



TAMPERE UNIVERSITY OF TECHNOLOGY

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**IMPROVING KNOWLEDGE WORK PRODUCTIVITY THROUGH
NEW WAYS OF WORKING**

Master of Science Thesis

Prof. Antti Lönnqvist has been appointed as the examiner at the Council Meeting of the Faculty of Business and Technology Management on September 5th, 2012.

ABSTRACT

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Knowledge work and knowledge work productivity have been studied for several years without achieving a consensus on how to improve it. One of the reasons is that the work practices and methods are based on traditional ways of working originating from the industrial era. Such ways of working are not applicable in our contemporary knowledge economy, hence there is a need for innovative ways to improve knowledge work productivity. 'New ways of working' offers a novel approach to tackle the issue.

The main objective of this research was to examine how new ways of working affect knowledge work productivity and thus to ascertain how new ways of working could improve knowledge work productivity. This study entails two aspects: work environment consisting of three dimensions (physical, virtual, and social) and work practices (such as flexible and mobile work). This study incorporated both a theoretical and an empirical approach. The theoretical part focused on understanding the dynamics of knowledge work, knowledge work productivity and new ways of working. The empirical part took the form of a qualitative case study with two case companies, Rapal Oy and Granlund Oy. The empirical material was gathered from 18 thematic interviews.

As a result, the impacts of the work environment and work practices were identified in both cases. The potential of new ways of working to improve knowledge work productivity was analyzed resulting in three most important aspects in both cases. Most of the key findings of this study corroborated those of earlier studies. However, this research emphasized the significance of the social environment and work practices as regards productivity. New ways of working were considered to affect, for example, work flow, time efficiency, knowledge sharing, and more intangible aspects, such as job satisfaction and motivation. However, the impact on the work-life balance was perceived to be a rather complex issue, since both positive and negative impacts emerged. In conclusion, this research increases the understanding of the relationship between new ways of working and employee productivity, offering a comprehensive view on the matter.

TIIVISTELMÄ

TAMPEREEN TEKNILLINEN YLIOPISTO

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Tietotyötä ja tietotyön tuottavuutta on tutkittu useita vuosia. Tästä huolimatta konsensusta siitä, miten tietotyön tuottavuutta voitaisiin kehittää, ei ole saavutettu. Tämän päivän tietoyhteiskunnassa, jossa suurin osa työvoimasta tekee tietotyötä, tehdään työtä edelleen menetelmillä, jotka ovat pitkälti peräisin teolliselta aikakaudelta. Nämä perinteiset työskentelytavat eivät kuitenkaan enää toimi odotetulla tavalla, minkä vuoksi tarvitaan uusia tapoja tietotyön tuottavuuden parantamiseen. 'New ways of working' tarjoaa uudenlaisen lähestymistavan tietotyön tuottavuuden kehittämiseen.

Tämän tutkimuksen tavoitteena oli selvittää, millä tavoin uudenlaiset tavat työskennellä vaikuttavat työn tuottavuuteen ja tätä kautta analysoida, miten näillä menetelmillä tietotyön tuottavuutta voitaisiin kehittää. Työssä käsiteltiin sekä työympäristöä, joka nähtiin koostuvan fyysisestä, virtuaalisesta ja sosiaalisesta työympäristöstä, että yksilöiden työskentelymenetelmiä, kuten joustavaa ja liikkuvaa työtä. Työssä aihetta lähestyttiin sekä teoreettisesti että empiirisen tutkimuksen avulla. Teoriaosuudessa keskiössä olivat tietotyö, tietotyön tuottavuus sekä 'new ways of working'. Empiirinen osuus toteutettiin tapaustutkimuksena, pohjaten laadulliseen tutkimusotteeseen. Tutkimuksessa oli mukana kaksi yritystä, Rapal Oy ja Granlund Oy. Tutkimuksen empiirinen aineisto kerättiin 18 teemahaastattelulla.

Tutkimuksen tuloksena molemmissa yrityksissä tunnistettiin tärkeimmät työympäristön ja työskentelytapojen vaikutukset tuottavuuteen. Tämän perusteella uudenlaisten työtapojen potentiaalia tuottavuuden kehittämisessä analysoitiin yrityskohtaisesti. Suurin osa yksittäisistä tutkimustuloksista täydentää aiempia tutkimustuloksia. Tässä tutkimuksessa kuitenkin korostui sosiaalisen työympäristön sekä yksilön työskentelytapojen merkitys. Uudenlaisilla työskentelytavoilla nähtiin usein olevan vaikutusta esimerkiksi työn sujuvuuteen, aikatehokkuuteen ja tiedon jakamiseen, sekä aineettomimpiin tekijöihin, kuten työtyytyväisyyteen ja motivaatioon. Työ- ja yksityiselämän tasapaino koettiin ongelmalliseksi, sillä uusilla työskentelytavoilla havaittiin olevan sekä positiivisia että negatiivisia vaikutuksia tähän. Lopputuloksena tämä tutkimus lisäsi ymmärrystä yksilön tuottavuuden ja uudenlaisten työskentelytapojen välisestä suhteesta ja tarjosi kokonaisvaltaisen näkökulman asiaan.

PREFACE

Writing this thesis was ultimately a much less painful process than I had expected. The main reason for this was the work I had done within this interesting subject before deciding to write my thesis on it. It was very fruitful to write my thesis on a subject that is so very topical and also close to my heart. Moreover, using new ways of working, such as working from home, while writing this thesis, deepened the learning process giving a practical view on the subject. I hope that the understanding gained throughout this process will someday become meaningful.

I would like to thank my supervisor Professor Antti Lönnqvist, for his encouragement and valuable guidance throughout this process. I wish to express my appreciation to the Department of Business Information Management and Logistics, Tampere University of Technology for providing me with the work environment and to the Performance Management Team for making it enjoyable to work during the project.

I want to express my gratitude to the RYM PRE NewWoW project for making this thesis possible and for offering such an inspiring subject. Special thanks to Rapal Oy and Granlund Oy for providing me with such interesting cases for this research.

I would especially like to thank my family for the support and my friends for making the time spent during my studies so memorable.

“Education is an admirable thing, but it is well to remember from time to time that nothing that is worth knowing can be taught.”

-Oscar Wilde-

Helsinki, October 23rd 2012

Jenna Ruostela

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1. INTRODUCTION

1.1. Background

The traditional ways of working originating from the industrial era are no longer applicable in our contemporary knowledge economy, where knowledge workers compose the majority of the workforce (Davenport 2008). Whereas these traditional ways of working have proven to be productive in industrial settings, they have not shown the same effects in knowledge work (see e.g. Drucker 1999). However, economies and organizations still need to maintain economic growth and profitability in knowledge era, which entails improvements in productivity and hence a motivated workforce (van Loggerenberg & Cucchiaro 1981, p. 87). The only way to maintain economic growth while ensuring the welfare of the workforce is therefore to design and develop new ways of organizing work so as to simultaneously improve productivity and the well-being of the workforce.

The number of knowledge workers has increased dramatically, as organizations have moved from manual production to a more knowledge-intensive business (Ramirez & Nembhard 2004, p. 602). Knowledge workers are the key assets in organizations in the contemporary business environment. They play a crucial role in creating economic value and growth in knowledge-intensive organizations since they innovate, invent new products and services, create strategies and design marketing programs. (Davenport 2010, p. 17.) Since the success of contemporary companies relies mainly on knowledge workers improving the productivity and performance of the knowledge workers becomes the key factor in creating economic growth.

“The most important contribution management needs to make in the 21st century is to increase the productivity of knowledge work and knowledge workers.” (Drucker 1999)

The quotation above has gained a lot of attention in the knowledge work literature ever since it was published and still appears in the majority of publications dealing with knowledge work productivity (see e.g. Sveiby & Simons 2002; Ramirez & Nembhard 2004; Röhl 2004; Haas & Hansen 2007; Steyn & du Toit 2009; Davenport 2010; Erne 2010; Wong & Neck 2010). This indicates that even though the importance of the issue is recognized, there have been no major advances in the methods for improving knowledge work productivity. One of the reasons for this is that the methods used today are still largely based on the same assumptions originating from manufacturing (Davenport 2008, p. 215). Thus managers are still looking for ways to improve the productivity of their knowledge workers.

One possible way of improving the productivity of knowledge workers is to design the work practices, methods, and settings in a totally new way. “New ways of working” provides a novel approach for questioning the contemporary and more traditional ways of working. It highlights the fact that in modern knowledge-intensive organizations work practices should be designed according to the requirements of the tasks at hand (e.g. Gibson 2003). It takes into account that the work settings should support the needs of an individual knowledge worker (e.g. Greene & Myerson 2011). When designing work practices there are three important aspects (see e.g. Vartiainen 2007) to be taken into account:

- 1) the physical environment needs to meet the requirements of the task
- 2) the virtual environment (e.g. ICT tools) needs to enable the use of different spaces and make knowledge and information sharing possible
- 3) the social environment (e.g. organizational culture) needs to support the new working methods.

In addition to these aspects, the success of new ways of working depends on the employees’ ability to exploit this potential. Although the work environment forms the prerequisites for new ways of working, harnessing the full potential is ultimately dependent on the employees’ capability to utilize this potential.

1.2. Context of the research

This research was carried out as a part of the ongoing NewWoW (New Ways of Working) research project on the RYM Oy’s PRE (Built Environment Process Re-engineering) program. RYM Oy is the Strategic Centre for Science, Technology and Innovation of built environment in Finland. It is a Venture for Intellectual Capital operating in the real estate and construction sector that invests the funds and know-how of companies and public financiers of innovation in research areas most important for international competitiveness.

The aim of the project is to provide an understanding of the changing nature and demands of knowledge work and their impacts on facility management and the productivity of organizations. New work space solutions are being developed using BIM (Building Information Modeling) in response to the increasing interactiveness and project nature of knowledge work. The project started in 2011 and will continue to the end of 2013.

The companies involved in this project are Rapal Oy (driver company), Granlund Oy, ISS Palvelut Oy and Senate Properties. VTT, the Technical Research Centre of Finland and Tampere University of Technology (TUT) are responsible for the research and therefore the academic results of the project. The focus of TUT in the project is on examining the possibilities of New Ways of Working in developing knowledge work productivity and creating metrics to measure it. This thesis therefore is closely

connected to TUT's objectives and benefits TUT in achieving the desired results. This research is also based on two case organizations that are involved in this project, Rapal Oy and Granlund Oy. The organizations and their backgrounds will be presented in more detail in Chapter 5.

1.3. Research problem and research questions

As argued at the beginning, knowledge work productivity has been studied for several years without achieving a consensus on the ways to improve it. However, a number of scattered ways that can be used to improve knowledge work productivity have been identified, including:

- automating certain tasks using IT (Kaplan & Aronoff 1996)
- providing mobile computing devices (Davis 2002)
- providing mobile business services (Vuolle 2010)
- providing better tools and work infrastructure (Haner et al. 2009)
- designing the work environment to enhance productivity via improved knowledge sharing (Peponis et al. 2009)
- improving knowledge flow (Laihonen & Lönnqvist 2011)

As seen from the list above, the literature on knowledge work lacks a holistic view on how to improve the productivity of knowledge work. However, the concept of new ways of working seems to provide a solution, suggesting a novel approach to this problem, while promoting a holistic view to improve knowledge work productivity. However, only few publications on the productivity impacts of new ways of working have been published (van der Voordt 2004a, p. 137; Khanna & New 2008). The impacts of these new working practices and settings are more often approached from an organizational level considering the overall performance of firms and cost savings (e.g. Bradley 2002; van der Voordt 2004a; Ruostela et al. 2012). However, the impacts of new ways of working on productivity at individual level are still vague. Thus there is a need for a deeper insight into the relationship between new ways of working and knowledge work productivity at the individual level. This requires a more profound understanding on these two phenomena: knowledge work productivity and new ways of working.

This research aims to identify the factors of new ways of working that have an impact on the productivity of knowledge workers. The objective is specifically to examine which factors would be able to improve or enhance productivity. This research examines the productivity impacts of new ways of working in two case organizations. Using two cases makes it possible to identify the potential of new ways of working in improving knowledge work productivity in these case organizations likewise to understand the phenomenon more profoundly. Hence the main research questions can be formulated as follows:

RQ1: What are the most important elements of ways of working that have an effect on knowledge work productivity?

RQ2: What is the potential of new ways of working for improving the productivity of knowledge work?

These research questions are approached by a few sub-questions. Firstly, the knowledge work productivity phenomenon is examined in the light of earlier studies aiming to answer the questions “*What constitutes knowledge work productivity?*” and “*Which factors affect knowledge work productivity?*” Secondly, the concept of new ways of working is discussed in the light of the literature attempting to answer “*What is new ways of working?*”. After this, based on the empirical research, the impacts of new ways of working and especially the work environment (physical, virtual and social) on productivity are analyzed in two case organizations. The empirical part responds to the first research question “*What are the most important elements of ways of working that have an effect on knowledge work productivity?*” This question is twofold and includes two sub questions: “*Which elements in work environment (physical, virtual, social) affect productivity?*” and “*Which personal ways of working affect productivity?*” Finally, based on the theoretical and empirical parts a synthesis of the productivity impacts of new ways of working in these two case organizations is constructed and the second research question “*What is the potential of new ways of working for improving the productivity of knowledge work?*” will be answered.

1.4. Scope and limitations

Productivity can be approached from various levels ranging from individual level to industry and national levels (Hannula 1999). However, productivity is conceived in the lowest level (individual) while the higher levels (such as industry and organizational) create the preconditions for productivity (Uusi-Rauva 1997, p. 17). Hence the focus in this thesis is on analyzing productivity at the level of individual knowledge worker. Another reason for choosing this level of examination is that the aim of new ways of working is to influence the way people work. It is therefore appropriate to study the impacts of different factors on productivity from an individual’s point of view.

There are many different kinds of knowledge workers (e.g. Davenport 2010), hence some limitations have to be imposed regarding the scope of the research. The aim here is to study the productivity of knowledge workers whose amount of manual work is minimal. This limitation rules out certain professions, such as health-care workers, which helps to unify the sample. Thus the sample includes knowledge workers whose workplace is traditionally an office (not e.g. a hospital or classroom). This limitation is important since the working environment is one of the main themes in this research and it is reasonable to focus on workers whose basic working conditions are similar.

The work environment itself is a complex and broad field that opens up a variety of research opportunities. However, since the work environment is only a single aspect in approaching new ways of working in this study the concept of work environment is not examined profoundly here, but only through the aforementioned three dimensions (physical, virtual, and social). Naturally, if other important aspects emerge during the empirical research they need to be taken into account individually.

1.5. Research philosophy, strategy and design

Before beginning the research some important decisions had to be made concerning philosophical view, research strategy, research design, and research methods. Saunders et al. (2009, pp. 107-108) present a model called ‘research onion’ which describes the different kinds of choices that guides the course of the research (Figure 1).

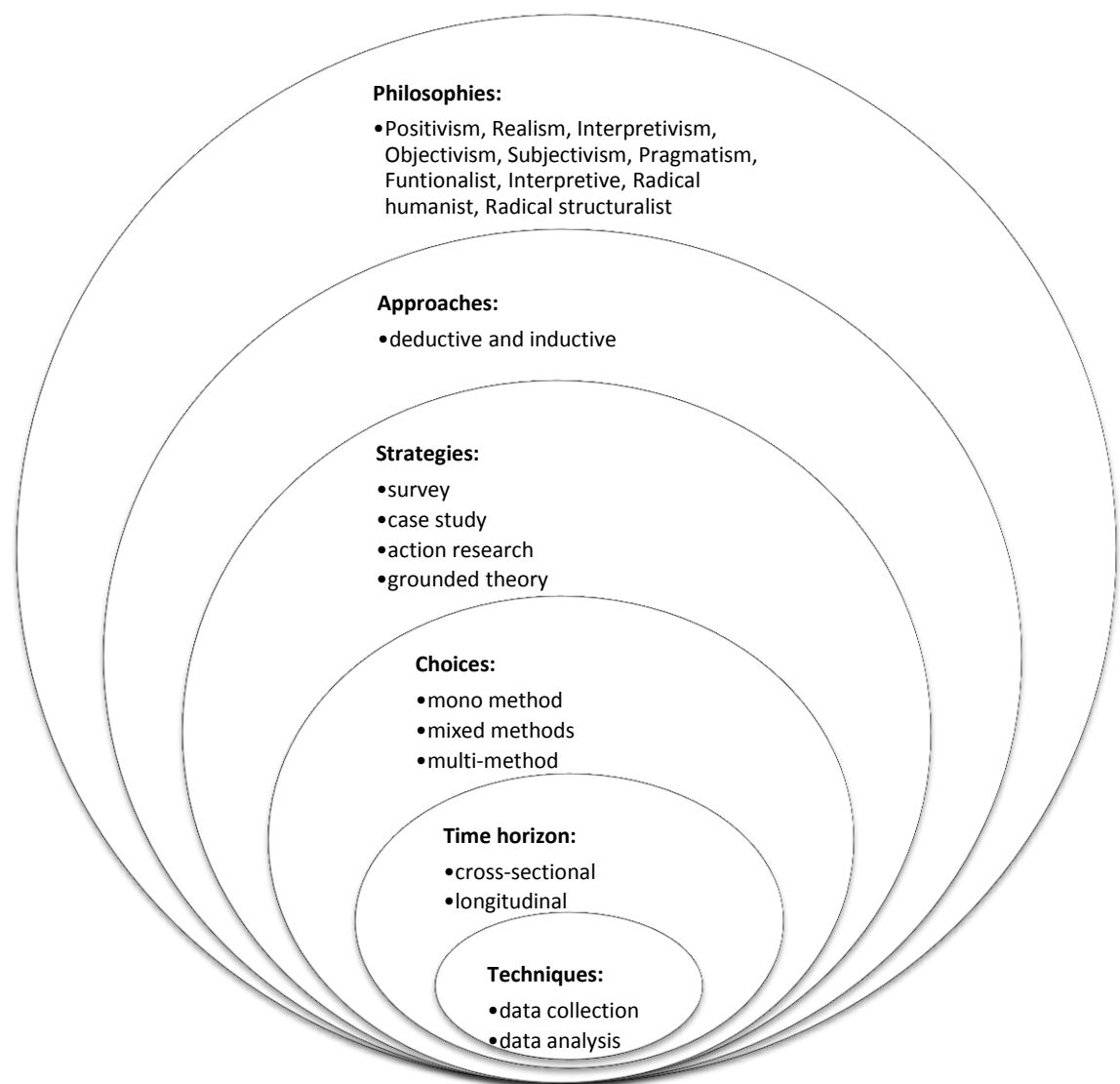


Figure 1. The research onion (adapted from Saunders et al. 2009).

