solutions and more tailored measures. In all cases the perspectives of results, customers and processes could adapt influences from different managerial manuals for building a performance measurement system. However, the measures related to knowledge work were case sensitive, and it was partly due to the role of researcher that there were similar solutions. In knowledge work the measures are more tailored and therefore the development process has more significance.

In the cases managers and employees perceived performance measurement as an important part of the management system. Both found it useful, as it gives balanced outlook to performance. In all cases the main rationales for using performance measurement, i.e.

how knowledge workers are managed by performance measurement, were similar to using performance measurement in non-knowledge work organisation. However, as the workers are not so easily replaced and competencies are emphasised the measures of intellectual capital and competency development are certainly among the most important ones.

5.2 Conclusions

The context of knowledge work is more complicated compared to manual work, because knowledge work is abstract by nature, as it is a more cognitive process than a tangible one. Moreover, operational measures are not easily derived from success factors, i.e. operationalisation of success factor is difficult. Yet absolute and relative competence should be taken into account when performance is measured, for it is the key to understanding knowledge work. The management by performance measurement, i.e. using it as a part of the management system focuses along results to the enablers of knowledge work. In that sense the empirical findings also confirm the assumption that performance measurement is an essential part of management system, as it represents a realisation of a certain management scheme. In the sense of performance measurement it requires its recognition of what are the competencies that customers and other stakeholders consider important, and how the organisation is structured to have an optimal set of relative competencies. From the point of view of the use of performance measurement, there are three main aspects for measurement in this study.

How strategy is implemented by using performance measurement, is the main rationale for using performance measurement. This is important when organisation is large enough not to have daily interaction between managers and employees. Performance measurement enables the dialogue and effective communication of strategic and operative issues. The pace of performance measurement is different, as knowledge workers often have longer timetables and such. In the sense of controlling the goals that are set in

all cases the evaluation results required a longer period than one month. Controlling the results was considered important, yet in all cases the arbitrary emergence of innovations and unique manifestations of knowledge was acknowledged.

Performance measurement is used for motivating the employees in a similar manner to non-knowledge work organisations. The role of communications is emphasised, as employees with sufficient information are better off than those not knowing the purpose of their work or the context of it. In case D the use of performance measurement system as a means of communications was followed most thoroughly, since the strategy was totally translated into success factors and measures. In the other three cases similar translation was done, yet there were some deficiencies. There was total agreement in all cases that motivation is important in knowledge work, as creativity cannot be forced or bought. Moreover, the willingness to work increases as there are explicit and comprehendible tasks and goals. In motivating the performance measurement system is not a value itself, it is more like a tool.

Performance measurement is applicable to help workers' personal development, if it is used for developing competencies and promoting transformation of knowledge and skills. For using performance measurement as a knowledge management activity, there are some notions from the cases. A manager of a case organisation explained the essence of such activity by the statement that “essence of knowledge worker management is to know what to develop”. So, if a manager could know what employees do not know or what competencies are lacking, the management would be much simpler. This notion emphasises the role of discussion in knowledge worker management. For employee and managers it is the simplest way to know what to develop[26].

As knowledge work does not have established distinction between planning and doing, one might even claim that in knowledge work planning is a part of doing, the ability to

[26] This notion rises from an idea by Plato as Socrates was the wisest man in ancient Athens as he knew that he knew nothing. If managers have false conceptions of knowing better than employees, there will be a significant risk of conflict.

discern the task is also important. In this setting juniors are guided by the seniors, as seniors have both explicit and tacit knowledge to see what juniors are missing. Suggestions given by seniors of education or training transfers and accumulates explicit knowledge, tacit knowledge is usually transferred by experiencing or learning by doing. Possible competency gaps are recognised in interaction, therefore dialogue is needed. Also arranging suitable conditions for learning, e.g. proximity and mentoring, possible gaps can be filled.

The case of managing the seniors is more complicated. Good advice would be that they should be left alone, or use a long leash. The management of senior knowledge workers was considered difficult in all of the cases, since they have a large amount of absolute competence that is often highly differentiated. In the case of seniors the evaluation should be left to peers, customers or some other central stakeholder group. The strategy should describe only restraining conditions of the work. In the cases of this study connection of performance measurement to knowledge management is the measurement of achieving the designed personal development goals. Measurement was used to see if new competencies are gained, set target of group working is achieved.

Every time a performance measurement system is developed and implemented, it is important to take into account possible weaknesses of measurement system. Most deficiencies can be removed by iteration, but there is also need to pay attention to the coherence of the system, i.e. remove possible conflicts. Explicit intentions were described by selected success factors. The most important issues are pointed out by critical success factors. In all the four cases these success factors are not task specific and they represent organisational consensus of what is important for fortuitous performance. From the managerial perspective the interpretation of explicit intentions is straightforward. Success factors emphasise knowledge and skills, social capital and ability to develop. Moreover, the working environment survey has an important role as the personnel have possibility to give feedback to managers. The mutual unanimity between project group and management of the case organisations implies that from the managerial perspective suc-

cess factors and measures are valid. Explicit intentions behind the success factors describe attitude towards employees. Employees are considered a valuable asset, thus it needs to be nurtured (cf. Drucker 1999).

By slightly changing the perspective coherence between measures and success factor can also be examined. Tacit intention related to quality is connected to ambiguity of quality in the knowledge work context. As management has only partly a conception of quality, other groups must evaluate it subjectively. Evaluation and taking certain quality criteria does not conflict with organisational democracy as long as the results of evaluation are also given as feedback to employees. Taking quality as a critical success factor, the importance of issue in knowledge work context is highlighted. However, choosing it describes lack of managerial power as quality is evaluated by outsiders and monitored by management.