As seen in the picture, these aspects form a complex in which all parts are at least to some extent influenced by one another. In the literature the usage of these terms is very often overlapping, especially as regards research design, strategy and methods. In this research the most fundamental issues are related to different philosophical bases, possible research strategies and methods, and techniques for data collection and analysis, which will be discussed next.

1.5.1. Research philosophy

Before it is reasonable to consider different strategies and approaches for the research it is important to identify its philosophical basis. There are two significant philosophical views that can be used as a basis for research: hermeneutics and positivism. The basic objective of hermeneutics is to increase the understanding of the phenomenon, whereas in positivism the aim is to achieve repeatable results from the proven facts. Hence this hermeneutic view aims at subjective interpretation and understanding the phenomenon whereas positivism highlights the objective and explanatory view. (Olkkonen 1994, pp. 26-27, 35).

Hermeneutics focuses on the interpretation of the social settings (i.e. people and processes) of the phenomenon, which is essential given the social nature of *new ways of working* (Olkkonen 1994). Furthermore, hermeneutics is the philosophy behind interpretivism, which is the epistemology of qualitative research and thus the work at hand (Myers 1997, p. 10). Last, it is argued that a positivistic view is too narrow-minded for any problem related to organizational science (Reason & Bradbury 2001, p. 88). Because of these arguments it seems clear that the hermeneutic view provides a better starting point for this study.

Interpretivism was mentioned as the epistemology underlying qualitative research (see e.g. Myers 1997, p. 10) and thus requires more attention. First, interpretivism is the most appropriate epistemology for business research (Saunders et al. 2009, p. 116). Second, interpretivism suggests that facts are always seen in the light of interpretation, arguing that data is not detachable from theory (Baskerville & Myers 2009, p. 40). Third, business studies are always rooted in a social context and thus require an epistemology that urges the researcher to understand the unique, complex situations and social settings that are present in the given problem setting (Saunders et al. 2009, p. 116). Considering that the concept of *new ways of working* is set within social settings and that the ‘facts’ of it are always interpreted in the light of the current situation, it is clear that interpretivism is the right choice for an underlying epistemology.

1.5.2. Research strategy

Derived from the philosophical background the next phase is to choose a research strategy that provides the guidelines for the execution of this research. Figure 2 presents a classification of different research approaches used often especially in Finnish

business research (Kasanen et al. 1991). The distinction is based on two paradigms: theoretical-empirical and descriptive-normative. Five different research approaches can be identified on the basis of these paradigms: concept-analytical, decision-methodological, nomothetic, action-analytical, and constructive.

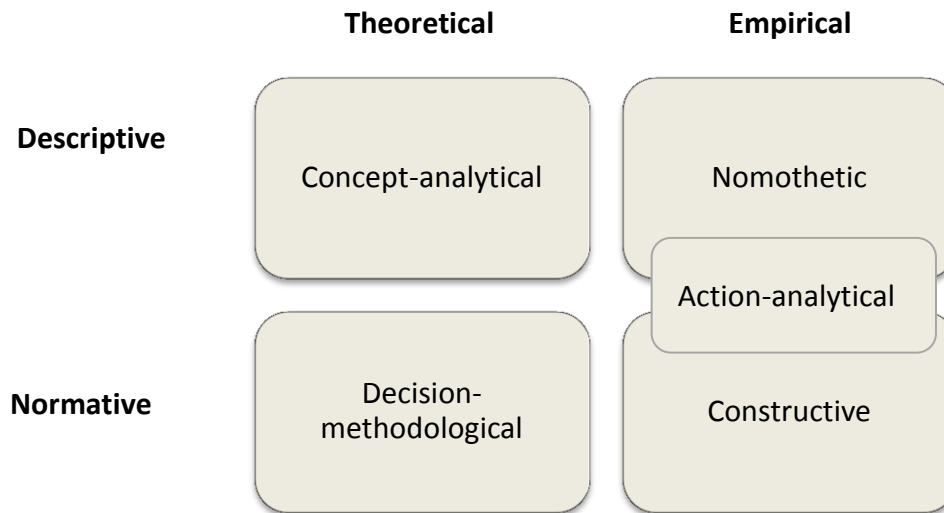


Figure 2. Research approaches in business research (adapted from Kasanen et al. 1991)

This research entails both theoretical and empirical approaches. In the theoretical part the main focus is on trying to describe the phenomenon and the objective is to form a basis for the empirical part of the research, suggesting that the approach is more descriptive. Therefore, in the theoretical part of the research conceptual analysis is used to understand the subject of the research comprehensively.

Conceptual analysis research can have various objectives. With conceptual analysis the aim may be to reach the different meanings connected to the concept, to create an operational definition for the concept, or to discern, specify and extend the existing knowledge about the concept. Conceptual analysis can also help the researcher to understand the phenomenon better and the outcome of the analysis can be used as a basis for structuring the concept. (Puusa 2008, p. 39.) In this research the point of using concept-analytical approach is to understand the phenomenon comprehensively and thus form a basis for analyzing the empirical results.

Choosing the approach for the empirical part is more complex. Choosing a hermeneutic starting point suggests that the approach cannot be nomothetic, which is in many ways paralleled by the positivistic view (Neilimo & Näsi 1980). Nor is approach purely normative, since the aim in constructive research is to form a construction that solves an explicit problem defined at the beginning of the research (Kasanen et al. 1991, p. 302), which is not the aim in this study. Hence the only choice left is the action-analytical approach, which thus needs more attention.

In the action-analytical approach the focus is on understanding the phenomenon and has its roots in hermeneutics. The objective in action-analytical research is not to find generalizations but is to create concept systems and a language that can be used to understand the phenomenon. (Neilimo & Näsi 1980, p. 35.) In action-analytical research it is typical that the empirical material is qualitative and usually carried out with selected cases (Olkkonen 1994, p. 73). Relying on these arguments the approach used in this research is decidedly action-analytical.

1.5.3. Research design

After choosing the approaches for this research the next step is to design its implementation. Bryman & Bell (2007) differentiate five different research designs; cross-sectional design, experimental design, longitudinal design, case study design, and comparative design. Experimental designs are rarely used in business and management research, mainly because when dealing with organizations the level of control cannot usually be accomplished. A cross-sectional study (or social survey) entails the collection of data on more than one case at a single point in time in order to collect quantifiable data with two or more variables. Longitudinal design is a research design typically used to map change and its impacts in business and management research. A comparative study entails applying more or less identical methods to two or more contrasting cases which are compared with each other. Case study entails a detailed and intensive analysis of a single case or multiple cases (Yin 1994). (Bryman & Bell 2007, pp. 44-66.)

Given the objectives of this research, case study provides the best approach. Also, the philosophical view and research approach support this choice since the empirical material on action-analytical approach is usually gathered via a few selected cases (see e.g. Olkkonen 1994). In case study the focus is on understanding the dynamics present within single settings (Eisenhardt 1989, p. 534). This gives an opportunity to thoroughly examine one case or, as in this research, two cases, since the case study approach is not confined to the study of a single case. Hence, this is a multiple-case study that focuses on examining the ways of working in two different firms.

According to Bryman & Bell (2007), especially in business and management research, multiple-case studies have become increasingly common. The use of multiple cases allows the researcher to compare and contrast the findings and based on that to better reflect the theory on the findings. Compared with cross-sectional design, a case study with multiple cases has its focus on the cases and the unique contexts, whereas in cross-sectional design the focus is on producing general findings. Therefore the emphasis in a multiple-case study is on the individual cases and with cross-sectional study it is on the sample of cases. (Bryman & Bell 2007, pp. 62, 64-65). Since the two cases used in this research differ from each other it is not reasonable to use a cross-sectional method.

According to Gummesson (2000), case study can have two kinds of interest. First, it can attempt to draw general conclusions from a limited number of cases. Second, it can seek to arrive at specific conclusions regarding a single case. Case studies, however, have come in for some criticism in the means, for example, of statistical reliability and validity and generalizability as well as whether the hypotheses generated can be tested. (Gummesson 2000, pp. 84, 88.) Since this research includes two cases it is justified to try to draw some general conclusions from the two cases. However, it needs to be taken into account in the analysis phase that the generalizability is restricted. Therefore the emphasis in this research is on drawing specific conclusions from both cases and to find some similarities and differences between these.

With respect to methodological issues the distinction between quantitative and qualitative research is very often made (e.g. Hirsjärvi & Hurme 2004, Bryman & Bell 2007, Tuomi and Sarajärvi 2009). Research strategies are often classified into quantitative or qualitative, although the juxtaposition is no longer relevant in most cases. However, this classification can simplify the understanding the differences between different research strategies, since the quantitative/qualitative distinction guides at least to some extent the choice of research methods and techniques. The qualitative/quantitative distinction is also a helpful umbrella for many other issues from the practical viewpoint in business research (Bryman & Bell 2007, p. 28).

Creswell (1994) has made possibly the most advanced distinction between quantitative and qualitative strategies. This entails five different categories; ontological, epistemological, axiological, rhetorical and methodological assumptions differentiate qualitative research from quantitative research. (Hirsjärvi & Hurme 2004, p. 21.)

In quantitative research strategy the ontological assumption is that reality is objective and consistent, whereas in qualitative approach reality is subjective and multifold as in the research at hand (Creswell 1994). Using hermeneutics as a basis for this research implies that the qualitative method should be used. In the quantitative approach the epistemological assumption is that the subject of the research is not dependent on the researcher, whereas in the qualitative approach the researcher and the subject interact with each other. (Creswell 1994.) Given the choice of interpretivism it is clear that from this point of view the natural methodological choice is qualitative.

From the axiological viewpoint quantitative strategy does not depend on values, whereas in qualitative research values play a major role. In quantitative research the language used is formal while qualitative research takes more note of individuals' language and terms. Methodologically quantitative research is based on the use of numbers, which is the most common difference between quantitative and qualitative research. (Creswell 1994.) In this research the focus is on the different meanings and people's perceptions and therefore not on the quantity of some specific answers suggesting to choice of qualitative research strategy. Considering all these aspects and

the aforementioned choices regarding philosophical view and research strategy and design it seems obvious that this research is decidedly qualitative in nature.

1.6. Outline of the thesis

This thesis consists of seven chapters. In the introduction chapter the background of the thesis is presented. The objectives for the research are set out and the research questions are formulated. The methodological starting point of the study is also outlined in the introductory chapter.

The next three chapters form the theoretical basis for the research. In Chapter 2 the objective is to gain a deeper insight into the phenomenon of *knowledge work* since understanding the nature of knowledge work is important for the purposes of this research. In the following chapter the focus is on *productivity*. To understand the phenomenon comprehensively the traditional definition of productivity is first discussed before narrowing down to the productivity issues in knowledge work context. In the last theoretical chapter the concept of *new ways of working* is presented.

Chapter 5 draws the theory chapters together and creates the foundations for the empirical research. After this, the empirical material is described likewise the methods used for collecting and analyzing the material. Chapter 6 presents the results of the empirical research and forms a synthesis of the theoretical background and the empirical findings. In this chapter the factors affecting knowledge work productivity and the potential of new ways of working are discussed case-by-case. After this the results are reflected to the existing literature and their significance is assessed in the light of earlier studies. In the last chapter “Conclusions” the main results and the contribution of the research are analyzed likewise the success of the research. In this chapter some future research themes are also identified and proposed.

2. KNOWLEDGE WORK

2.1. The evolution of knowledge work

Today, knowledge workers are the fastest growing group of workers (Davenport 2008, p. 216). The number of knowledge workers has increased as organizations have moved from manual production to a more knowledge-intensive business (Ramirez & Nembhard 2004, p. 602). The midpoint of the shift from manual workers to knowledge workers was in the mid-1950s, when knowledge workers outnumbered manual workers (Thomas & Baron 1994, p. 5). At the same time the number of workers in services accounted for 50 percent of the workforce (Fitzsimmons & Fitzsimmons 2008, p. 5).

The emergence of knowledge workers can be seen as a consequence of a broader shift from an industrial to a postindustrial society, where rather than, for example, physical strength, knowledge is seen as the key resource for workers and where higher education becomes significant (Fitzsimmons & Fitzsimmons 2008, pp. 7-8). This shift has made room for knowledge workers to grow to become the largest group of workers. Because of this, knowledge workers are now argued to be the key assets in creating organizational growth in the 21st century (see e.g. Drucker 1999, p. 79; Davenport 2010, p. 17). Hence more attention should be paid to improving the performance and productivity of knowledge workers.

The importance of knowledge workers has been acknowledged in the literature and knowledge workers have gained a lot of attention in recent decades although little consensus has been achieved on the matter (e.g. Bosch-Sijtsema et al. 2009). Regarding the productivity of knowledge workers especially the development is still in its infancy. One of the reasons for this is that knowledge workers are still very much being managed with methods that were developed in the industrial age. (Davenport 2008, pp. 215-216.) Thus the methods used for improving the productivity of knowledge workers are also inherited from the manufacturing era. Clearly, these methods are not applicable since knowledge work is very different from manual work.

Simultaneously the importance of services and service business has increased. Service industries are leaders in every industrialized nation creating new businesses and jobs. Many of these jobs in service industries are for knowledge workers and have the greatest expected growth in professional and business services. (Fitzsimmons & Fitzsimmons 2008, p. 3.) Thus the majority of knowledge workers produce some kind of services (i.e. consulting services, legal and financial services, health-care services

etc.) (Laihonen et al. 2012, p. 103), which is why the service perspective needs more attention.

Services can be seen as the application of specialized competences, through deeds, processes, and performances for the benefit of another entity or the entity itself (Lovelock 1991, p. 13; Vargo & Lusch 2004, p. 326). Services are traditionally distinguished from products on the basis of four criteria: services are usually intangible in nature, they are created and consumed simultaneously, they cannot be stored and they are heterogeneous. The customer's role in services is often emphasized since the customer may have an impact on the service process. (see e.g. Fitzsimmons & Fitzsimmons 2008, pp. 19-21.) Due to the customers' active role in the service process they can also influence productivity (Ojasalo 2003, p. 18). The value of a service is always manifested when it is used by the customers (Bosch-Sijtsema et al. 2009, p. 536). Hence it is usually the customers who define the ultimate value and quality of a service. This special role of customers is one of the key points from the service perspective in the light of this research.

One issue having an impact on the growing number of knowledge workers is the fact that knowledge workers work in very different sectors of the economy, for instance in legal and financial services, health-care, research and development and IT-industries (Alvesson 2001, p. 864; Okkonen 2004, p. 59). Such organizations are generally called *knowledge-intensive organizations* (see e.g. Alvesson 2001). Knowledge-intensive organizations according to Starbuck (1992, p. 715) are companies where knowledge is the main input and is more important than the other inputs (compared, for example, to labor and capital intensive firms). Therefore the intellectual capital and other intangible resources are considered to be especially important for knowledge-intensive companies (see e.g. Sveiby 1997).

Von Nordenflycht (2010) also emphasizes these special characteristics of knowledge-intensive firms. He selected the three most important distinctive characteristics from the literature that can be used to classify knowledge-intensive firms: *knowledge intensity*, *low capital intensity*, and *a professionalized workforce*. Based on these, four different types of knowledge-intensive firms are identified: *Technology Developers* (such as R&D labs), *Neo-Professional Service Firms* (such as consulting and advertising), *Professional Campuses* (such as hospitals) and *Classic Professional Service Firms* (such as law, accounting and architecture). (von Nordenflycht 2010.) This highlights the fact that knowledge-intensive firms are a wide-ranging group of organizations. At the same time this classification takes into account that there are also many differences between knowledge-intensive firms.

From these three characteristics Käpylä et al. (2011) focus on *knowledge intensity* and identify different kinds of knowledge-intensity profiles among knowledge-intensive firms. Whereas von Nordenflycht (2010, p. 159) emphasizes the importance of human

capital, Käpylä et al. (2011) take a wider perspective and define knowledge intensity based on intellectual capital. (Käpylä et al. 2011.) Although intellectual capital can be classified in various ways (see e.g. Brooking 1996; Edvisson & Malone 1997; Sveiby 1997) Käpylä et al. use the categorization where intellectual capital is classified into three dimensions: human assets (e.g. individual's knowledge and competence), structural assets (e.g. organization's values and culture) and relational assets (e.g. relationships with stakeholders and organization's image) (Lönnqvist 2004). Käpylä et al. (2011, pp. 321-323) identify the most important knowledge assets of a company according to their main business objectives, suggesting that different kinds of knowledge assets are important to different kinds of knowledge-intensive firms.