Monitoring the working environment by a survey management has enabled an anonymous feedback channel even for delicate issues. However, tacit intention of management can also be willingness to justify their way to manage the organisation. The value of working environment index depends on the questions. If there are questions on managerial practices, how to organisation works, equality etc. survey has value as a means of dialogue. If a survey consists only of secondary questions considering physical environment and such, it has no value for managing knowledge workers.

Tacit intention of personnel turnover could at least be seen as source of organisational renewal. However, in the case of academic faculty personnel turnover was due to the fact that there are persons to leave academia for other jobs and persons returning. If management sustains personnel turnover it indicates at least the fact that there is acknowledged need for change in organisation. Social capital is emphasised as there are measures designed for group-working and stakeholder communications. Tacit intentions for such measures are that management has found out the complexity of operating environment and discovered that networks of peers are a hidden resource. Taking different

perspectives to skills, qualifications and knowledge management emphasises the diversity of knowledge work. There is no other way to accumulate intellectual, thus management has taken an active role in developing competencies in mutual understanding with employees. However, in the cases, measures for competency development were subjective; hence tacitness lays on the nature of intellectual capital. Taking competency related issues into measurement systems there is a shift towards knowledge management.

The rationale for using performance measurement in the cases considered is threefold. Firstly, competencies are emphasised and measurement is also used to focus on new competencies or measuring the result of decided development schemes. Secondly, employees are considered as an asset hence their opinion on working environment is also important. Management pays attention to certain features of organisation and collects feedback from the employees. And thirdly, the intellectual capital management perspective is emphasised, as it is possible to enable knowledge acquiring, disseminating and competence developing activities by defining certain measures. By arranging channels for employee feedback management has possibility to avoid situations of unwanted employee turnover.

If the findings of this study are reflected to the prior knowledge on performance measurement, two notions should be added. Due to manageability gap, i.e. simultaneous planning and doing, knowledge workers cannot be managed or measured by a traditionally designed performance measurement system. Knowledge work requires organisational democracy, but also a certain framework for activities. The idea of rotating a performance measurement system 180 degrees points out the importance of competencies instead of the results. Without knowledge and skills employees are unable to conduct their work, thus in the context of knowledge work creation of new knowledge and accumulation of skills is the key to success. The major difference with traditional performance measurement is that in the traditional sense the outcomes or results are emphasised. In the context of knowledge work the results are still important, especially in for-profit organisations, but there is also parallel emphasis on competency. Competencies are the

base of any knowledge work organisation, therefore nurturing them is one of the key points in using performance measurement. The success factors that emphasise intangible resources (cf. RBV- or KBV-approaches) are the key to have sound measurement system. If more traditional measurement systems are considered, as was the point originally presumed when the research for this study was started, there is difference to some extend. If the propositions have had the role of weak hypothesis, it could be stated that propositions are proved to be true.

Finally, the difference between traditional context and knowledge work context is also connected to direction of measurement and conjectural direction of causality. In traditional setting the causality (e.g. Kaplan and Norton 1996, 111; Hannula et al 2002, 161-165) is assumed to be opposite than the direction of measurement. Measurement in traditional setting is more connected to outcomes or financial results and enablers of those are set as drivers. Traditionally that is very convenient way to analyse processes and operations, but in knowledge work context the time span is long, even infinite such analysis is more difficult. Knowledge Based View of a Firm suggest that strategy should be formulated along competencies. As measures should be designed and implemented according to strategy, in knowledge work context the direction of measurement (i.e. analysis) and conjectural direction of causality is the same. Figure 21 illustrates the finding.

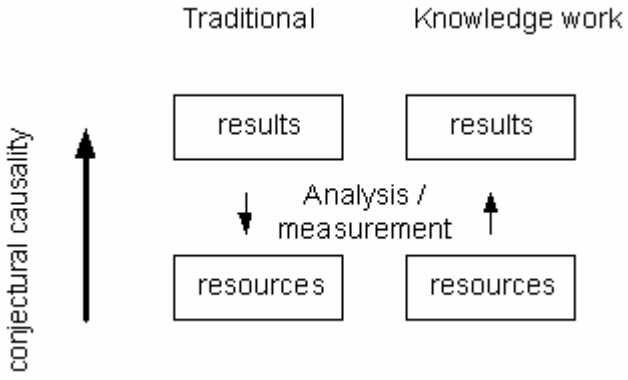

Figure 21 Directions of conjectural causality and measurement

In terms of Phusavat et al (2003), in knowledge work context the performance measurement is a mix of MBO-approach and TQM-approach as both organisational and individual levels are required. In the MBO approach the measurement is mutually performed by supervisor and employee and in the TQM approach subjective measurement is feedback from managers, peers, and customers about the personal qualities of the employee and objective feedback based on the work process itself using e.g. statistical quality-control methods (ibid.). MBO approach is emphasised when subjective evaluation and different methods based on dialogue are used. In the cases, there were several measures that fall in MBO category. On the other hand TQM approach is emphasised in many organisational level measures, thus it can be stated that on the organisational level TQM approach dominates. In knowledge worker management TQM approach is to take organisation as a whole under examination, i.e. examining the black-box. MBO approach is to peek inside the box. In order to manage overall performance, it is necessary to use both approaches.

6 Discussion

This chapter discusses the study by raising the managerial implications, evaluates the study and makes suggestions for further research. The managerial implications reflect the findings in fieldwork, yet they are partly derived from theoretical points discussed. Those implications are also a synthesis of lessons learned in the cases and conclusions presented above.