From the previous arguments it can be claimed that knowledge work and service business are the key business areas that lead the economic growth. However, despite growing recognition, there is little consensus as to what constitutes knowledge work (Kelloway & Barling 2000, p. 287). Thus in the light of the main objectives of this research the concept of knowledge work requires a more detailed definition.

2.2. Definition of knowledge work

The concept of 'knowledge work' was first applied in 1960, simultaneously and independently by two Americans, Peter Drucker and Fritz Machlup (Okkonen 2004, p. 55; Greene and Myerson 2011). Machlup (1962) was one of the first to emphasize intellectual capital as an important asset in organizations. Drucker (1959) first used the term to refer to 'knowledge workers' as workers who work with intangible resources (according to Ramirez & Nembhard 2004). Since then knowledge work has gained increasing attention and thus definitions in the literature.

As its most basic knowledge work is defined by the knowledge intensiveness of work since knowledge is the key resource of a knowledge worker (Okkonen 2004, p. 55). For example, Davenport and Prusak (2000) define knowledge workers as those who create knowledge, or as those whose use of knowledge is a dominant aspect of their work. Thompson et al. (2001) broaden the concept more and determine that a knowledge worker is someone who has access to, learns and is qualified to practice formal, complex and abstract knowledge. Knowledge work entails tasks that allow the knowledge worker to manipulate, extend and creatively apply of that knowledge. (Thompson et al. 2001, p. 926.) Davenport (2008) defines knowledge workers as those who have high degrees of expertise, education, or experience, and the primary purpose of their jobs involves the creation, distribution, or application of knowledge. In short, knowledge workers "*think for a living*". (Davenport 2008, p. 217.)

Kelloway & Barling (2000) identified three different thematic definitions of knowledge work in the literature: knowledge work as a profession, knowledge work as an individual characteristic and knowledge work as an individual activity. However, they

criticize all these different categorical ways of defining knowledge work and propose that knowledge work should, by contrast, be seen as organizational behavior. They argue that knowledge work is rather a continuum along which work may vary. (Kelloway & Barling 2000, p. 289-291.) According to this definition knowledge work is not some specific category of work and therefore should not be directly compared, for example, with manual work. Instead, it should be seen as a certain dimension of work (Kelloway & Barling 2000, p. 291).

Okkonen (2004) also uses the continuum ideology when defining knowledge work (see Figure 3). The continuum of work has two ends: manual work and creative and problem-solving knowledge work. In addition to these two extremes, the complexity of the task must also be taken into account. Five extreme examples of different kinds of workers are employed to provide the general ideas of knowledge work.

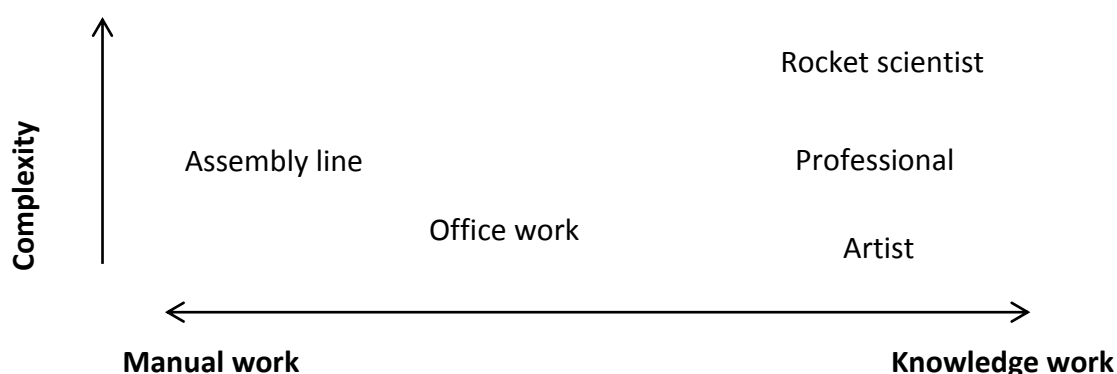


Figure 3. *Continuum of work (adapted from Okkonen 2004, pp. 56-57).*

In the figure above the assembly line represents manual work, where technical skills and an ability to read written instructions are required. Office work refers to white-collar work and is halfway along the continuum: it has features of routine work and yet there is freedom to improve processes, i.e. use creativity. Information and communication technology usually has a significant role in the work processes of office workers. The last three on the continuum represent different kinds of knowledge workers. The amount of manual work remains the same but the complexity differentiates them from each other. (Okkonen 2004, p. 56.) This way of defining knowledge work also supports the fact that knowledge work should not be seen as an opposite to manual work. In many cases when some work is categorized as knowledge work, it still contains a certain amount of manual work. For example, Drucker (1999) identifies a specific group of knowledge worker who do knowledge work and manual work. He calls them “technologists”: people who apply knowledge of the highest order. For example surgeons, who need very specialized knowledge when operating on a patient’s brain, belong to this group. (Drucker 1999, p. 88.)

To conclude this part it can be argued that knowledge work entails various tasks and processes in which knowledge has a different role. Table 1 summarizes the most common knowledge actions of knowledge workers discussed in the literature. It must be emphasized that some knowledge actions are overlapping and most of them are to some extent interrelated.

Table 1. *Knowledge actions of knowledge workers.*

Knowledge action	Sources
Acquisition and finding	<ul style="list-style-type: none"> • Kelloway & Barling 2000 • Sellen & Harper 2003 • Holsapple & Jones 2004 • Davenport 2008
Application	<ul style="list-style-type: none"> • Kelloway & Barling 2000 • Davenport 2008
Creation	<ul style="list-style-type: none"> • Kelloway & Barling 2000 • Sellen & Harper 2003 • Davenport 2008
Organizing	<ul style="list-style-type: none"> • Sellen & Harper 2003 • Efimova 2004
Packaging and storing	<ul style="list-style-type: none"> • Kelloway & Barling 2000
Sharing	<ul style="list-style-type: none"> • Sveiby & Simons 2002 • Davenport 2008

These different knowledge processes are an important point of view in knowledge work productivity and performance (e.g. Haas & Hansen 2007; Nenonen 2004; Mills & Smith 2011). Since knowledge workers tasks are complex and usually require problem solving (see e.g. Ramirez & Steudel 2008, p. 565) acquiring new knowledge is important (Kelloway & Barling 2000). Davenport (2008, p. 228) emphasizes that high performing knowledge workers are continuously learning new skills and get more out of a given experience.

Knowledge workers also apply theoretical and analytical knowledge in order to solve problems (see e.g. Davenport 2008, p. 217). Thus they can apply the same knowledge in different contexts and situations. Knowledge creation is also considered to be one of the key issues in knowledge work (see e.g. Kelloway & Barling 2000, p. 301). Knowledge workers create innovations that enhance their firms' competitive advantage (Davenport 2008, p. 215), which makes knowledge creation an essential part of knowledge work.

Organizing knowledge includes finding, interpreting and connecting pieces of information (Efimova 2004, p. 11). It can entail various unstructured processes leading to more organized knowledge that can be applied in different contexts. After knowledge is organized into a more specified form it is important to package and store it (see e.g. Kelloway & Barling 2000). This usually means documentation and reporting. The basic rationale behind knowledge storing is to facilitate knowledge sharing which from an organizational perspective is one of the key issues, especially regarding productivity (see e.g. Peponis et al. 2009, p. 837). Sharing knowledge eliminates “reinventing the wheel” by cutting out the overlapping tasks and thus enabling productive collaboration (see e.g. Sveiby & Simons 2002, p. 432; Nenonen et al. 2009). In addition to this knowledge-intensive nature, other special features are used to define knowledge work. These special characteristics will be discussed next.

2.3. Characteristics of knowledge work

Knowledge work is very often compared with manual work (e.g. Drucker 1999). Various characteristics can be identified that define knowledge work (in addition to the knowledge-intensiveness). For example, Ramirez & Steudel (2008) identified eight dimensions that differentiate knowledge work from manual work:

- 1) Autonomy
- 2) Structure
- 3) Tangibility
- 4) Knowledge
- 5) Creativity and innovation
- 6) Complexity
- 7) Routine and repetitiveness
- 8) Physical effort. (Ramirez & Steudel 2008, p. 565.)

Structure refers to the number of established rules and policies about the execution of a task (Ramirez & Steudel 2008, p. 565). With respect to the structure of work, knowledge work is far less structured than production work and the processes of knowledge workers are highly variable and hard to define. Partly due to the unpredictable nature of their work, knowledge workers cannot be told what to do. (Davenport 2008, p. 217.) Thus they require *autonomy* that relates to the degree of control of the worker over how a task is done (Ramirez & Steudel 2008, p. 565). Hence knowledge workers need a much higher level of autonomy than, for example, those working on an assembly line. Autonomy requires commitment to the job and Davenport (2008) notes that in knowledge work commitment is especially important. Instead, for example, in a factory the employees would be able to work even if they hated their jobs or were otherwise uninspired to perform their tasks. (Davenport 2008, p. 218.) Commitment and motivation are especially important in terms of productivity of knowledge work.

Tangibility refers to how visible a task is (Ramirez & Steudel 2008, p. 565). Knowledge work is usually described as less tangible than manual work (see e.g. Ray & Sahu 1989; Drucker 1999). Because of this it is sometimes impossible to tell whether knowledge workers are working or not. Only the tangible results at the end of a work task gives the opportunity to evaluate what has been achieved. (Davenport 2008, p. 217.) This is also somewhat challenging since not even the results and outputs of knowledge work are usually tangible (see e.g. Laihonon et al 2012).

Tangibility is also linked to the *knowledge* dimension, since knowledge is the main intangible resource in knowledge work. Knowledge dimension refers to how much prior knowledge and executing cognitive actions are part of the task (Ramirez & Steudel 2008, p. 565). As argued in the previous section, knowledge is the key issue that differentiates knowledge workers from manual workers. Furthermore, knowledge work entails a great amount of different kinds of knowledge processes (see Table 1). *Creativity and innovation* refers to the degree to which processes lead to creative and innovative outcomes (Ramirez & Steudel 2008, p. 565). Knowledge workers are argued to be the key assets in their companies' competitive advantage due to the innovative nature of knowledge work (see e.g. Davenport 2008, p. 215). Hence creativity and innovation play a bigger role in knowledge work than in manual work.

Complexity refers to how difficult or complex the task is (Ramirez & Steudel 2008, p. 565). As argued before, the complexity of tasks may vary depending on different kinds of knowledge workers although knowledge work is considerably more complex than, for example, manual work (see e.g. Okkonen 2004, p. 56). Knowledge workers' tasks vary as well, which means that some of their tasks may be very complex whereas others may be highly *routine and repetitive* referring to regular tasks that are based on formal procedures (Ramirez & Steudel 2008, p. 565; Bosch-Sijtsema et al. 2009, p. 533). *Physical effort* is about how much a task requires physical strength and power to perform a task. (Ramirez & Steudel 2008, p. 565.) In knowledge work the amount of physical effort required is usually minimal. An exception to this is the knowledge workers doing considerably more physical work, e.g. the aforementioned surgeons.

2.4. Different types of knowledge workers

Although knowledge workers have some general characteristics that are common to all knowledge workers, there are also a lot of differences between knowledge workers (e.g. Davenport 2010) and their work tasks. In the literature knowledge workers have been classified according to various criteria, for example generation (Jorgensen 2003), work tasks and activities or technology usage (Greene & Myerson 2011). In this chapter some classification methods of knowledge workers are discussed in greater detail.

Davenport (2010) introduces four key types of knowledge work based on the degree of expertise and the level of coordination involved (Figure 4).

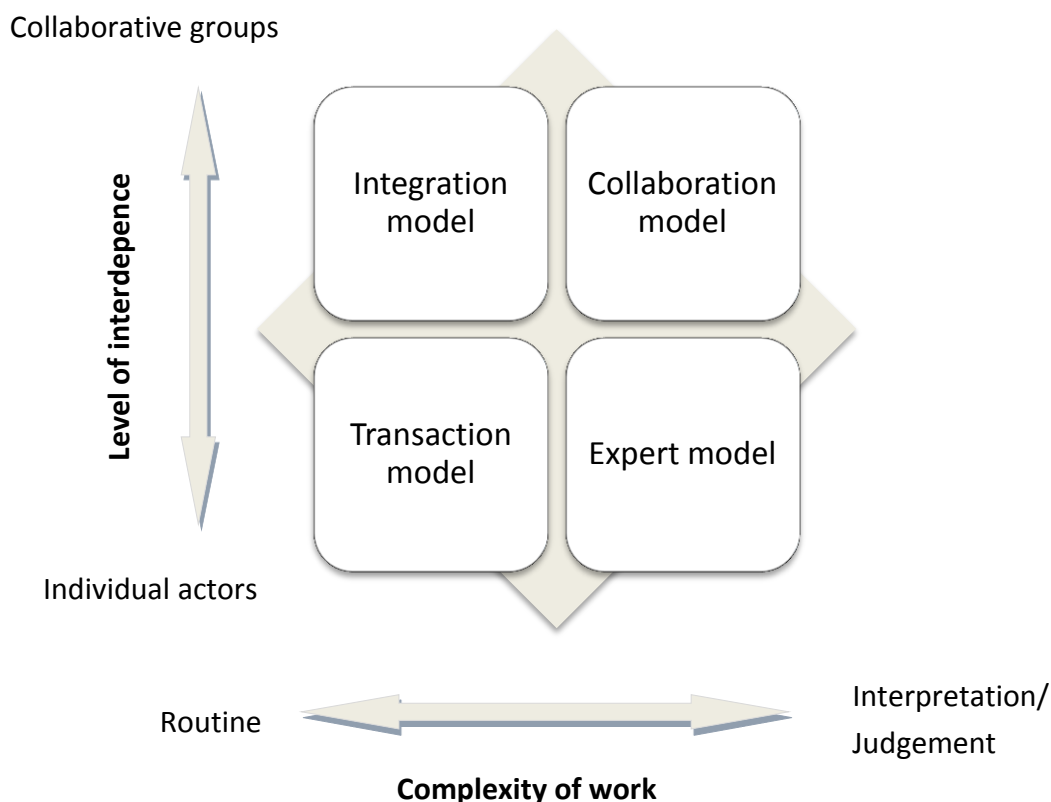


Figure 4. Four approaches to knowledge work (adapted from Davenport 2010).

Transaction work is individual routine work and dependent on formal rules and procedures (e.g. accountant). *Integration work* is systematic and repeatable work and reliant on formal processes and methodologies (e.g. Human Resource (HR) unit). The need for collaboration separates integration workers from transactional workers. *Collaboration work* is improvisational work and calls for profound expertise across multiple functional and flexible team structures. (e.g. R&D) *Expert work* is judgment-oriented work and is based on individuals' expertise and experience (e.g. researcher). (Davenport 2010, pp. 20-21.) These different kinds of knowledge workers need different work environments (Davenport 2008, p. 232).

Haner et al. (2009) also divide knowledge workers into four categories. They argue that there are three distinctive characteristics of knowledge work:

- *complexity* with respect to the tasks
- *autonomy* of the knowledge workers with respect to the work process they are engaged in
- *newness* with respect to the work results. (Haner et al. 2009, p. 21.)

Based on these, four different types of knowledge workers are identified. Type A is best described as “knowledge-based” work where knowledge may be important. However, only little own decision-making is needed, newness is underrepresented with respect

to the work results and the level of job complexity is fairly low. This type includes jobs with routines and standardized processes (e.g. secretaries). Type B can be described as “knowledge-intensive” work. Work may require higher education and long-term experience (e.g. specialist in a particular occupation). Type C is also “knowledge-intensive” work. Contrary to type B there is more newness with respect to the “what” and less autonomy with respect to the “when” and “where” to work (e.g. engineers in development units). Type D includes knowledge workers whose work is characterized by the newness and complexity of the tasks and who enjoy a great deal of autonomy. Such knowledge workers represent “knowledge” work at the highest and purest level possible. Their knowledge needs to be constantly renewed in order to solve problems creatively (e.g. researchers and consultants). (Haner et al. 2009, pp. 40-41.) In conclusion, this classification emphasizes the role of knowledge in performing different work tasks.

Greene & Myerson (2011) take a totally different approach to categorizing knowledge workers. They classify knowledge workers into four categories based on their mobility patterns and motivation (see Figure 5). The rationale behind this classification is that different kinds of knowledge workers must be provided with different kinds of work environments and virtual tools so that these meet the requirements of the tasks. (Greene & Myerson 2011, pp. 23.) This classification also takes into account the communication and interaction patterns of different knowledge workers.