6.1 Recommendations

The reality of work exposes itself quite differently for persons responsible in organisation than to those only conducting a set of planned tasks. In knowledge work, the balancing between control and creativity is also one of the outcomes regarding knowledge work. In order to ensure a sufficient amount of freedom, knowledge workers' natural willingness to improve should be taken into account. Because knowledge work is a mix of prior knowledge, learning new, innovation and complexity, all these components should be sustained. As the essence of knowledge work is to have accurate solution in the right scale to the problem in hand, the way how it is delivered is secondary. As discussed above certain tasks require more planning and regulating; it is the craftsmanship of the managers to see what the line not to be crossed is. Most knowledge workers who took part in this study did agree that work is easier if communication works and employees know what the goal is. The most important recommendation concerning knowledge work is to set management in the context. The most feasible way to manage knowledge workers is to do it by motivation, as creativity and aspiration cannot be forced.

When organising tasks are considered, the above recommendation applies here. The organisation is the context of work; hence it should be enabler of new knowledge creation and innovation. Strict hierarchies seldom are enablers of knowledge worker performance. However, from the perspective of management a certain amount of bureaucracy is desirable. Since knowledge and new ideas are fluctuous, and yet people have their own social groups in work, an ideal work setting for knowledge work would be ba[27]-like. In most organisations arranging an ideal form of such ba can be difficult, therefore it might help if organisational restraints are made invisible.

The process of designing a performance measurement system is a unique process in an organisation; therefore it should be planned carefully. There are some recommendations rising from the experiences from this study. In development, support of managers is essential, even if employees were enthusiastic to conduct such a project, the lack of support from CEO or equivalent will ruin all. The second big consideration is to have approval from the personnel too. Usually the process itself helps people to be motivated, as through the participation to process they learn new things about organisation, and also become more measurement-conscious.

The performance measurement development process model described above is a sufficient way to construct a measurement system. The process itself is comprehendible and people in organisations are usually wit enough to get through the process. However, using an outside facilitator helps to achieve the goal, but a facilitator or consultant is not a value per se. As a result of performance measurement development process, there should be a measurement system with a couple of perspectives (i.e. more than 1, less than 10) and a handful of measures (i.e. at least one for each perspective, total less than 20). In knowledge work context, the measures considering intellectual capital, knowledge, competencies or competence development are central in the same sense as people are among

[27] Ba refers to concept by Nonaka and Takeuchi (1995). Ba is the shared context in which knowledge is shared, created and utilised. Ba can be a physical or virtual place. The key to understanding ba is interaction

the most important assets. Therefore, those measures should be evaluated thoroughly keeping the test of practicality in mind: Is this really worth of measuring?

6.2 Evaluation of the results

This study was based on the strategy of active participation and intervention. Validity and reliability are not applicable per se in action research (Huttunen et al 1999, 113). Reliability is not a suitable concept, as the idea of action research is to intervene. The research project is based on intervention, in order to change the state of the research object. The result should be evaluated through new conventions established and how the practices have changed (ibid, 118). In action research, it is not a goal to make empirical observations corresponding to theory, i.e. to validate theories, hence the aim can be to construct the new while changing the old (ibid. 132). As this study was conducted as action research, the role of researcher in defining success factors and designing the measures raises the issue of reliability of results of this study. For the research object, i.e. case organisation, the measurement system represents reliable and valid conception of the world. The case in the scientific sense might be different, if this study was evaluated by the criteria derived from positivistic paradigm.

According to Tynjälä (1991), in the fields of qualitative research there is no coherent conception of validity and reliability. The reason is that there are several different research approaches and techniques. In action research the primary objective is usability or practical improvement of a constructed intervention, thus finding the ultimate truth is a secondary objective. An action research project is successful if, and only if, it has affected or changed the research object (Huttunen et al. 1999, 118-119). This means it needs to be a more practical, rational or reasonable practice, which is proven via its actual working (ibid). Action research needs three things: a way of representing research results that enhances their usability in the context of research, a complementary way of construing causality, and an appropriate method of causal inference. According to these criteria, this study is acceptable. The results of action research passed the semi-strong

market test; therefore it is assumable that the suggested construction has caused a change. The causality that is constructed and inferred is represented in cause and effect charts as a truth of case organisation. Therefore challenging it might be task of other study than this.

In constructivism knowledge is value mediated and created by interaction between research subject and research object (Guba and Lincoln 1994b, 111). In the process of action research interaction literally creates the findings, thus the findings are dependent on the process as well as on the reality affecting the phenomena. Thus it could be stated that the journey is at least as important as the destination. According to Alasuutari (1989), the constructivist approach relies on making visible the rules of reasoning and collective presumptions, which are used in everyday situations to help people to make sense of different occasions. In this sense, constructed artefact, i.e. performance measurement system, represents this. The artefact is a true representation of organisational situation and therefore a valid analysis of the case.

According to Aaltonen (1989), evaluation criteria of quantitative research are not directly applicable in qualitative research. Therefore reconsideration is needed. What is internally valid in quantitative research, should be credible in qualitative research (Guba and Lincoln 1994, 114). The criteria of external validity should be replaced by transferability and reliability by dependability (ibid.). The criteria of objectivity should be replaced by conformability, as this qualitative research in this study subjectivity of truth is central assumption (c.f. Guba and Lincoln 1994, 114).

In this study credibility rises from the issue of how the research objects were approached. The processes were conducted as uniformly as possible by applying one method. Therefore, the result rising from the cases can be analysed parallel. Another central component of credibility is the issue, how the access to research objects was possible. In this study full access to necessary, and sometimes also to trivial, material and discussion was granted. Moreover, as the process itself was based on interaction and mu-

tual benefit can this study concerned credible one. Credible results in action research emerge, if there is mutual understanding in e.g. case organisation. In this study that was the case, as in the project groups were agreement on measurement systems to be implemented. Credibility of this study is also raised by triangulation, as result or pieces of evidence are evaluated also by other persons. Credibility is also issue of acceptance. The results of this study are credible at least in three cases. In the problematic case the issue of credibility may rise from different premises e.g. accurateness of observations or similar experiences in different settings.

Transferability rises from the need to have an effect also on wider extent. In this study the results are transferable to small and mid-size knowledge work organisation. Some results are normatively transferable to larger body of organisations, too. However, the nature of performance measurement system does not allow direct transferability; it must be done through the same process as in the cases. The managerial norms, arose from issues of manageability and managerial system of organisation, are, however, applicable as far as the values behind them are acknowledged and accepted. The results of action research are connected to unique experience of process, thus the results contain also a little amount of serendipity or chance.

Dependability is the issue of confidence or decreasing the number of disturbing elements to minimum. This study is dependable as most factors affecting the research process and objects are taken into account, thus from the premises of this study it is a presentation of conception of the phenomenon from certain perspective. As the premises of this study are taken into account, the research itself is dependable. The research object, situation or the context of research, and the process itself restrain dependability.

In this study conformability is the issue of truthfulness, i.e. the circumstances are as they are described. All cases form their own organisational setting that is subject to constant change. Therefore conformability does not necessarily hold any more, as the circumstances may have changed after intervention. However, the truthfulness is taken into ac-

count as cases were reported. To increase conformability the representative of each case organisation checked the case. Those persons were the ones who took part in the process; therefore they share the same experience as it is written in the case reports. Conformability is verified as triangulation is used and also outsiders have evaluated this study.

6.3 Evaluation of the study

The study contributes to knowledge worker management by its results. The research questions were answered, as were the goals set for this study achieved. The aim of the study was to create recommendations of sound use of performance measurement in knowledge work context by identifying and defining the main attributes of quality and productivity of knowledge work, i.e. to point out critical factors of knowledge work. As the nature of knowledge work revealed itself sufficiently, this study succeed to collate the main attributes of knowledge work, and moreover to make normative science out of the cases. The issue of using performance measurement was also examined thoroughly as the measurement systems were analysed. However, to make deeper analysis on the issue of effects, a follow up research should be done. Because the measurement system was tested by weak and semi-strong market tests, the follow up research would have been necessary to make the strong market test.

The uniqueness of this study lies on the issue of pointing out the use of performance measurement in knowledge work context. The prior assumption for this study was that performance measurement frameworks suit that purpose, but how those frameworks suit is one of the major outcomes. The contribution of this study does not lie on the issue of performance measurement per se, but more on the context of applying it. This study describes the rationales for using performance measurement in knowledge work context as it finds similarities and differences of measurement compared to more traditional context. Moreover, by finding and connecting competence development and knowledge

management activities to performance measurement the research has also practical value.

Because every study is dependant on the methods chosen, also that should be taken into account as this study is evaluated. By choosing qualitative approach and action research strategy this study was, at least to some extent, free of restraints. The research process itself brought up new points that were not understood or taken into account when setting up the research setting. The chosen approach served its purpose well. However, taking a more positivistic approach, the results would have different value as the possibility to make generalisations would be better, but there would have been also some trivial findings. If there had been a single hypothesis to be tested, the research process would have been different as there would have been need for hypothesis creation by more structured and rigid literature review.

Most important features of action research that came up were participation and access to processes. The proximity to informants was also important, as data was enriched by those relationships. Participation also helped to understand and analyse the data more thoroughly, yet sometimes there was an overload of perceptions. Choosing constructive approach requires social and open mind, as the researcher becomes part of another community. It would be almost impossible to conduct similar research differently, yet choosing action analytical approach similarities with process and outcomes would have occurred. Most distinct difference would have been, that in action research the aim is to take action, to change, as in action analytical approach researcher is brought oneself apart from the object of research by taking the role of outsider. Also, using that approach, the case criteria would have been different as there would have been implemented measurement systems. In this study the journey was considered as important as the destination.

6.4 Further research

One of the most important issues concerning knowledge work is the three dimensional approach to rate of manual work required, complexity of the work and the autonomy of a worker. As this study stated, knowledge work is a complex phenomenon, thus it needs further research. The three dimensions of knowledge work would be suited for better performance evaluation and also rewarding knowledge workers. In order to make sense out of that, management gap needs further examination as now it is in the prepositional phase and notions of it are only qualitatively reflected to empirical results.

The issue of connecting the rewarding scheme and performance measurement is interesting, but out of the scope of this study. In this study the connection, its functionality, and other issues are taken for granted. Further research should be done on that issue. Most important questions would be the connection between measures and reward, what are the triggers of reward and what should be rewarded. If rewarding is concerned in its largest extent it is a very integral part of management. If it only considers monetary compensation, it is the question of reallocation of resources or profit. The connection between performance measurement and rewarding should take into account in the widest extent. Knowledge work seems only partly to be a means of subsistence. For many knowledge workers it is also an important way of self-expression, thus rewarding should have components that support also knowledge workers individual and professional identity.

As many knowledge workers are part of an organisation, the systems theoretic approach to knowledge work organisation would give sufficient change to perspective. As organisations are considered to be more than the people within, further research should be concentrated on autopoietic process of renewal and enhanced performance. It would be important to connect autopoiesis theory and performance measurement in order to find drivers for renewal. Moreover, there would not be a long step from recognition to evaluation.

In knowledge work the role of social capital seems to be important. Because knowledge is created and mediated in social situations, there would be a niche for studying social capital. In the context of knowledge work, social capital should be taken into account as sum of more or less institutionalised relationships of mutual acquaintance and recognition, network of social exchanges between actors engaging in transactions. Moreover, the three dimensions of social capital affecting any actor in knowledge work are structural, i.e. presence or absence of interaction, dimensional, i.e. mutual trust and trustworthiness, and cognitive, i.e. shared understanding of common goals and proper ways to act. Further research should concentrate on manifestations and behaviour of it; of course not forgetting measurability.