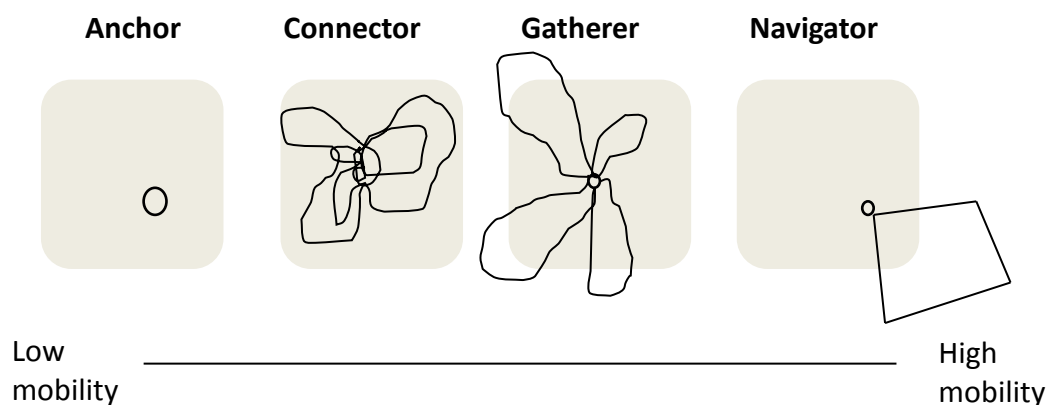


Figure 5. Four different types of knowledge workers based on their mobility patterns (adapted from Greene & Myerson 2011).

The Anchors spend most of their time at the desk and their mobility is very limited. Because the anchor is always present other people go to the anchor for information. Therefore they have an important role in knowledge transfer. *The Connectors* typically spend half of their time in different places around the building: for example, in meeting rooms, at colleagues’ desks or in the café. They are dependent on interaction with other people in different sectors of the company. A typical example of a connector is the R&D manager of an industrial company. This type highlights the need for collaboration and sharing of ideas. (Greene & Myerson 2011, pp. 23-25.)

The Gatherers spend around half the week away from the office. They can be found, for example, at customers' offices or third locations such as cafés or lobbies. The Gatherers bring important information and new relationships back to the office. They also use mobile technologies for communication while on the move. *The Navigators* only visit their offices from time to time, spending most of their time out of the office networking. They are usually key figures in the company and hence need to feel welcome in the office. This group includes, for example, consultants and salesmen. (Greene & Myerson 2011, pp. 26-28.)

Dove (1998) groups knowledge workers into three classes according to the role and nature of knowledge in their tasks:

- *Creation of knowledge work*. This work is based on innovation and these workers are dependent on innovation to complete their tasks. This group includes, for example, engineers, managers and inventors.
- *Portable knowledge work*. This is based on wide and immediate utility. These workers possess knowledge that they can apply in a general manner in various contexts. For example, software programmers are this type of knowledge workers.
- *Specialty knowledge work* is based on narrow but high utility. These workers have the specific knowledge that they need to perform a specific task. They are considered experts at what they do. Their knowledge is task-specific and not easily transferable to other areas. An example of this type of worker could be a programmer who writes code in a proprietary language.

Nevertheless, there are many kinds of knowledge workers, which highlights the fact that knowledge workers are a wide and diverse group of workers working in different industries in our contemporary business environment. According to Drucker (1999), knowledge workers are the most valuable assets of a 21st-century institution. Hence improving knowledge work productivity is the most important issue for managers in 21st century. (Drucker 1999, p. 79), which is why the concept of knowledge work productivity will be examined in the next chapter.

3. KNOWLEDGE WORK PRODUCTIVITY

3.1. Productivity

As argued in the introduction, the productivity of knowledge work is a tricky issue. Considering the objectives of this research it is essential to understand the concept of productivity. Fundamentally productivity means how well an organization can exploit the inputs and resources and transform them into outputs (see e.g. Uusi-Rauva 1997, p. 20). However, since productivity is one of key themes of this research it requires a more in-depth understanding. Before it is reasonable to approach productivity in the knowledge work context the concept of productivity itself and its origins need to be discussed.

The word “productivity” was mentioned for the first time in 1776 in an article by Quesnay. More than a hundred years later, productivity was defined by Littre as the “faculty to produce”. (Sumanth 1984, p.3 according to Hannula 1999, p. 32.) Derived from this, productivity has been defined in many ways ever since. Traditionally productivity has been defined as the efficiency with which outputs are produced – the ratio between output and input (Craig & Harris 1973, p. 14; Thomas & Baron 1994, p. 5). This is the most basic definition of the concept although many alterations and additions have been made in the literature to complement the definition (see e.g. Tangen 2005, pp. 35-36). Bernolak (1997) takes the definition little further. According to Bernolak ‘productivity’ means how much and how well we produce from the resources used. Resources refers to all human and physical resources, for example the people who produce the goods or provide the services, and the assets with which the people can produce the goods or provide the services. (Bernolak 1997, p. 204.)

Productivity can be defined in many ways and from many different perspectives. It is usually determined in relation to the discipline of the definer. For example, economists, behavioral scientists, engineers, and managers define the term in different ways. (Hannula 1999, p. 11.) Productivity can also be approached from different levels. According to Hannula (1999) the levels can be roughly categorized into macro and micro level. Macro level includes international, national economy and industrial levels, whereas micro level includes for example firm, department and individual levels. (Hannula 1999, pp. 20-21.)

Thus the level has an impact on the productivity concept, which is why it is important to define the level at which productivity is explored. As for the firm level, *total productivity* is the most comprehensive productivity concept including all the outputs

produced and all the inputs used to produce the outputs (Hannula 1999, p. 16). Total productivity is the ratio output over the total input including labor, capital, material, energy, and miscellaneous inputs (Kendrick 1961 according to Hannula 1999, p. 16). These factors of total inputs can also be examined separately. Thus, *partial productivity* can be defined as the ratio output over a certain type of input used to produce the output (Domar 1962, p. 598). The expression is usually classified by the type of input, for example labor productivity, capital productivity, material productivity and energy productivity (Hannula 1999, pp. 19-20). From these, for example, labor productivity is the oldest and most commonly studied variety of productivity (Domar 1962, p. 597) and also offers the most interesting approach for this study.

Productivity should be seen as a multidimensional concept. The meaning of the concept may vary depending on the context in which it is used, although the main idea remains the same. It can also be claimed that productivity is commonly used in academic and commercial circles without adequately defining the concept and, for example, the concepts of the productivity and performance of a firm are often considered to be interchangeable. (Tangen 2005, pp. 34-35.) Due to these deficiencies in defining the concepts productivity is commonly confused with other concepts related to companies' performance. Naturally there are some significant differences between such concepts. Hence it is important to understand the interrelationships between the concepts that are used to describe and evaluate the overall performance of a firm.

3.2. Productivity and related concepts

Productivity is one of the main factors affecting the overall performance of a firm, which itself is a complex phenomenon (Hannula 1999, p. 24). *Performance* relates to the ability of the measured object to achieve the desired results. Performance is always a multidimensional phenomenon and can be examined from different perspectives. It can also be widely seen as a company's ability to maximize profit for all the key stakeholders. (Hannula & Lönnqvist 2002.) According to Sink (1983, p. 36) the overall performance of a firm comprises seven criteria: effectiveness, efficiency, quality, productivity, quality of work life, innovations, and profitability. Thus productivity can be seen as one of the factors that determine the performance of a firm.

In spoken language *profitability* and productivity are sometimes confused and incorrectly used as synonyms. Productivity is a focal factor affecting the profitability and competitiveness of a company. However, the relationship between profitability and productivity is not always unambiguous. (Lönnqvist et al. 2010, p. 81.) In addition to productivity, another factor having an impact on a firm's profitability is price recovery, which refers to the relationship between the unit prices of different outputs and the unit costs of different inputs used to produce the output (Hannula 1999, p. 25-26). Figure 6 presents the relationships between these concepts.

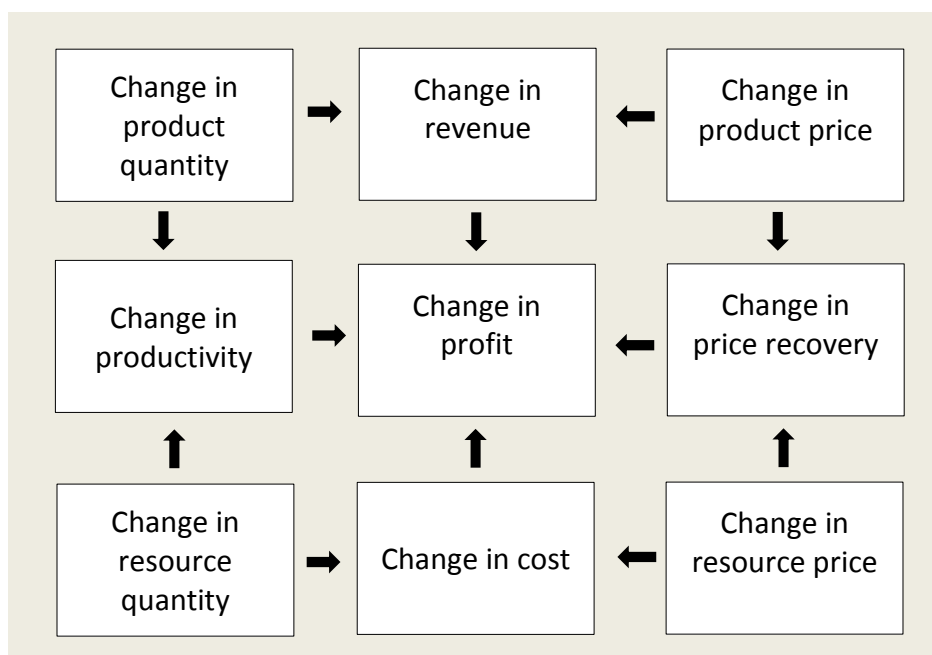


Figure 6. Relationship between profitability, productivity and price recovery (van Loggerenberg & Cucchiaro 1981, p. 90)

As can be seen in Figure 6 the relationship between productivity, profitability and price recovery is somewhat complex. For example, change in resource quantity and product quantity affects productivity, which in return leads to change in profitability. At the same time change in product price and change in resource price have an effect on price recovery, which brings about the change in profit as well. The figure emphasizes that there are major differences between the concepts of productivity and profitability.

Productivity is also quite commonly confused with *efficiency* as well (Hannula 1999, p. 28) since the definitions of these two concepts are rather similar (Lönqvist et al. 2010, p. 81). For example, Koss & Lewis (1993, p. 273) state that efficiency is the ability to produce the desired effect with a minimum of effort, which is close to the concept of productivity. The usage of these two terms depends on the context and point of view (Hannula 1999, p. 29). Another performance-related concept is *effectiveness*. This is commonly confused with efficiency, partly due to the similar spelling of the words. Effectiveness is defined as the ability to reach a desired target. Whereas efficiency is more related to the internal performance of a process at hand, effectiveness refers more to the external performance. In other words, while efficiency concentrates on the usage of the inputs, effectiveness is more output oriented. (Hannula 1999, pp. 29-30.)

Tangen (2005) summarizes the relationships between the concepts (see Figure 7). As the figure emphasizes, productivity forms the basis for a firm's profitability and thus its performance. (Tangen 2005, p. 43.)

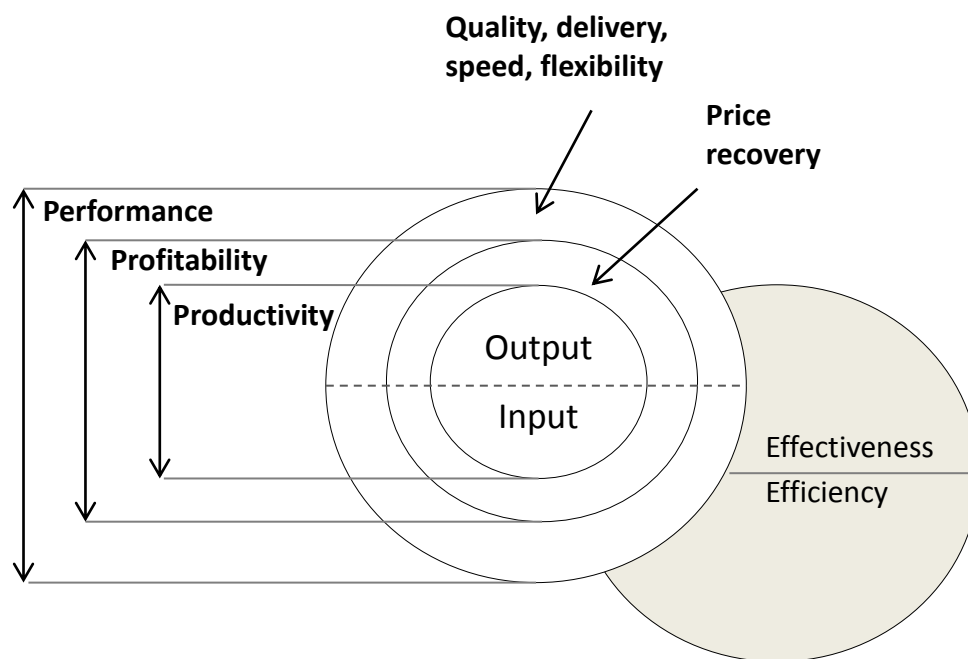


Figure 7. *The relationship between the factors of a firm's overall performance (adapted from Tangen 2005, p. 43).*

The figure emphasizes the fact that these concepts used to evaluate the overall performance of a firm are closely linked to each other and all offer a different level perspective on the matter. It also highlights the position of productivity at the center of the figure, indicating the essential role of productivity in a firm's overall performance.

However, in knowledge-intensive organizations the most important inputs are their knowledge workers, which is why in knowledge work context it is reasonable to approach productivity from an individual level. Especially in labor-intensive business it is justified to use labor productivity instead of total productivity (Antikainen 2006, p. 10). Although the total productivity of a firm is also an important aspect, in knowledge-intensive firms the focus is usually on labor productivity, i.e. one of the types of partial productivity (see e.g. Hannula 1999). Therefore the concept of knowledge work productivity will be discussed next.

3.3. Productivity of knowledge work

As discussed, productivity is traditionally defined as the ratio between outputs and the input used to produce output as discussed in the previous section (e.g. Hannula & Lönnqvist 2002, p. 30). However, in knowledge work this issue needs to be reconsidered due to the major differences between industrial workers and knowledge workers discussed in Chapter 2. This section focuses on discussing productivity in knowledge work context concentrating on productivity at an individual level.

In knowledge work the idea derived from the traditional definition of productivity remains the same but the operationalization of the concept is more difficult. This is because both inputs and outputs are usually difficult to define (Davenport 2008). One reason for this is that both the inputs as well as the outputs are usually intangible in nature in knowledge work (Antikainen 2006, p. 11; Bosch-Sijtsema et al. 2009, p. 536; Laihonon et al. 2012). In knowledge work there is not necessarily a direct relation between input and output as there are several intervening variables (Bosch-Sijtsema et al. 2009, p. 536). Thus it is hard to recognize which outputs resulted from which inputs.

The outcomes of knowledge work are often not comparable (Bosch-Sijtsema et al. 2009, p. 536). This is partly because of the quality aspect, according to which the quality of the outputs is seen to be even more important than the quantity of the outputs (Drucker 1999, p. 84). The outcomes also take a long time to develop and the value usually manifests when used by the customers (Bosch-Sijtsema et al. 2009, p. 536), which makes the evaluation of the relation between inputs and outputs even harder.

According to Drucker (1999) there are six major facts that determine knowledge work productivity:

- 1) Knowledge worker productivity demands that we ask the question: “What is the task?”
- 2) The responsibility for productivity rests with knowledge workers themselves
- 3) Continuing innovation has to be part of the work, and the responsibility of knowledge workers
- 4) Knowledge work requires continuous learning and teaching
- 5) Quality of output also needs to be taken into account in productivity in addition to quantity
- 6) A knowledge worker has to be seen and treated as an asset rather than a cost to the company. (Drucker 1999, p. 83-84.)

The first requirement in approaching knowledge work productivity is to find out what the task is to enable the knowledge workers to concentrate on the task and to eliminate everything else (Drucker 1999, p. 85). This emphasizes that in knowledge work the focus should be more on the results and outcomes, not on *how* the work is done. This implies that knowledge workers have to have autonomy and thus the responsibility for the results (Drucker 1999, p. 86). According to Davis (2002) the productivity of knowledge work depends on their ability to manage themselves. The most productive knowledge workers are usually better at managing their use of time, attention and motivation. (Davis 2002, p. 68-69.)

In knowledge work creating innovations is an important part of productive work (Drucker 1999, p. 84; Ramirez & Nemhard 2004, p. 617). This is because that creating innovations is one of the most fundamental features of knowledge work (Davenport 2008, p. 215). Thus in the light of productivity innovations are one of the most important aspects that determine the productivity of knowledge work. In order to be

innovative, knowledge workers need to constantly learn new things. Furthermore, it can be claimed that high-performing knowledge workers are learning all the time (Davenport 2008, p. 228). Since the business environment is also constantly evolving firms need to nurture their knowledge workers' learning in order to gain competitive advantage.

Quality is one of the most important aspects to be taken into account in knowledge work productivity. Although acknowledged in the literature, quality is only rarely included in the methodologies created to evaluate knowledge work productivity (Ramirez & Nembhard 2004, p. 618). Productivity of knowledge work has to aim first at obtaining quality - not the minimum but the optimum or maximum quality. Only then is it justified to concentrate on the quantity of output. (Drucker 1999, p. 84.) This also requires a change in managing knowledge workers. It is argued that in order to be productive knowledge workers need to be treated as assets to their companies, not as costs. The most fundamental difference between assets and costs is that costs need to be reduced and controlled whereas assets need to be encouraged to grow. (Drucker 1999, p. 87.) This highlights the need for a shift in mindset when "managing" knowledge workers, since knowledge workers cannot be managed as workers were managed in the industrial era (Davenport 2008, p. 215).

Erne (2010) argues that it is not 'productivity' that managers of knowledge workers should be concerned about. Instead he proposes five success indicators that are the key factors in expert work: quality of results, organization of work, innovation behavior, quality of interaction, and skill development. (Erne 2010, p. 305.) However, these are all mentioned as important variables having an impact on knowledge work productivity (see e.g. Drucker 1999; Davenport 2008). These variables can also be seen as drivers for productive knowledge work which and be discussed in more detail next.

3.4. Drivers of knowledge work productivity

Despite the lack of comprehensive methods for improving knowledge work productivity, the various factors affecting knowledge worker productivity have been discussed quite a lot in the literature (Laihonen et al. 2012, p. 103). The factors are commonly divided into inputs, processes (transformation of inputs to outputs) and outputs (e.g. Stainer and Stainer, 1998; Hannula 1999; Antikainen 2006; Laihonen et al. 2012). This division can be paralleled by examination of the traditional production process (Antikainen 2006). For example, Antikainen (2006) made a list of different factors affecting knowledge work (Table 2).

The most important input in knowledge-intensive organizations is their intellectual capital (Antikainen 2006, p. 21). However, from a productivity perspective the intellectual capital is not a value in itself; what is meaningful is how an organization can utilize its intellectual capital and how it is applied in practice, for example in problem

solving (Drucker 1999, p. 84). In addition to intellectual capital, social capital and networks are among the enablers of productive knowledge work (Davenport 2008, p. 228).

Table 2. *Factors affecting knowledge work productivity (adapted from Antikainen 2006, p. 20).*

Inputs	Process	Outputs
Organization: <ul style="list-style-type: none"> - Intellectual capital - Innovativeness - Organization's standards, routines and methods - Information systems - Quality of information - Networks - Use of time - Work environment - Objectives of the work 	<ul style="list-style-type: none"> - Organization of work - Allocation of tasks - Organization of management - Clarity of the job description - Collaboration - Knowledge sharing - Delays and interruptions - Opportunity to influence own job 	<ul style="list-style-type: none"> - Innovations - Quality - Time efficiency - Fulfilling customers' expectations
Individual: <ul style="list-style-type: none"> - Motivation - Job satisfaction - Personal networks - Physical fitness - Factors outside work (e.g. personal life) 		

Information and communication systems are one of the most important tools of knowledge workers. Different kinds of information systems can improve the productivity of knowledge workers, for example through automating some routine tasks, supporting knowledge sharing and supporting the utilization of existing knowledge (Kaplan & Aronoff 1996; Haas & Hansen 2007). However, the information systems should meet the requirements of the organization in question. According to Stähle et al. (2004, p. 78) organizations cannot gain competitive advantage by using information systems, but the lack of proper information systems can impede their operation. However, when the information systems are not appropriate and usable with respect to the tasks at hand, they may even have a negative impact on productivity (see e.g. Karr-Wisniewski & Lu 2010). In addition to these, the work environment can be seen as one important factor that can enhance productivity (see e.g. Vartiainen 2007). The concept of work environment will be discussed in more detail in the next chapter since work environment is at the center of new ways of working.

Individual factors such as motivation and job satisfaction are argued to enhance productivity (see e.g. van der Voordt 2004a; Origo & Pagani 2008). Thus focusing on improving employees' motivation and satisfaction can enhance their productivity. This can be achieved via organization level inputs since, for example, information systems and work environment can directly affect employees' satisfaction and motivation (see e.g. Peponis et al. 2007).

The process aspect is also important since the way work is organized affects the overall productivity of a company. The process perspective focuses on more intangible factors since knowledge work is by nature very intangible as it is usually difficult to see whether one is working or not (Davenport 2008, p. 217). Knowledge work is usually at least to some extent dependent on other people's inputs, which is why the tasks and work processes need to be designed reasonably to minimize dead time and to prevent bottlenecks. Team structures and allocation of tasks also affect productivity, especially in team work (Bosch-Sijtsema et al. 2009). Another important factor that enables productive collaboration is knowledge sharing (Nenonen et al. 2009). Knowledge sharing is considered to be one of the key factors affecting knowledge work productivity (Sveiby & Simons 2002; Antikainen 2006; Davenport 2008; Laihonon & Lönnqvist 2011). Other knowledge actions, such as continuous learning and knowledge acquisition, are understood to influence the productivity of knowledge workers as well (Drucker 1999; Najafi & Afrazeh 2010).

One important factor that is argued to have a huge impact on knowledge work productivity is management (see e.g. Litschka et al. 2006; Davenport 2008). It is important to acknowledge that knowledge workers cannot be managed in the same way as manual workers. Yet, nothing has replaced the traditional management methods and theories. (Davenport 2008, p. 216.) Thus, changing the managerial culture is one of the biggest challenges, but can also lead to major impacts on productivity.

To conclude this chapter there are many variables that can affect knowledge work productivity. Factors at the organizational level are argued to have a huge impact on the productivity of the knowledge workers. For example, management style, organizational culture and structure as well as the work environment, working conditions and information technology are considered to be the key issues affecting the productivity of the knowledge workers (see e.g. Davenport et al. 2002; Litschka et al. 2006; Bosch-Sijtsema et al. 2009). Hence it can be argued that 'new ways of working' offers a promising and comprehensive approach to improving knowledge work productivity, since it takes all important aspects into consideration. In the next chapter the concept of new ways of working is examined in greater detail.

4. NEW WAYS OF WORKING

4.1. What is meant by new ways of working?

New ways of working is one of the key themes in this study. In this research new ways of working is seen as a viewpoint from which the productivity of knowledge work is examined. It is considered a novel approach for improving the productivity of knowledge work yet the positive impacts are not self-evident. Hence the concept of new ways of working requires more attention at this point.

In this thesis new ways of working is not considered as a specific approach but rather a philosophy for challenging the dominant ways of working and organizing work. Since new ways of working is a broad theme that can encompass various methods for designing and organizing work settings and practices it cannot be seen as a well-defined concept. These and the fact that new ways of working is still a novel theme mean that new ways of working is hard to explicitly define.

However, there are few definitions to the concepts. According to Springer (2011) new ways of working refers to non-traditional work practices, settings and locations with information and communication technologies (ICT) to supplement or replace traditional ways of working (Springer 2011). From another point of view new ways of working can be seen as a method for transforming workplaces into flexible, adaptable, and collaborative learning environments (Aaltonen et al. 2012, p. 7). Van der Voordt (2004a, p. 133) uses the concept of new ways of working to describe the ways of working that are dynamic and less closely linked to place and time. Lönnblad & Vartiainen (2012, p. 9) elaborate the concept and use it to refer to such concepts as telework, multi-locational and mobile work, remote work, distributed work, virtual work, and global work. Hardy et al. (2008, p.61) also introduce a few concepts that can be related to new ways of working:

- hot desking
- hotelling
- mobile working
- teleworking
- homeworking/working from home
- non-territorial working
- virtual team-working
- flexible working

For a more comprehensive view of the new ways of working, these concepts need to be examined in more detail. Hot desking is a way of organizing office space where desks are shared over time by a number of individuals. The desk can be bookable or ad hoc based. Instead, hotelling is more formal version of bookable hot desking and is usually for a shorter stay at the desk. Mobile workers spend considerably much time on the move, travelling and working from various locations and communicating with different ICT tools. (Hardy et al. 2008, pp. 61-62.)

Teleworking is accomplishing work tasks from a different site, for instance from home, that is remote from the conventional office and has the support of ICT, (Millward et al. 2007, p. 547; Aboelmaged & El Subbaugh, 2012, p. 4). The difference between homeworking and working from home is that homeworking is more permanent, whereas working from home happens only occasionally. Non-territorial working is working in the office using a range of shared, communal workspaces. (Hardy et al. 2008, p. 61.) According to Elsbach (2003, p. 622) hot desking and hotelling are examples of implementing non-territorial workspaces.

Team-working becomes a virtual team when group members communicate with each other from different locations via electronic media and never or rarely meet each other face-to-face (Bosch-Sijtsema et al. 2009, p. 543). This is enabled, for example, with video conferencing equipment. In flexible working employees agree on different patterns of work, such as working part-time, in order to improve the work-life balance. (Hardy et al. 2008, p. 61.)

As seen from the definitions of these concepts the focus in many cases is on re-organizing the physical place and location where the work takes place. However, as Springer points out, without sufficient ICT tools working from different physical locations would not be possible or at least not productive. Fast and mobile IT facilities have made it possible to work when and where people prefer to work (Gorgievski et al. 2010, p. 207), which is why ICT is a focal aspect among of new ways of working.

However, using these new office designs and multiple locations enabled by efficient ICT tools is not possible without a shift in mindset. The traditional way of organizing work originating from the manufacturing era is not applicable in the contemporary business environment, where work is increasingly flexible and mobile (van Meel 2011, p. 365). Organizations and managers need to change the way they think about work and work practices. Such challenges were one of the reasons why ideas related to these so-called new ways of working were not adopted in the 1970s where new ways of working originates according to van Meel (2011). The managers were not ready to provide their employees with the autonomy needed for mobile and flexible working. (van Meel 2011, p. 365.)

Van Meel (2011) argues that the concept 'new ways of working' is by no means as new as the term implies. Instead, today's concepts such as mobile work, desk sharing, videoconferencing, paperless and open plan offices, and flexible ways of working originate from the 1970s or even earlier. For example, in a research project in 1973 teleworking was presented as a novel way to increase productivity, improve the work-life balance of the employees and reduce environmental impacts. The same issues are still very much in evidence. (van Meel 2011, pp. 358, 365.) But why these concepts are still called as 'new ways of working'? Why are these new ways of working not widely accepted ways of working in the contemporary knowledge work?

The main reason for this is that although the concepts were introduced long ago the ideas were not widely adopted at that time. The main reason for this is that the managers were not ready to trust their employees so much as to provide them with the autonomy these ways of working would have required. Also, the technologies were not able to support the flexible ways of working. (van Meel 2011, p. 365).

However, work life today has changed since the 1970s. In general, it has become much more digital, loose, informal, flexible, and mobile. (van Meel 2011, p. 365.) The technology has also advanced compared with the technologies used in the 1970s. At the same time the awareness and understanding of the nature of knowledge work have increased. These facts create a better starting point for managers of today to implement new ways of working. Since the technology and physical environment already enable the adoption of new ways of working, the only obstacle to the adoption of new ways of working is the outdated mindset of the managers and employees.

New ways of working have been approached from many different directions and there are some related concepts that refer to similar concepts but from a different aspect, which is why they also need to be discussed. For example, alternative workplace is a term close to new ways of working from the work environment viewpoint. Alternative workplace (AW) refers to the combination of non-traditional work practices, settings, and locations that supplement or replace traditional offices (Mahlon 1998; Ouye et al. 2010). Hence the main focus in the concept of the alternative workplace is on the different physical settings.

Alternative Officing Strategies (AOS) has been used as an umbrella term for the myriad ways business organizations are reshaping their workplaces. The concept of 'alternative officing' emerged in the early 1990s and was commonly used to describe certain pilot programs for teleworking. Today, however, AOS is used more widely and in different contexts. AOS covers everything from flexible working hours and modified office standards to working at a satellite office, at home or in a car. (Steelcase 2000, p. 3.)

Another topical concept in Finland for the past two years is smart work (*in Finnish 'älykäs työ'*) although the use of such a term is not settled and an equivalent expression

has not been found in the international literature. However, the concept is used to refer to questioning the current ways of organizing work that is not applicable in knowledge work context. It highlights the fact that the work practices cannot be designed based on models originating from the manufacturing era (cf. Älykäs työ 2012). Hence the concept of 'smart work' best takes into account the need for change in the managerial practices and also the mindsets of the employees.

As argued before the physical dimension of work environment as well as the virtual tools plays a huge role in new ways of working. In addition to these, the social environment including, for example, organizational and leadership culture needs to be taken into account since they create the preconditions for the adoption of new ways of working. Hence these aspects require more thorough understanding. The next chapter examines the concept of work environment from three different perspectives: *physical, virtual, and social*.

4.2. Physical, virtual, and social work environment

Each workplace can be seen as an integration of embedded spaces consisting of these three spaces: *physical, virtual and social* (Bosch-Sijtsema et al. 2009, p. 541). The nature of the physical (i.e. physical work settings and location), virtual (i.e. virtual working tools), and social (i.e. beliefs and values) environment will be discussed in more detail in this chapter.

Physical space refers to the physical work settings. Vartiainen et al. (2006) divide physical space into five categories:

1. Home
2. The main workplace
3. Moving places (e.g. cars, trains, planes, and ships)
4. Other workplaces (e.g. customer's or a partner's premises)
5. "Third workplaces" (e.g. hotels and cafés etc.) (Vartiainen et al. 2006, p. 5.)

Thus physical space refers to the physical settings and location where work is accomplished. Contemporary knowledge workers are increasingly mobile, working more and more outside their offices, for example at customers' offices, home, "third places" or on the road (Maier et al. 2008, p. 510; Breu et al. 2005). This means that the physical environment where the work takes place is changing and thus the relevance of traditional offices is diminishing to some extent. More importantly, the function of traditional offices is changing (Harrison 2002, p. 254). Since knowledge work no longer necessarily takes place in traditional offices, the most important aspect of office buildings is their increasingly important social function enabling people to interact and collaborate (Harrison 2002, p. 254; van Meel 2011, p. 365).

The increased mobility of the employees implies new requirements for office design since the personnel is not constantly present. In traditional offices the increased mobility of workers would mean empty offices and thus inefficient office space usage (Maier et al. 2008, p. 511). However, new ways of organizing workspaces can intensify the office space usage and at the same time have other positive impacts as well. One possibility for using office space more efficiently is non-territorial working. According to Elsbach (2003), these non-territorial workspaces comprise shared workspaces, which enable more efficient and cost-effective use of the office space. The use of such non-dedicated workspaces is becoming increasingly popular (Elsbach 2003, p. 622.) as the flexibility and mobility of knowledge workers have increased. Multi-use offices consisting of different spaces for different kinds of tasks are commonly used to implement the non-territorial working. In the multi-use office the workspace is always selected based on the task at hand (Haner 2005, p. 293). In addition to more efficient space usage such dynamic use of office space supports the fact that different spaces can be used for carrying out different tasks. Thus such dynamic use of different spaces can better support the requirements of the tasks at hand (e.g. Haner 2005).

However, working from different locations rather from a single base, and working in/from non-traditional locations such as cars, airports, hotels is by no means easy, and creates a number of challenges for workers (Hislop & Axtell 2009, p. 61). Compared to the familiar and resource-rich surroundings in the main office, for example, mobile workers encounter certain challenges due to the unfamiliar environment when on the move. Cafés, trains, hotels and other places where mobile workers may work offer a different context for working in which available technology and communication infrastructures, noise levels and the available physical workspace vary. (Perry et al. 2001, p. 324.) Because of this the tasks that can be performed in these different locations vary. For example, the environment in a car is very different from the environment in a café, which sets limitations to the tasks that can be carried out within this environment. (Hislop & Axtell 2009, p. 66).

One of the key issues enabling the use of different locations is *virtual space* that should support the physical environment (Harrison 2002, p. 255). Virtual space refers to an electronic working environment or virtual working space (Vartiainen 2006, p. 6). The internet and intranet provide a platform for working places for both simple communication tools (e.g. e-mail) and complex ones, such as collaborative working environments. The virtual space can be analyzed by focusing on connections, devices and services. The purposes, usability and functionality of the connections, devices and services also need to be taken into account. (Vartiainen 2007, p. 195; Haner 2009, pp. 43-44.) Thus the virtual environment is a complex set of different kinds of services and devices that need to meet the requirements of the task, the employee and also the physical location.

Physical and virtual spaces are closely interrelated (Hyrkkänen et al. 2012, p. 193). This means that different physical spaces have different needs for virtual space. For instance, mobile working usually requires a combination of IT networks and devices such as wireless internet connections and sufficient mobile phones (Breu et al. 2005, p. 2). On the other hand different ways of working and different tasks also set various requirements for the virtual environment. For example, in collaborative work different collaborative virtual tools are needed. Collaborative virtual working space integrates different communication tools like e-mail, voice, videoconferencing, chat, group calendar, document management and presence awareness tools (Vartiainen 2007, p. 195). The use of such collaborative tools enables more efficient teamwork, especially in the case of virtual teams, where the team members are geographically scattered (see e.g. Bosch-Sijtsema et al. 2009).

When considering individual work efficient ICT resources allow knowledge workers to access corporate systems and to communicate with colleagues and, for example, customers, while on the move (Breu et al. 2005, p. 2). The use of such technologies enables more efficient use of time, for example, while travelling and commuting, which is why knowledge workers have been provided with mobile technologies in order to improve their productivity (see e.g. Davis 2002). However, this continuous connectivity can also have some negative impacts, such as information overload, that needs to be considered (Karr-Wisniewski & Lu 2010; Bontis 2011).

As argued, sufficient information technology can enhance the flow of information in an organization's social networks (Davenport 2008, p. 229). The social networks and the social environment in turn have an impact on the knowledge sharing within an organization (Nenonen 2004, p. 233). *Social space* refers to cognitive constructs, thoughts, beliefs, ideas, and mental states that employees share (Vartiainen 2007, p. 196). It includes the social constructs and interaction relationships of employees such as collaboration and management (Haapamäki et al. 2010, p. 12). As virtual and physical spaces represent the tangible factors of work environment the social space is the intangible factor that enables the knowledge flow in an organization. However, the physical and virtual environments can support the social environment and thus knowledge sharing (Nenonen 2004, p. 238).