As stated above, the manager who knows what employees do not know, is better off than a manager who does not. There would be need for research in the field of competency development. As this study suggests, the idea of management by objectives enables dialogue also on issues of what to be developed. In that field, further research should be concentrated on defining competencies and the lack of them, measuring development and also evaluating the ability to develop. All these suggested ideas for further research concluded in them the theme of measurement. In management measurement and measures are needed, as what you cannot measure, you cannot manage.

7 Summary

Performance measurement is one of the major tools in contemporary management. It has shown to be an efficient tool for communicating strategic issues, i.e. it is used for implementing strategy. Moreover, performance measurement has also other advantages as it is a tool for controlling, communicating and learning. Performance measurement is an analytically built set of critical success factors and measures for them. To put it short: it is a strategy in action.

The objective of this study was to create recommendations of sound use of performance measurement in knowledge work context by identifying and defining the main attributes of knowledge work, i.e. to point out critical factors of knowledge work and construct measures for those success factors. The success factors and measures are tied to certain context, thus the results are more like recommendations than tight managerial norms.

This study was based on a constructive research approach, as there were certain constructions built in cases with uniform method. This study employed action research as the strategy to gather data. Because action research enables high level of participation, therefore the role of the cases is twofold. The cases were a source of knowledge on the nature of knowledge work. The cases were also used to test the constructed measurement systems. The validation of measurement systems was based on evaluation done by project groups in the case organisations.

The study consisted of a set of tasks that were practical by their nature, but based on a certain theoretical framework. The theory of knowledge worker management was established in four propositions considering contemporary organisation as a context for work, the art of management by objectives, the nature of knowledge work, and performance

measurement as an applicable tool for knowledge worker management. Taking the propositions as guidelines for case studies, the research setting was affixed.

Combining performance and knowledge-worker productivity criteria, seven necessary conditions for knowledge-work performance were defined. Firstly, effectiveness means having the right solution on the right scale to a problem defined by a customer. Secondly, efficiency should be understood in its economical sense, i.e. a solution is produced with minimum input. Thirdly, quality refers to the accuracy of a solution. Fourthly, productivity equals the number of the output of accurate solutions. Fifthly, the work should be performed under such conditions, as help and encourage workers to do their best. Sixthly, innovations are guaranteed in a state where workers aim to construct new and better solutions to problems rather than mechanically apply old ones. And seventhly, profitability means that revenues must exceed costs.

The case studies employed an idea of balanced performance measurement based ideas of two performance measurement frameworks: The Balanced Scorecard and Performance Prism. The process model for building performance measurement systems was kept as simple as possible, as the aim was to have high practicality. The process itself had three main phases: meta-level of planning the process; strategic level of constructing or revising strategy, defining critical success factors for strategy, and practical level of defining measures for success factors and implementing the measurement system.

The main outcome of this study was that performance measurement in knowledge work context does not per se differ from using performance measurement in a more traditional setting, but success factors in knowledge work are more resource orientated. The measures considering results, external key stakeholders or processes are somewhat similar. In the knowledge work context, the role of employees as the main asset is emphasised. Knowledge worker equals the competencies, i.e. knowledge and skills. The notions of emphasised competencies drive the measurement system toward active approach. Meas-

ures should be designed to control the accumulation of knowledge and skills and drive competency development.

The rationale for using performance measurement in knowledge work is threefold. Firstly, competencies are emphasised and measurement is also used to focus on new competencies or measuring the result of decided development schemes. Secondly, employees are considered an asset; hence some degree of democracy is required. And thirdly, the intellectual capital management perspective is emphasised, as it is possible to enable knowledge acquiring, disseminating and competence developing activities by defining certain measures for those issues. The major difference with traditional performance measurement is that in the traditional sense the outcomes or results are emphasised. In the context of knowledge work the results are still important, especially in for-profit organisations, but there is also parallel emphasis on competency. Competencies are the base of any knowledge work organisation, therefore controlling them is one of the key points in using performance measurement.

Organisational performance (organisation approach) requires identifying critical success factors, i.e. outcomes or drivers, on an organisational level. The organisational level is general and therefore it takes into account factors determined from the outside. Organisational level is the domain of management. Issues related to results, infrastructure and other enablers are considered. Organisational level is the level of strategy. Therefore every scheme must be implemented by setting operative plans or goals. Individual performance (performance driver/competency approach) takes into account the individual features of personnel. The level of individual performance is the level of leadership or applying the idea of how knowledge workers are supposed to be managed.

Performance measurement is very contextual, yet the main points for a knowledge work organisation can be defined as follows: dialogue, transparency, motivation and fairness. Dialogue is due to the fact that the manageability gap exists, i.e. managers need a sufficient amount of feedback. Transparency and motivation go along, as a managerial sys-

tem should be communicative and unidirectional. Fairness of a managerial system, e.g. performance measurement system, should be considered along with the designing and implementation process.

When applying performance measurement, certain steps should be taken. The process model employed in this dissertation was divided into three main phases: the meta-level i.e. planning the process, strategic level and practical level. The meta-level concerned issues of getting acquainted and constructing mutual, coherent insight as to what performance measurement is all about. The strategic level concerned formulating and revisioning of strategy. Moreover, the very essence of strategy was supposed to be explicated here. The practical level concerned the measurement, i.e. how critical success factors are operationalised, how measures are defined and how data is gathered and reported. The significance of the facilitator is high on the meta-level and it decreases when shifting to strategic and practical level. The performance measurement system is a contextual artefact, thus all operationalisations and use of performance measurement system is done in target organisation by the members of it.

Due to the manageability gap, i.e. simultaneous planning and doing, knowledge workers cannot be managed or measured by traditionally designed performance measurement system. Knowledge work requires organisational democracy, but also a certain framework for activities. The idea of rotating the performance measurement system 180 degrees indicates the importance of competencies instead of the results. Without knowledge and skills employees are unable to conduct their work, thus in the context of knowledge work the creation of new knowledge and the accumulation of skills is the key to success.