One instance of social environment is an organizational culture. According to Schein (1983) organizational culture “...is the pattern of basic assumptions which a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, which have worked well enough to be considered valid, and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.” To put it briefly, organizational culture can be defined as the deep-seated (often subconscious) values and beliefs shared by personnel in an organization (Martins & Terblanche 2003). Thus organizational culture has a significant role in new ways of working since it enables the adaptation of

new working methods and therefore it needs to be considered how the organizational culture supports the new working arrangements (Roper & Kim 2007, p. 107). It also affects the way people communicate and share knowledge, both of which are argued to have an impact on productivity (see e.g. Peponis et al. 2007, p. 816). At the same time organizations will need to consider how they can support the development of organizational culture and the sense of community since the employees are increasingly mobile and spend only little time in the office. They need to think how different kinds of physical and virtual environments can contribute to preserving the organizational culture and the social nature of work. (Harrison 2002, p. 255.)

Organizational culture defines the way an organization manages its business (Barney 1986, p. 657). Therefore, the managerial culture is also important, and needs to be taken into account in new ways of working. New ways of working also poses new challenges for managers due to the use of different locations for working (Halford 2005, p. 19). However, the managerial culture creates the framework for new ways of working and may be either an enabling or limiting factor in the adoption of new working methods.

Social networks play an important role, especially in knowledge work (Davenport 2008, p. 228). With respect to the creation of these social networks, office buildings have an important social function (van Meel 2011, p. 365). Although knowledge workers like working from home occasionally they do not want their homes to be their only offices due to the social aspect of the physical offices. Office buildings are the intersections of knowledge sharing; a place where social networks are formed, tacit knowledge is exchanged and social capital built through interaction. (Davenport 2005; van Meel 2011, p. 365.) This emphasizes the importance of the social environment even though the working patterns are changing and work is becoming more mobile.

As argued, the physical, virtual and social spaces are all important in new ways of working. According to Nenonen (2004, p. 233), the physical, virtual and social spaces need to be in balance with each other (Figure 8).

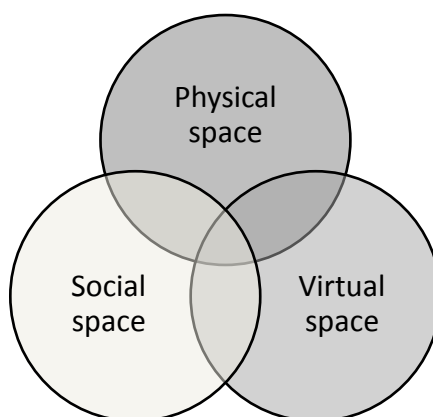


Figure 8. *The balance between physical, virtual and social spaces (adapted from Haapamäki et al. 2010, p. 13).*

Thus when developing a workplace all these dimensions need to be taken into account. These dimensions should not be seen as separate parts of the work environment; they should be seen as a whole in which each dimension interacts with one another (see e.g. Haapamäki et al. 2010, p. 12). Davenport (2008) also emphasizes that the most effective workplace development projects include changes in the physical workspace, information technology and management and culture (Davenport 2008, p. 231). For example, when an organization decides to engage in remote work, in addition to the physical place they need to consider how it is enabled by the virtual tools and services. Further, they need to consider how the company policies support remote working: should there be some common rules for remote work and how should remote working be managed?

4.3. Work practices

Even though an organization provides the facilities for new ways of working, this does not necessarily lead to changes in the work practices of the workforce. Thus, the potential of new ways of working is also dependent on the individual workers and the way they utilize the opportunity that the work environment provides. Advanced facilities and virtual tools are not intrinsically valuable; they need to be utilized appropriately in order to create value for the employees and thus the company. Hence, it is ultimately the employees' responsibility to utilize the potential of new work settings and find ways to work smarter.

Flexibility is one of the most important objectives of new ways of working (Warren et al. 2007). The need for flexibility occurs at many levels in the business environment. Companies are expected to adapt rapidly to the changing requirements of their customers and are constantly seeking new ways to be agile. This is one of the reasons leading to flexibility in other levels. Employees require flexibility of their employers in order to improve their work-life balance. Similarly, the employees are expected to be flexible in their approach to their jobs and to acquire multiple skills that allow them to move flexibly between different activities. (Gibson 2003, p. 12.) Figure 9 presents the key forms of flexible work and their implications for the working environment.

Three different types of flexibility are presented in the figure: contractual flexibility, time flexibility and location flexibility. *Contractual flexibility* means flexibility in the way employees are employed (e.g. outsourcing). *Time flexibility* refers to formal or informal agreements between employer and employee about working hours. *Locational flexibility* gives employees a chance to choose where they work including the option to work at home or at other locations. (Gibson 2003, p. 15.) The last two are relevant for this research since they are one of the key elements in new ways of working.

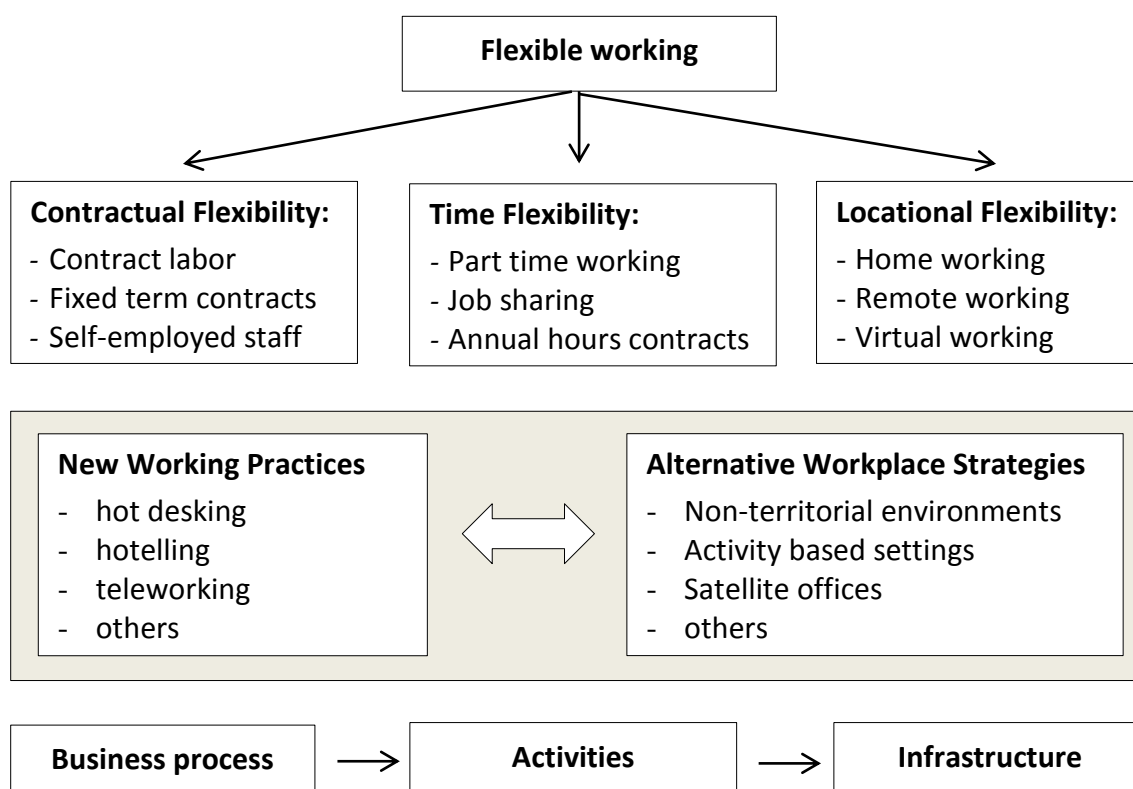


Figure 9. Flexibility in the workplace (adapted from Gibson 2003, p. 19).

Locational flexibility emphasizes that employees are no longer tied to a single place of work but rather should strive to work in the most appropriate place for the task at hand (Gibson 2003, p. 19). This increased flexibility offers opportunities for employees to better handle their tasks (Aboelmaged & El Subbaugh, 2012, p. 7). For example, working from home lets employees avoid interruptions caused by a restless office environment and carry out tasks that require concentration (Halford 2005; Hislop and Axtell 2009). It also offers an opportunity to choose when to work and when to have some personal time (Vartiainen & Hyrkkänen 2010, p. 131). This in turn may enhance the work-life balance. When the work is more flexible it is possible to spend more time at home, for example, when saving on commuting time (Harrison 2002, p. 257; Vartiainen & Hyrkkänen 2010, p. 131).

However, employees can nowadays also utilize commutes and travelling. According to Vartiainen & Hyrkkänen (2010) the development of technological tools has enabled more dynamic usage of different locations and enabled collaboration between employees independent of time and place. They present a model that examines this transformation of telework from traditional single-location work to mobile, multi-locational work (see Figure 10).

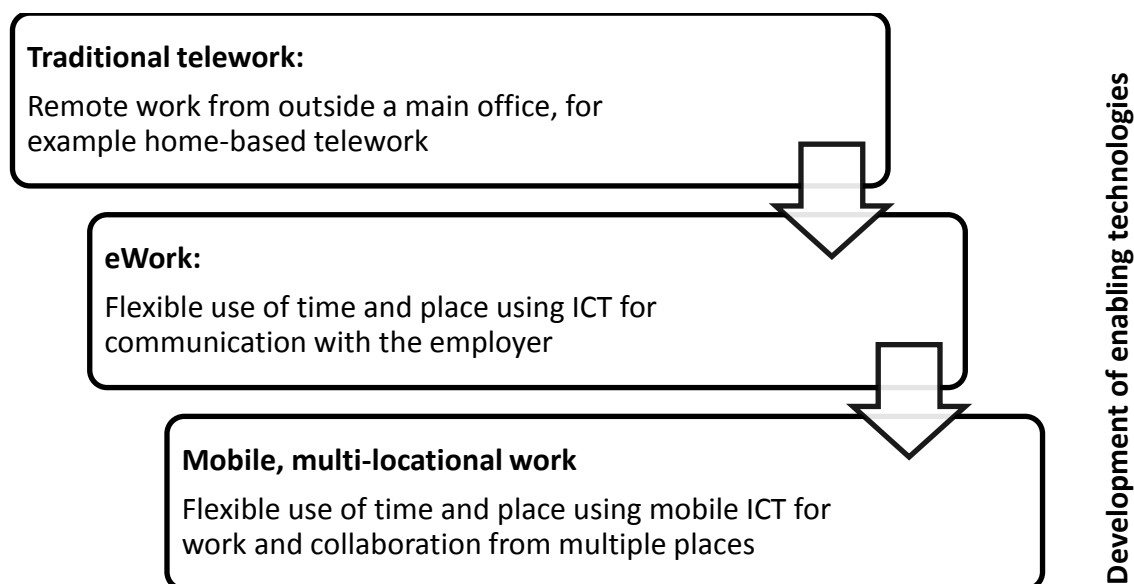


Figure 10. From traditional telework to the concept of mobile, multi-locational work (adapted from Vartiainen & Hyrkkänen 2010, p. 119).

Knowledge workers are increasingly mobile, working more and more outside the traditional offices, for example at customers' offices, home, "third places" or on the road (Breu et al. 2005; Maier et al. 2008, p. 510). The development of ICT tools has made it possible for people to work independent of time and location (Felstead et al. 2005; Hislop & Axtell 2009). Such ICT-enabled mobile work makes possible more efficient use of time since employees can better utilize the otherwise dead time, for instance while traveling (e.g. by train, or air) or waiting (e.g. in railway stations, in airport lounges) (Perry et al. 2001, p. 337). Mobile work also emphasizes the employees' autonomy and control of time and tasks (Vartiainen & Hyrkkänen 2010, p. 133). They can, for example, decide when to work and when to relax.

However, there are some challenges that employees need to overcome in order to utilize mobile working efficiently. First, employees need to adapt continuously to the changing environment (Vartiainen & Hyrkkänen 2010, p. 132). This requires the ability to concentrate in different contexts. Second, mobile workers are required to use different kinds of technologies in order to be connected to colleagues and customers. Thus skills in employing different kinds of virtual infrastructures are important (Hallford, 2005; Vartiainen & Hyrkkänen, 2010). Third, mobile work can cause difficulties in separating work from personal time (Vartiainen & Hyrkkänen 2010, p. 133). However, this depends largely on the person's time management and tasks. Fourth, in mobile work the amount of face-to-face interaction decreases since employees may not be present in the offices at the same time (Vartiainen & Hyrkkänen 2010, p. 133). Such informal interaction is considered to be important for creating trust and social networks (van Meel 2011, p. 365). Despite these challenges new ways of working can have multiple positive impacts, which will be discussed next.

4.4. The impacts of new ways of working

New ways of working can have many positive impacts on a firm's business. These impacts can be approached from organizational level (affecting the total productivity and performance of organization) and individual level. For example, flexibility can on the one hand support a firm's performance at the strategic level and on the other hand improve workers' productivity at the operational level (Gibson 2003, p. 17). At the organizational level the majority of the impacts are related to improvements in a company's overall performance, whereas at the individual level new ways of working are considered to have positive impacts on job satisfaction and motivation and hence productivity (see e.g. van der Voordt 2004b).

Many positive impacts can take place at the organizational level. Most rationales for implementing new ways of working from the organizational perspective are related to cost and resource savings as can be seen in Table 3.

Table 3. *Impacts of new ways of working in organizational level.*

Viewpoint	Possible benefits	Sources
Resources	<ul style="list-style-type: none"> - Efficient space and technology usage - Space utilization rate 	Bradley 2002, Felstead et al. 2005, Ruostela et al. 2012
Cost savings	<ul style="list-style-type: none"> - Reduced internal operating costs - Reduced travel costs - Reduced occupancy costs 	Mahlon 1998, Bradley 2002, Van der Voordt 2004b
Sustainability	<ul style="list-style-type: none"> - Reduced carbon footprint - Carbon emission from travel and office buildings 	Bradley 2002, Hassanain 2006, Junnila 2006, Gratton 2011, Ruostela et al. 2012
Positive image	<ul style="list-style-type: none"> - Customer satisfaction - Attraction/retention of clients - Impacts and value for customer 	Bradley 2002, Van der Voordt 2004b

With different kinds of space usage it is possible to use the organization's resources and especially space more efficiently (van der Voordt 2004b, p. 242). This naturally leads to reduced occupancy costs since there are more employees per one desk (for example, in a hot desking solution). Working from home reduces travel costs and at the same time takes into account the sustainability aspect reducing the carbon footprint caused by commuting (see e.g. Hassanain 2006, p. 214). According to Bradley (2002) and van der

Voordt (2004a) these new ways of working may also improve the image of the company from the customers' perspective.

However, although the impacts at organizational level are significant, the impacts at individual level are more interesting for this research. New ways of working may have an impact on employees' job satisfaction (e.g. van der Voordt 2004a). Employee satisfaction refers to the degree to which the working environment meets the needs of the employees. It may be related to the work itself (for example, the complexity of the task, degree of autonomy, skills required), the social environment (for example colleagues, management style), the physical working environment (for example the workplace, lighting). The interaction between these aspects also plays an important role. (van der Voordt 2004a, p. 137.) New ways of working can also improve the work-life balance (van Meel 2011, p. 358). When the work is more flexible (time or location) it may be possible to spend more time at home, for example, when saving the commuting time (Harrison 2002, p. 257).

The basic rationale behind all the different aspects is the desire to improve productivity and business performance, while also taking into account the welfare of the personnel (van der Voordt 2004a, p. 133). As Bontis (2011) puts it; it is about finding ways to "*work smarter, not harder.*" This emphasizes the fact that productivity improvements can be achieved by designing the work practices more reasonably, and also focusing on the welfare of the workforce.

In the literature the link between new ways of working and productivity is still somewhat tenuous. Only few research results are available on the possible effects of innovative design of workplace and settings on productivity (van der Voordt 2004a, p. 137) and the literature lacks a comprehensive view of the positive impacts of new ways of working. However, many of the features related to new ways of working and their impacts on the productivity have been studied (see Table 4).

There is some evidence that physical space has an impact on productivity. According to Peponis et al. (2009) the office layout can indirectly contribute to productivity. This is based on the idea that different layouts can facilitate communication and sharing knowledge and ideas. By supporting the flow of both formal and informal information the office design can affect the processes that make a knowledge-intensive organization more productive. (Peponis et al. 2009, p. 837.) Hassanain (2006, p. 217) has also acknowledged the positive impact of work environment on knowledge work productivity and emphasizes that the workplace should be designed according to the workers' needs.

Table 4. *Impacts of different new ways of working related features on productivity.*

Feature	Source
Office layout and design	Hassanain 2006, Peponis et al. 2009, Appel-Meulenbroek 2010
Flexibility	Gibson 2003, Origo & Pagani 2008, O'Neill 2010
Distributed work arrangements	Roper & Kim 2007, Bosch-Sijtsema et al. 2009
Mobility	Davis 2002; Breu et al. 2005
Telework	Baines 2002, Aboelmaged & El Subbaugh 2012

It is argued that flexibility can have positive impacts on productivity (Roper & Kim 2007, p. 107). Origo & Pagani (2008) argue that when employees are more satisfied their job performance is better, for example in terms of lower absenteeism. Flexibility may also have an indirect impact on productivity via its influence on workers' job satisfaction. (Origo & Pagani 2008, p. 540.) Distributed work arrangements and virtual teams are also claimed to have an impact on knowledge work productivity as well (Roper & Kim 2007; Bosch-Sijtsema et al. 2009). Distributed work increases flexibility and can thus enhance productivity (Roper & Kim 2007, p. 107).

According to Davis (2002, p. 73) in some cases mobility and high level of access to data can improve the productivity of the employees. The productivity can be improved through a technology-enabled ability to make use of previously unproductive time and communicate via multiple channels regardless of location (Breu et al. 2005, p. 2). However, the general impacts of mobility on productivity and quality of work life are somewhat uncertain (Davis 2002, p. 73). The impacts of telework are also vague (see e.g. Baines 2002, p. 98). Aboelmaged & El Subbaugh (2012) studied the factors affecting the productivity impacts of teleworking. Job security, job satisfaction, work flexibility, organizational commitment and management support were considered the key determinants of productivity in teleworking. Another interesting point that emerged in the study was that flexible working needs both technical and emotional support from the managers and well-defined policies. (Aboelmaged & El Subbaugh, 2012.) Telework is also claimed to improve the work-life balance and hence productivity (see e.g. van Meel 2011, p. 358).

5. PLANNING AND EXECUTING THE EMPIRICAL EXAMINATION

5.1. Summary of the theoretical part

Knowledge work and knowledge work productivity have been studied for several years. The amount of literature on knowledge work productivity is huge and the contents diverse. The concept has been studied from multiple aspects including, for example, ICT solutions, management practices, knowledge flows and organizational structures. The fundamental nature of knowledge work has also attracted a lot of attention leading to various definitions and lists of special characteristics of knowledge work and different ways to classify them.

Knowledge work productivity is a complex phenomenon and has accordingly attracted attention among scholars. However, understanding the phenomenon of knowledge work productivity and the methods to improve it is still inadequate. Despite this, different ways to improve knowledge work productivity have been identified in the literature. Nevertheless, there are generally two problems why these methods are not generally accepted and adopted. First of all, although the nature of knowledge work has been much discussed, the acknowledged differences from manual work have mainly been ignored in developing the methods to improve knowledge work productivity. Furthermore, the methods are still very much founded on assumptions originating from the industrial era. Second, there are no comprehensive approaches to the subject. In the literature the focus is usually on some specific method to improve the productivity of knowledge workers (e.g. providing more efficient IT-tools), rather than taking a view.

The aim of new ways of working is to offer a novel and comprehensive approach to improve knowledge work productivity. However, only few studies have examined this concept. Furthermore, *the impacts* of new ways of working are even more uncertain due to their novelty. Those publications that have studied the impacts of new ways of working have generally adopted an organizational perspective. One of the reasons for this is that at the organizational level the impacts of, for example, new office solutions (e.g. improved cost efficiency and reduced environmental impacts) are easy to identify and measure since they are objective and concrete. Instead, the impacts in individual level are more complex and more difficult to define and quantify because the phenomenon is still fairly new and includes numerous aspects and approaches. The impacts of new ways of working on knowledge work productivity are also difficult to identify due to the intangible, vague, and subjective nature of knowledge work

productivity phenomenon. However, various new ways of working (such as flexibility, physical environment, and mobility) have been argued to have impacts, for example, on job satisfaction, welfare and the work-life balance of the employees but the relationship between new ways of working and productivity of the employees is still vague.

Derived from this a more in-depth understanding is required of the relationship between knowledge work productivity and new ways of working, i.e. *the productivity impacts of new ways of working in knowledge work context*. Thus there is a need for research that examines these concepts profoundly. In this research a qualitative approach is used to gain a deep insight into the phenomenon. The empirical material in this research is from two case organizations. Using two case organizations gives an opportunity to tackle the organization-related issues of new ways of working. It also makes it possible better understanding of the dynamics behind the factors affecting knowledge work how features related to different new ways of working could help to improve productivity. Furthermore, this approach emphasizes that it is essential to understand the organizational context and objectives when new working practices and methods are designed. Thus the aim in this study is to identify the organization-specific potential of new ways of working for improving the productivity of knowledge work. In the next chapter the two case organizations are introduced. The methods for collecting the empirical material and the execution of the whole process are also presented.

5.2. Case organizations

This research is based on two case organizations, Rapal Oy and Granlund Oy, both of which are part of the NewWoW- project, which is one of the reasons why these two were chosen. Another reason for selecting Rapal and Granlund was that they are different from the NewWoW point of view. While Rapal have made changes in their ways of working in the last few years, Granlund are just starting their own process. Thus studying these two is a promising starting point for the research. Next, case companies are introduced..

Rapal Oy is an expert in the financial management of built environment. Rapal produces real-time information for owners, constructors and users of premises and infrastructure in order to help them make economically viable and environmentally responsible decisions. Rapal offers and develops financial management products and services for their customers, covering the entire life cycle of built environment. Rapal's operations are based on three main products, Fore, Optimaze.net and Forecast, from of Optimaze.net is their main product. Rapal was established in 1991 and is owned by the personnel. In 2011, the net sales were over €5.4 million. The number of employees is about 60. However, as the company is growing the number of workers is continuously increasing as well.

Rapal carried out a workplace development project during 2009 when their rental agreement expired. At the beginning of the project Rapal divided their employees into three different profiles (fixed, flexi and mobile) based on their ways of working and the related space and technological needs. Based on the profiling the optimal space need was calculated and different alternative facilities were explored. After deciding on the new location a new office layout was designed resulting in a multi-use office where the varying needs of different working profiles were taken into account. This project significantly improved the overall performance of the company.

However, despite the significant improvements in the overall performance of the firm there is no evidence of improvements in productivity. The impacts of Rapal's new ways of working on their employees' productivity remain unclear, which is why this research can provide important information for Rapal.

Granlund Oy is Finland's leading building services consulting firm. Granlund's core business areas are building services design, facility management consulting and the development and sale of facility management software. Granlund was established in 1960 as an HVAC (heating, ventilation and air conditioning) and plumbing design company. In 2011, the net sales were approximately €32.9 million. Granlund employs 360 experts in the fields of building services, facility management, and energy and environment consulting.

Granlund is still at the beginning of its NewWoW project. Before the interviews were carried out the profiling of this project had been completed. Granlund's employees were divided into three profiles in the same way as Rapal's. However, the workspaces and working methods had not yet been designed on the basis of this information. Hence it is safe to say that the ways of working at Granlund are still evolving. Thus this research provides Granlund with important information about the potential of new ways of working that they can utilize when redesigning their work practices and settings.

Although there are some differences between these two case organizations, such as size, age and maturity level in new ways of working, there are also some significant similarities. First, both organizations operate in branch built environment. Second, both organizations are knowledge-intensive and employ knowledge workers. Thus for the purposes of this research these companies are ideal. They are not different in a way that would compromise comparing the results of the cases but have dissimilarities which make them interesting for the purposes of this research. In the next part the methods for collecting the material from these cases and the execution of the process will be introduced.

5.3. Research methods and execution

A wide range of information-gathering techniques can be used in case studies (Gummesson 2000, p. 83); interviews, observations, questionnaires, or examining codified information are techniques that are usually used in qualitative research (Hirsjärvi & Hurme 2004; Metsämuuronen 2006, pp. 116, 118; Bryman & Bell 2007; Tuori & Sarajärvi 2009, p. 71). For the purposes of this research the interview technique seemed to be the best choice for collecting empirical material. Since the aim in this study is to gain a deep insight into the impacts on productivity of different ways of working and people's perceptions of these, using a questionnaire is a too limited technique because of its predetermined nature. Observations are not feasible since the phenomenon is too complex and intangible to be observed within a short time period. Thus the only technique that gives the researcher a tool to access the phenomenon comprehensively is interviewing. However, choosing interviewing as a method is insufficient as there are also multiple methods for carrying out interviews.

5.3.1. Thematic interviews

Interview is one of the basic techniques for data collection in empirical research. Interview methods are usually classified according to how fixed the questions are and how much the interviewer can control the course of the interview. Hence, interview methods can be roughly divided into different categories. The most commonly used interview type is formal interview in which the questions and their order of presentations are fixed. Formal interviews are an option when the data needs to be quantified easily, when formal hypotheses are needed for testing or when the researcher knows the expected outcomes of interviews in advance. (Hirsjärvi & Hurme 2004, pp. 43-45.) In this research the quantification of the data is not required. Also, the outcomes of the interviews were not known beforehand due to the novel approach to knowledge work productivity. Therefore, formal interview is not appropriate technique for this research.

The other category includes all other interview techniques, for example unstructured interview, semi-structured interview, in-depth interview and thematic interview. Unstructured or in-depth interviews are usually used, for example, in psychological and sociological research. The interview technique is very much like a conversation and the questions are open and may be formulated based on the answers to earlier questions. (Hirsjärvi & Hurme 2004, pp. 43-46.) In-depth interviews are not applicable in this research since there are some common themes that outline the research, suggesting that the researcher pursues information from a predetermined direction – something that is not related to in-depth interviews (Patton 2002, p. 342). Therefore in-depth interviews are too free for the purposes of this research. Thus thematic or semi-structured interviews seem like a natural choice.

Thematic interview is a semi-structured interview technique based on the ‘focused interview’ introduced by Merton, Fisker and Kendall in 1956. In thematic interviews the interview is based on different themes discussed during the interview. Compared with other semi-structured methods the nature of thematic interview is more like an unstructured interview than a structured interview but because of the fixed themes it can be classified as a semi-structured method. One of the benefits of thematic interviews is that it does not tie the research to qualitative or quantitative methods. Thematic interview also emphasizes the interaction between people and highlights people’s own interpretations. (Hirsjärvi & Hurme 2004, pp. 47-48.)

Thematic interviews are based on the subject of the research and the positioning of the research problem. The questions in thematic interviews are founded on the framework of the research and the existing knowledge about the phenomenon. (Tuori & Sarajärvi 2009, p. 75.) In this research the themes are based on the literature on knowledge work productivity and aspects related to new ways of working.

Thematic interview was chosen because it gives flexibility for both the researcher and the interviewee. The subject is fairly new and the answers need not and indeed cannot be tied to predetermined choices since the answers are expected to be complex. Furthermore, thematic interview technique also enables the emergence of new aspects, which is important in this research. Although the interviews are based on certain key themes, some further questions were added in order to gain a deeper insight into the key topics. However, the interviews do have some characteristics from semi-structured interviews and thus are not purely based on thematic interview technique.

5.3.2. Choosing the interviewees

The objective in qualitative research is not to make statistical generalizations. Instead, it is important to understand and describe the phenomenon comprehensively. Thus, when selecting the interviewees, it is essential that the interviewees have sufficient knowledge or experience about the phenomenon. (Hirsjärvi & Hurme 2004, p. 58; Tuomi & Sarajärvi 2009, p. 85.) Since the aim of this study is to examine productivity from individual knowledge workers’ perspectives it is reasonable to interview the personnel and not for example the management of the firm. With this in mind, the interviewees were chosen from the two organizations presented earlier.

The selection of the interviewees was based on of their differences. First, they were chosen from three different profiles, *fixed*, *flexi* and *mobile* according to their tasks and mobility patterns. Second, in the process of selecting the interviewees their other differences were taken into account, considering factors such as gender, age, assignment and position in order for the sample to be as comprehensive as possible. The sample of interviewees consisted of junior consultants, consultants, senior consultants, chief consultants, HR coordinator, managers (sales, service, training, R&D, group).

5.3.3. Conducting of interviews

The interviews were carried out in face-to-face private conversations on the case companies' premises. All the interviews were recorded for analysis. The length of the interviews was between 45 and 90 minutes. The language used in the interviews was Finnish since all the interviewees were native Finnish speakers. Therefore the quotes presented in this thesis have been translated by the researcher so that the translation preserves the original meaning and intent.

The course of the interviews followed a specific interview outline that the researcher created for the purposes of this research (see Appendix 1). The same outline was used in every interview although some alterations and corrections were made to the structure as the interview process proceeded. For example, the order of some questions or themes was switched. In spite of these small changes the purpose of the questions remained the same and therefore the same information was gathered in all interviews.

During the interviews many additional questions were asked to gain a deeper insight. Some of these were prepared beforehand to ensure the quality of the interviews (Hirsjärvi & Hurme 2004, p. 184) whereas some were made up during the interviews. One of the interviewees was not able to participate in a private face-to-face conversation. The questions were sent via e-mail to the interviewee who sent back responses. In order to preserve the comparability of the results the question form was modified so that the interview had the same focal questions that were used in the face-to-face interviews.

5.4. Data analysis

After the interviews were carried out, the interviews were listened to and transcribed for analysis. For the purposes of this research the transcription was done carefully but not word for word. After that, the material was read several times, since the quality of the analysis depends on how familiar the researcher is with the material (Hirsjärvi & Hurme 2004, p. 143).

The methods used for analyzing the data affect the results of the research, especially in qualitative research, where the researcher interacts with the subject of the research (Creswell 1994). Therefore it is important that the analysis is made systematically and following some general guidelines. Thus, the principles of data analysis in qualitative research need to be discussed first.

Processing the material in qualitative research encompasses several phases involving both analysis and synthesis. In the analysis phase the material is decoded into smaller parts, classified and the classes are combined. Analysis is followed by synthesis in which the objective is to form new entities and interpretations from the material. After

that the aim is to gain a more comprehensive theoretical understanding of the phenomenon. (Hirsjärvi & Hurme 2004, pp. 143-144.)

The analysis process can be simplified into three phases: *description*, *classification* and *combination* (Dey 1993, p. 31 according to Hirsjärvi & Hurme 2004, pp. 145). Describing the material forms the basis for the analysis. The purpose of describing is to chart the characteristics of people, events or objects. In the classification phase the researcher discerns the material and the phenomenon which enables the comparison of the data. In the last phase, the combination phase, the researcher strives to find regularities and similarities from the classified data. (Hirsjärvi & Hurme 2004, pp. 145-149.)

Tuomi & Sarajärvi (2009) present the following detailed framework for analyzing qualitative material:

1. Decide which are the most interesting issues in this material and make a strong decision.
2. Go through the material and separate and flag the interesting information.
3. Eliminate everything else from this research.
4. Round up the flagged material and separate it from the other material.
5. Classify, type and organize the material into themes.
6. Write a summary. (Tuomi & Sarajärvi 2009, pp. 91-92.)

In this research the analysis was done as a combination and modification of these two. The material was printed out so that it was easier and more convenient to process. Then a framework for analysis was created based on various new ways of working initiatives emphasized in the theoretical part of the research (see Figure 11). First, the three dimensions of the *work environment* (physical, virtual, and social) were included in the framework. Second, *work practices* were added to the framework including the two most emphasized aspects: flexibility and mobility. In each part of the framework the focus was on analyzing the impacts of these new ways of working initiatives on employees' productivity. Thus the first three aspects examine the impacts of the work environment whereas the last two focus on individuals' work practices and their impacts on productivity. Based on the key factors identified the potential of new ways of working for improving productivity is analyzed.

The two cases were analyzed separately, first Rapal and then Granlund. Finally, some general notions were also made from both cases. In the analysis the material was read through searching for interesting aspects and at the same time finding connections to the theory and similarities and differences between the other parts of the material. These interesting parts from the data were underlined. At the same time interesting quotations were sought from the material. After that the underlined material was read again and different kinds of categories were identified. Finally, the underlined material was classified into different categories and a summary of it was written.

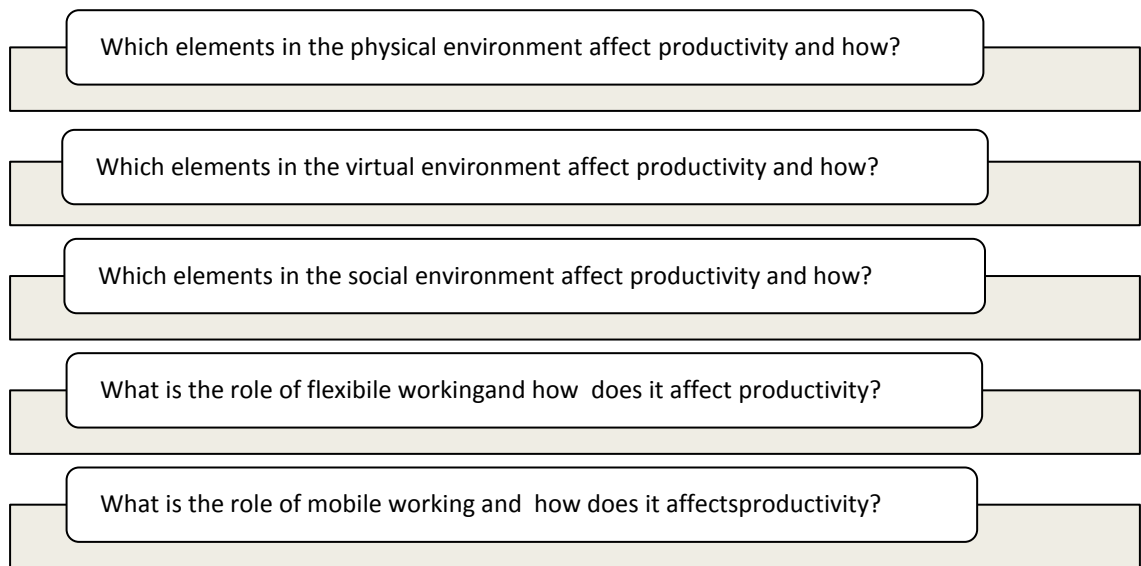


Figure 11. Framework for analyzing the results.