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Appendices

Appendix 1 Documentation of 13-step project model applied in the cases (in Finnish)

1. Projektin perustaminen, workshop
   - Tutkijaosapuolen esittely
   - Projektipäällikön valinta
   - Mittaustarpeen määrittäminen
   - Hankkeen ongelmakohtien tunnistaminen
   - Mittaristohankkeen tavoitteiden asettaminen
   - Projektiryhmän ja mahdollisten erillisten kehitysryhmien jäsenten valinta (asiantuntijajäsenet / projektihenkilöstö)
2. Koulutus mittaamisesta
3. Projektisuunnitelman laatiminen
4. Vision ja strategian täsmentäminen sekä toimintaprosessien kuvaus mittariston pohjaksi
   - Avainhenkilöiden haastattelut
   - 1-2 päivän workshoppia (projektiryhmä ja kehitysryhmät)
     - yhteinen ymmärrys visiosta, strategiasta ja prosesseista
     - sidosryhmien tavoitteiden kartoitus ja priorisointi
     - mittariston eri näkökulmien/ulottuvuuksien valinta
     - strategisten tavoitteiden määrittäminen kullekin näkökulmalle/ulottuvuudelle (johdetaan visiosta ja strategiasta näkökulmien mukaiset alatavoitteet)
5. Menestystekijöiden määrittäminen
   - Workshop (projektiryhmä ja kehitysryhmät)
6. Mittareiden määrittäminen menestystekijöille ja tavoitetasojen asettaminen
   - Workshop (projektiryhmä ja kehitysryhmät)
7. Organisaation eri tasojen/osien menestystekijöiden ja mittareiden johtaminen koko organisaation menestystekijöiden ja mittareiden perusteella sekä toimintaprosessien perusteella.

- Workshop-työskentelyä soveltuvissa ryhmissä

8. Mittareiden ja menestystekijöiden keskinäisten syy-seuraussuhteiden dokumentointi (workshop yhdessä/ryhmittäin tai muutama vastuuhenkilö
9. Mittareiden datalähteiden, laskentaperiaatteiden ja raportointiperiaatteiden määrittäminen
    - Workshop
        - tarvittavien datalähteiden määrittäminen
        - mittareiden omistajien nimeäminen
        - päätös hylätäänkö mittarit, joille ei pystytä määrittämään datalähdettä datan
        - korvaavien tai lisämittareiden tarpeen määrittäminen tämän ja edellisen (7.) vaiheen perusteella
        - mittareiden laskentaperiaatteiden määrittäminen
        - mittaustulosten raportointiperiaatteiden määrittäminen
10. Mittareiden käyttöperiaatteiden määrittäminen ja dokumentointi (ns. käyttöohjekirjan laatiminen kaikista mittareista)
    - Jokaisen mittarin omistaja dokumentoi mittarin
11. Mittariston ottaminen testikäyttöön
12. ”Valmiin” mittariston käyttöönotto
13. Mittariston karsinta ja täydentäminen tarpeen mukaan

Appendix 2 Documentation of 13-step project model applied in the cases

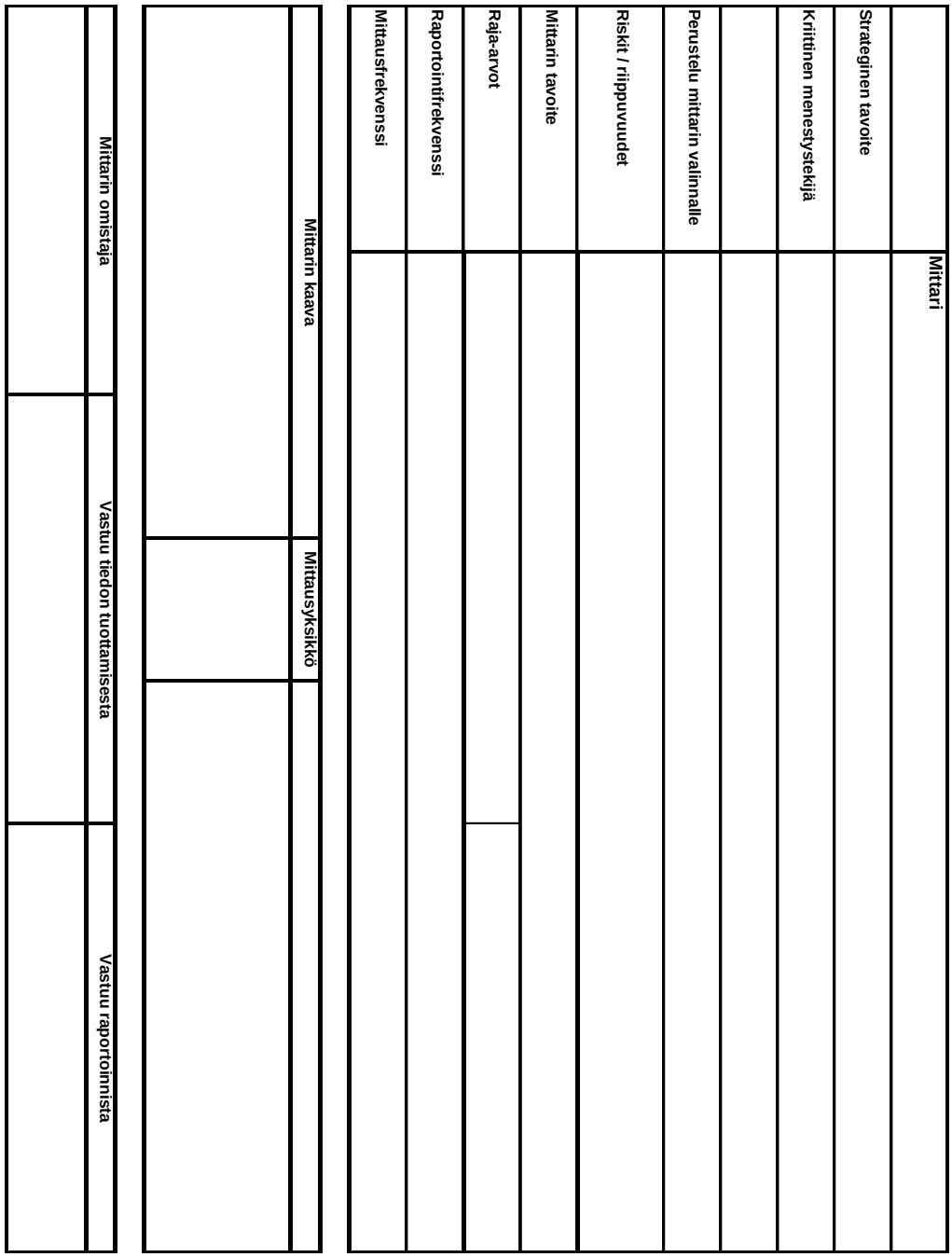
1. Founding the project, a workshop
   - introduction of researchers
   - choosing project coordinator
   - definition of measurement needs
   - identifying possible problems
   - setting goals for measurement system project
   - definition of project-group and other participants
2. Training for basics of performance measurement
3. Project plan and timetable
4. Checking the vision and revising strategy
   - interviews of the key personnel
   - 1-2 one day workshops (project group and other participants)
     - shared understanding on the vision, the strategy and the processes
     - definition of stakeholder needs and prioritising them
     - definition of the perspectives to the measurement system
     - definition of strategic goals for each perspective
5. Definition of critical success factors
   - Workshop (p project group and other participants)
6. Definition of measures and setting target levels
   - Workshop (project group and other participants)
7. Deriving the sublevel success factors and measures

   Deriving success factors and measures for sublevels by using organisation level success factors and measures or processes
   - Workshop-team work in suitable compositions
8. Documentation of expected causal relations (workshop or by the persons responsible)
9. Definition of data sources, measurement and reporting
   - Workshop
     - definition of the data sources required

- deciding on whether to accept or reject measures without suitable data source.
- finding replacing or additional measures according to phases 7. and 8.
- definition of the methods to produce the measurement data
- definition of the reporting principles and practices

10. Documentation of the measurement system (i.e. making a measurement manual)
    - the owner of each measure documents individual measure
11. Testing the measurement system
12. Implementing the system
13. Revising the measurement system if necessary

Appendix 3 Applied scorecard model for documentation of a measurement system (in Finnish). Model adapted from Case A



Mittarin nimi

Strateginen tavoite: Minkä strategisen tavoitteen toteutumista mittarilla pyritään seuraamaan?

Kriittinen menestystekijä: Mistä kriittisestä menestystekijästä mittari on johdettu?

Prosessi: Millä prosessilla mittarin tulokseen voi vaikuttaa?

Perustelu mittarin valinnalle: Miksi mittari on valittu mittaristoon? Kirjoita auki perustelu.

Riskit / riippuvuudet: Antaako mittari yksinään vääriä viestejä (esim. kustannus vs. laatu)? Mitkä muut mittarit / tekijät on otettava huomioon tulosta analysoitaessa? Voiko mittarin tulosta manipuloida, eli muokata tulosta mieleisekseen? Mittaako mittari oikeasti oikeaa asiaa?

Mittarin tavoite: Mittarille asetettava tavoitearvo. Tavoitearvo voidaan periaatteessa määritellä kolmella eri tavalla: historiatietoa vertaillen, benchmarkaten esim. toimialaan tai sitten seurannan kautta (jos ei ole historia- tai benchmark-tietoa).

Raja-arvot: Ylin: Mikä tulos olisi mittarille erinomainen **Alin:** Mikä olisi alin hyväksyttävä taso

Raportointifrekvenssi: Kuinka usein mittaria raportoidaan / seurataan? Seurantafrekvenssit voivat olla esim. kuukausi / neljännesvuosi / vuosi

Mittausfrekvenssi: Kuinka usein mittaritietoa on rekisteröitävä? Mittausfrekvenssi saattaa olla eri kuin raportointifrekvenssi. Mittausfrekvenssi kertoo kuinka usein tiedot on kerättävä tai tallennettava, jotta tiedot löytyvät oikean tasoisina, kun on aika raportoida.

Mittarin kaava

Mittausyksikkö

Mittaritiedon lähde: mitä vaaditaan tiedon saamiseksi

Määritelmä mittarin kaavasta: Mikäli mittari on suhdeluku, sekä osoittaja että nimittäjä määritellään sisällöltään, esim. lisäarvoa kokeneiden asiakkaiden määrä / asiakkaiden määrä -> Mitä lisäarvo tarkoittaa? Mitä tekijöitä se pitää sisällään? Miten asiakasmäärä määsitellään -> vain aktiiviset 12 kk ajalta jne.

Missä mittayksikössä tieto on

Mistä tietojärjestelmästä tietoa saadaan? Jos tieto ei tule järjestelmistä, miten tieto saadaan ja rekisteröidään? Tuotetaanko tieto itse vai tuottaako sen joku ulkoinen taho? Esim. asiakastyytyväisyyskysely ja imagetutkimukset vaativat kyselylomakkeen tietojen keräämisen, jonka voi suorittaa ulkoinen palveluntarjoaja ja tietojen tallentamiseen ja analysoimiseen tarvitaan tietokanta tai mahdollisesti sovellus.

Mittarin omistaja

Vastuu tiedon tuottamisesta

Vastuu raportoinnista

Kuka vastaa mittarin tuloksesta ja korjaavien toimenpiteiden toteutuksesta? Eli kenellä on liiketoimintavastuu kyseisestä asiasta? Tähän on nimettävä henkilö. Kuka vastaa tiedon rekisteröinnistä ja tuottamisesta, eli siitä että tieto on olemassa oikeana ja oikeassa muodossa? Voi olla esimerkiksi tietojärjestelmävastaava, prosessin omistaja tms. Tähän voidaan määritellä useampi henkilö. Kuka vastaa raporttien tekemisestä ja tiedon raportoimisesta eteenpäin? Esim. controller vastaa talousraporttien ja analyysien tekemisestä. Nimeä henkilö(t).

Appendix 4 Explanations for applied scorecard model for documentation of a measurement system (Appendix 3). Model adapted from Case A

The fields in the scorecard and possible guidelines for filling the scorecard.

Mittarin nimi /The name of the measure

Strateginen tavoite/Strategic goal: What is the strategic goal that the measure draws attention to?

Kriittinen menestystekijä/Critical success factor: From which critical success factor the measure is derived?

Prosessi/Process: What is the process that affects the measure?

Perustelu mittarin valinnalle/Justification of the measure: Why this measure is chosen to measurement system? A written explanation on the issue.

Riskit / riippuvuudet/The risks / dependencies: Does the measure lead to partial optimisation or does it give wrong signals (e.g. costs vs. quality)? What other measures or factors should be taken in account? Can the measure be manipulated? Is the measure unambiguous? Is the measure valid?

Mittarin tavoite/ The target level of the measure

Raja-arvot/Limits: Ylin/Top: What would be good value **Alin/Bottom:** What would be the lowest acceptable value?

Raportointifrekvenssi/Reporting frequency: How often the measure is reported / evaluated? Possible frequencies coul be e.g. a month, a quartal or a year.

Mittausfrekvenssi/Measurement frequence: How often data is gathered? Can differ from reporting frequence. Measurement frequence is the guideline to be applied to anable that measures can be reported as determined.

Mittarin kaava/Equation

Mittausyksikkö/Unit of measurement

Mittaritiedon lähde/Data source: What is required to get the data?

Määritelmä mittarin kaavasta/Definition of the equation: Explicit directions how e.g. nominator and denominator are defined.

Missä mittayksikössä tieto on/ Unit for measurement data

Mistä tietojärjestelmästä tietoa saadaan?/From which system the data comes from? If not, how the data is gathered? Is the data from inside sources or are there outside sources required?

Mittarin omistaja/The owner of the measure

Vastuu tiedon tuottamisesta/The person responsible for the data

Vastuu raportoinnista/The person responsible for the reporting

Who is responsible for results and correcting actions. A person must be nominated

Appendix 5 Working environment survey (in Finnish)

Työtyytyväisyyskysely (oma arvio 1-5)
I Työn sisältö
1. Tulos- ja muiden työtavoitteiden selkeys
2. Työn itsenäisyys ja työn sisältöön vaikuttaminen
3. Työn vastuullisuus, haastavuus ja mielenkiintoisuus
4. Työn fyysinen kuormittavuus
5. Työn henkinen kuormittavuus
II Johtaminen
6. Lähimmän esimiehen antama tuki
7. Töiden yleinen organisointi yksikössä
8. Töiden yleinen organisointi koko organisaatiossa
9. Palautteen saanti työtuloksista, ammatinhallinnasta ja työssä edistymisestä
10. Palkkauksen kannustavuus ja oikeudenmukaisuus
III Työyhteisön toimivuus
11. Työyksikön sisäinen yhteistyö ja työilmapiiri
12. Koko organisaation sisäinen yhteistyö ja työilmapiiri
13. Tasapuolinen kohtelu organisaatiossa
14. Työpaikkakiusaaminen organisaatiossa
15. Sukupuolten tasa-arvon toteutuminen organisaatiossa
IV Kehittymisen tuki
16. Uralla eteneminen ja sen tukeminen
17. Ammatillisen kehittymisen tuki ja vahvistaminen
V Muut organisaatioon liittyvät asiat
18. Organisaation sisäinen avoimuus ja tiedotus
19. Organisaation julkikuva työnantajana
20. Työtilat ja työvälineet
VI Lisäkysymykset
21. Lisäkysymys1
22. Lisäkysymys2
23. Lisäkysymys3
24. Lisäkysymys4
25. Lisäkysymys5
VII Halukkuus työpaikan vaihtoon ja henkilökiertoon
26. Halukkuus työpaikan vaihtoon lähitulevaisuudessa
27. Halukkuus henkilökiertoon

Appendix 6 Working environment survey

Working environment survey (subjective evaluation on scale1-5)
I Contents of the work
1. Clearness of the set goals
2. Independency and possibilities to affect the contents
3. Responsibility, challenging and interesting
4. Physical stress
5. Mental stress
II Leadership
6. Support from the closest supervisor
7. General organisation of work in the primary unit
8. General organisation of work in the whole organisation
9. Feedback, professional development and progress
10. Consolance of remuneration
III Functionality of working community
11. Internal cooperation and environment in the primary unit
12. Internal cooperation and environment in the whole organisation
13. fairness of management
14. Bullying in the organisation
15. Gender equality
IV Support for the development
16. Career progress and support for it
17. Professional development and support for it
V Miscellaneous
18. Internal openness and communication
19. Organisational image as an employer
20. Working premises
VI Additional questions
21. Additional question1
22. Additional question 2
23. Additional question 3
24. Additional question 4
25. Additional question 5
VII Willingness to change positions or to participate personnel rotation
26. Willingness to change position in near future
27. Willingness to participate in personnel rotation