In the next chapter the results of the empirical research are presented and analyzed by utilizing the aforementioned framework.

6. RESULTS AND DISCUSSION

6.1. Defining productivity

Before we can discuss what affects knowledge work productivity, we first need to consider the term 'productivity', as there may be very different perceptions of it. Therefore the answers may vary regarding the respondent's perception of the concept.

Even though the responses varied a lot, some key elements could be identified. In terms of productivity the respondents defined the term in general through inputs, outputs and outcomes. Each of these elements includes different aspects ranging from financial issues to customer satisfaction and other more intangible aspects.

Starting from the inputs the respondents' main concern was resources, of which time was considered to be one of the most important aspects for productivity. Hence productivity is doing things on time and minimizing the time used to complete the task as one respondent stated:

"Of course, if two people do the same thing and with equal quality the one who does it faster is more productive."

The outputs also need to be in line with the time used as one of the respondents notes:

"When you have a feeling that the ratio of the amount of work to output seems reasonable. If you work one month and your result is only one page... Well, that is not productive!"

Another issue from this viewpoint is using the resources reasonably and doing the right things relative to the work task. In one respondent's opinion productivity is:

"[It is] to achieve something, not to say with minimal effort as you can but by cutting down the unnecessary things"

Many of the interviewees defined productivity through the actual outputs. The most obvious response was that productivity is achieving some concrete results and outputs such as documents, papers or, for example, a program code. Non-concrete, intangible outputs were taken into account, from which generating new ideas was considered to be most important.

A few respondents mentioned that in addition to the quantity of the output, the quality of the output is also important. This is how one of the interviewees defined productivity:

“I think it’s doing the right things with the right methods. And so that the result is what was expected and wanted – no second-class stuff.” One respondent said that quality is even more important than the usage of time.

Although the concrete outputs are important relative to productivity, many respondents thought that the actual impacts are also crucial as two of the respondents put it:

“But I don’t think it is really productive if I produce documents. Writing documents is not valuable in itself”

“If I have some great ideas and solutions written on a piece of paper it does not have any impacts. It is not productive until it has been implemented. In my opinion any information is irrelevant if no-one reads it. And that’s the challenge!”

This aspect is perhaps the most important issue when talking about productivity, since it emerged in almost every interview to some extent. Some respondents took into account that in some operations the impacts cannot be measured immediately, since the impacts will not be realized instantly. For example, in marketing the impacts of a marketing event are difficult to define, since they may appear after a long time and therefore it is impossible to say immediately whether it was productive or not. This is how one person responsible for marketing explained it:

“Sometimes it feels that although I manage to do things efficiently I don’t know if that has had any actual impacts.”

The responses related to outcomes can be roughly divided into intangible impacts (for example customer impacts) and tangible impacts (for example money). Financial aspects are important in many of the respondents’ opinion as well. Especially from a corporate viewpoint the results that can be measured in monetary units are considered to be the most valuable when considering productivity. In the knowledge work context especially the billing rate was considered to be an important measure in some respondents’ minds.

From a more intangible perspective the customer impacts were considered to be a major issue that needs to be taken into consideration when defining productivity. Below is a list of some things that were considered to determine productivity according to some responses:

- Satisfied customers
- Retained customers
- New orders from old customers
- New customers
- Actual impacts on customers’ business

As can be seen, different people have different perceptions of productivity. However, when all these aspects are put together they construct a good definition for productivity that corresponds with those in the literature. Traditionally productivity has been defined as the ratio between outputs and the inputs used to produce the outputs (see e.g. Craig & Harris 1973, p. 14). The interviewees also agreed that inputs as well as outputs need to be taken into account when defining productivity. For example, the amount of time used to complete a task was considered to be one of the factors of productivity. Timelines according to the literature are also one of the much used dimensions when evaluating knowledge work productivity (see e.g. Ramirez & Nembhard 2004, p. 617).

From an output perspective both quantity and quality perspectives were taken into account and quality was even considered to be more important than quantity. According to Drucker (1999), too, the productivity of knowledge work has to aim first at achieving quality. Only after that is it justified to concentrate on the quantity of output. (Drucker 1999, p. 84.) In addition to concrete outputs such as documents, the intangible outputs such as new ideas were considered important as well. This, in addition to innovativeness, is an important aspect of productivity, especially in the knowledge work context (e.g. Drucker 1999, p. 84; Ramirez & Nembhard 2004, p. 617).

In addition to the traditional perspective including inputs and outputs, taking into account the impacts emphasizes that in knowledge work productivity cannot be defined solely on the basis of inputs and outputs. According to the interviews the customer perspective is an important aspect that needs to be taken into account. The customer perspective is important, especially in the service business (see e.g. Fitzsimmons & Fitzsimmons 2008). However, the relationship between productivity and, for example, customer satisfaction is fairly complex and constantly debated in the literature (Anderson et al. 1997, p. 131).

To summarize the discussion about knowledge work productivity, inputs as well as outputs and actual impacts need to be taken into account. Both the intangible and tangible perspectives of each of these are important, especially in knowledge work. (see Figure 12). According to the interviews the inputs and outputs are significant at an individual level. If productivity is examined at the organizational level, the impacts need to be taken into account.

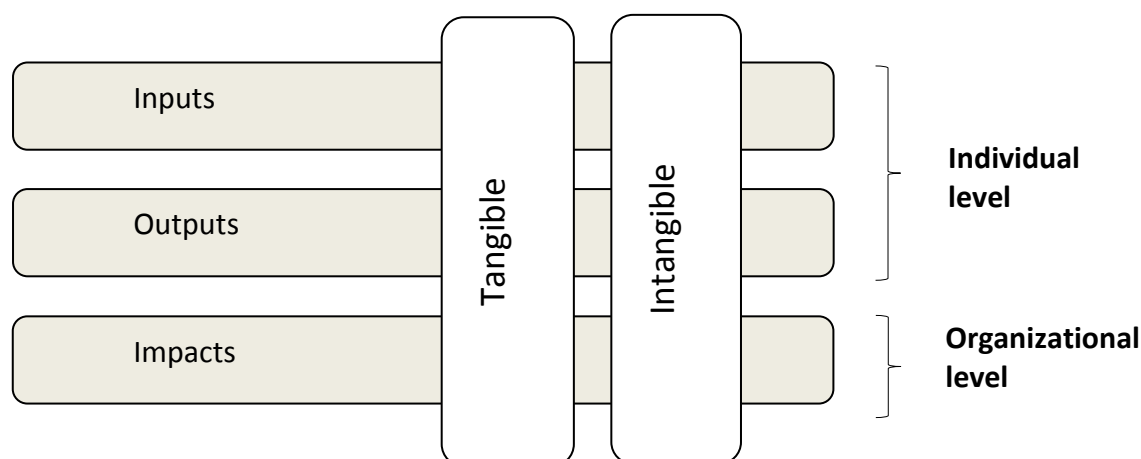


Figure 12. Defining productivity.

Despite all the good definitions some criticism was presented as well. These were the first words of one respondent about productivity:

“I must say that I don’t like the word ‘productivity’ as a whole. I see it that it is a matter of potential, that you can give everything you have... Whether it is productive or not, I don’t know. But it’s a question of whether you can harness all your potential for the task.”

Given this argument it is appropriate to continue to the next section and analyze the impacts of factors related to various new ways of working on productivity at the case companies, Rapal and Granlund.

6.2. Case Rapal

This chapter presents the findings of the interviews carried out at Rapal. The aim is to identify which factors are considered to be significant for productivity at Rapal. First, the impacts of the physical environment (such as multi-use office) on productivity are discussed. Second, the focus is on virtual environment and the role of ICT tools in productivity. Third, the social environment is examined in the light of productivity. Both positive and negative impacts are identified. Fourth, the effects of flexibility and mobility are discussed. In light of these findings, the potential of new ways of working for improving the productivity of Rapal’s workforce is analyzed.

6.2.1. Impacts of the physical environment on productivity

The physical environment is considered to have both positive and negative impacts on productivity at Rapal. Considering first the positive impacts of the physical environment on the productivity of knowledge workers at Rapal, it emerges that many of the positive impacts are related to the multi-use office and flexibility of different spaces

The openness of the office environment is seen as something positive affecting productivity at Rapal. In an open-plan office communication is considered to be easier (e.g. compared to more traditional offices, where employees have their own rooms) and knowledge sharing to be more efficient, both of which have a positive impact on productivity. According to some of the interviewees, the most essential aspect related to the open space is that one can immediately see whether some colleague is there or not. This makes it easy to go to talk to someone if help is needed in some tasks. Since at Rapal there are only few assigned desks and almost everyone chooses their desks again every morning, employees may be sitting next to different people each day, which, according to many interviewees, means that people get to know each other better.

A few respondents also mentioned that in an open office space there is constantly something happening in the environment, which has a positive impact on productivity. Some interviewees noted that if others are working hard and enthusiastically it may also affect an individual's work motivation and enthusiasm. Perhaps one of the most important aspects in open-plan offices that was also noted during the interviews, is the question of peace; having a peaceful environment has a positive impact on productivity. And if this is lacking the effect on productivity according to the interviewees will be negative. Some of the interviewees also said that they would be less productive in a more conventional office space where everyone has their own rooms.

According to the responses, the office equipment as well as the office space need to be flexible and adjustable in order to be productive. The versatility of the working space is also important as one interviewee stated:

“The variety in the work space is important, that there are lounge couches (and you don't want to place that in the middle of an open-plan office where everyone sees that you are lounging there), different spaces, corners... That they say that you can go work in a café or in terrace or go walking.”

Similarly, most of the interviewees also emphasized that the employees need to have an opportunity to choose between different physical environments, since different employees have different needs. According to one employee the ideal physical environment is:

“A place where you have good karma and positive energy. A place where you feel comfortable. And of course that means different things to different individuals.”

According to some of the interviewees office equipment needs to be ergonomic and adapt to the needs, for example, of different sized persons. They also noted that it is important that the office space is comfortable. A comfortable office environment was seen have a positive impact on the atmosphere and the employees' mood which, as mentioned before, indirectly affects productivity. Some of the interviewees mentioned that if the members of a team are positioned close to each other it has a positive effect

on productivity. According to them, it enables the team to work more efficiently since it eases their communication. Some also pointed out that at the same time it may affect the overall working atmosphere making it more peaceful.

Although the open office environment has multiple positive drivers for knowledge work productivity, there is also a downside. The openness also has some negative impacts. One of the most often mentioned factors with a negative effect on productivity is the restlessness of the work environment in an open-plan office, since work is constantly disturbed by someone or something, as the majority of the interviewees pointed out. According to a few respondents in some cases the noise level rises too high, which may indirectly affect productivity through its influence on employees' stress levels..

Having un-assigned workstations has some negative impacts according to the interviews. A few respondents pointed out that, especially for new employees, it may be rather difficult to adapt because the people around them change all the time and they do not get to know other people so well. Therefore they may not initially feel comfortable working there, which affects their productivity. Some of the interviewees also said that lack of own work space had some negative impacts on their productivity. Some of the respondents considered that un-named work stations also have an impact on the restlessness of the office, which impairs the employees' ability to concentrate.

As for the few indoor environmental issues, for example air conditioning, temperature or lighting, their impact on productivity was seen either to be negative or neutral. If, for example, it is too hot or too cold in the office, it may affect productivity negatively. Then again, if the temperature is close to the ideal level, it usually has no impacts according to some interviewees. Such features simply need to be in order.

6.2.2. Impacts of virtual environment on productivity

The most important hardware tools for Rapal's employees are laptop computers and mobile phones, many of which are smart phones. Mobile phones are most generally used for making phone calls to customers and mobile colleagues. Many employees use them for checking and updating their calendars, reading e-mails and surfing in the internet as well, although the frequency of use may vary depending on the employee's needs and also the level of mobility. One of the interviewees also uses a smartphone as a base station to get a wireless internet connection.

According to the interviews, the most important communication software is e-mail. E-mail is the primary channel for all formal communication, and is used for both internal and external information sharing. Skype is used for communication as well, but for different purposes. Skype connects the people working at different locations to each other and is mainly used for internal informal communication. According to the majority of the interviewees, Skype is used when someone wants an answer to a question immediately. Therefore it is usually used for instant messaging and, as some

pointed out, it can be paralleled by some informal corridor discussions. It is, however, used very irregularly and occasionally and there are mainly no policies for when and how to use Skype according to the majority of the interviews. In addition to using Skype as an instant messaging tool, it is also used for making calls and attending meetings remotely.

Other important software tools are the basic Microsoft Office tools such as Outlook, Word, Excel and Powerpoint. Of these, Outlook is the most relevant for communication, since it is used for sending and receiving e-mails and calendar features. Network drive is used for internal information sharing and storing, but many of the interviewees remarked that the structure of the network drive is very much out of order, which makes it really difficult to find the relevant information.

One of the most emphasized aspects affecting productivity in virtual environment is mobility. According to the interviewees, it is important that the mobility of the employees is enabled by the tools and software. For example, when the computers are portable the employees can choose where to work. The information systems also need to support mobility, as one respondent stated: *"You need to have access to the files; your location must not affect it."*

Some of the interviewees perceived that it is important that the employees can communicate easily, for example when on the move or at the customer's office or working from home. According to a few respondents, at Rapal communication is effortless anywhere at all. In addition to external mobility, internal mobility has to be easy as well, as some respondents noted. If the computer takes much time recovering when it is transferred from one place to another, it may have a considerable impact on productivity. According to one interviewee, a couple of months ago when she still had her old computer it took about 10 to 20 per cent of the time of her whole working day.

With smartphones people can also check their e-mails when on the move, which directly affects their productivity as one respondent said:

"Of course all the communication tools affect it, Skypes and stuff. I can answer e-mails with my mobile phone, quickly and easily."

However, some of the interviewees pointed out that there may be also some negative effects related, for example, to mixing work and personal time. Access to the internet regardless of the location was perceived to be important, partly because many of Rapal's systems are browser based.

According to the interviewees, problems in the virtual environment have a direct impact on productivity. If the application needed for the task is not working properly, it may even create a bottleneck preventing productivity. This may also have other more

indirect impacts on productivity, for example, via affecting an employee's mood, as one interviewee put it:

“Of course it affects (productivity). If the computer goes down it slows things up. You'll get frustrated, and you could also lose some information.”

According to a few interviewees, problems with the usability of Skype affect productivity negatively at Rapal. When trying to hold a videoconference with multiple participants at different locations and with different kinds of connections, it is sometimes even impossible to make it work. This naturally has an impact on the productivity of multiple employees. Many of the interviewees pointed out that difficulties in knowledge sharing, especially codified knowledge due to the structure of the network drive, have a negative influence on productivity.

6.2.3. Impacts of social environment on productivity

Organizational culture as well as managerial and leadership culture has a huge impact on productivity according to the interviews at Rapal. According to the interviewees, organizational culture and managerial culture both have an impact, for example, on the knowledge flow within the organization, which in turn has a positive impact on productivity.

With respect to managerial and leadership culture, the most important factor affecting the productivity of the employees is for management to show interest in employees' wellbeing according to many of the interviewees. It affects the overall atmosphere and motivates people and thereby improves their productivity. One instance of this is the bonus system that some of the respondents mentioned to motivate people.

Some of the interviewees emphasized that it is important that the focus is on the results instead of the time cards, which requires mutual trust. This is considered to have a positive impact on productivity, as one noted:

“If management thinks that this flexible way of working is okay, that's very progressive! It means that they focus on the outputs instead of time cards, and that supports it and also increases productivity.”

According to the majority of the interviewees, the management encourages people to work in the way that best suits each individual. This increases motivation and satisfaction, which in return have a positive influence on productivity. However, one interviewee remarked that the freedom of choice should be articulated more clearly and it should be made more transparent. The autonomy of the employees and well-defined objectives were also considered to have a positive impact on productivity.

The managerial culture is based on the organizational culture, which, according to the interviews, is perhaps the most important aspect for new ways of working. The majority of the interviewees said that when the social atmosphere is good and open, and when employees are having a great time at work, it affects productivity positively. Having other people around even though performing some individual tasks has an impact on motivation. Many of the interviewees noted that it is important to have the support of colleagues. For example, when the others are working efficiently it spreads around the office. This naturally has a positive influence on employees' productivity. Conversely laziness permeates through the office and one interviewee called this the "Friday effect".

Rules both written and unwritten play a huge role in creating the organizational culture. According to a few interviewees, it is important that there are some general rules that everyone obeys. The rules enable productive working. As one employee argued, the norms and the etiquette are one of the most important aspects in a work environment:

"If you have fancy facilities it's like a church: although you have the padded benches it's not working without the etiquette telling you how to behave in the place. And the etiquette is created by taking the lead and doing things: you need to create the behavioral norms."

However, the balance between written and unwritten rules is somewhat complex, as a few of the respondents pointed out. With written rules one gets to some point, but the unwritten rules ultimately determine the behavior of an organization. One interviewee noted that this is especially challenging when new employees are familiarized with the rules: what are the norms that should be made clear to new employees and which are the ones they need to discover for themselves? All the same, the organizational culture defines the norms of behavior and forms the basis for productive knowledge work.

One of the characteristics in Rapal's social environment is that they work together for a common goal. One interviewee described that they work like a fire brigade: when a problem arises they support and advise the one in need. This naturally causes interruptions and decreases the productivity of those who are interrupted since he/she has to postpone the tasks at hand. On the other hand many of the interviewees emphasized that this way of tackling issues enables a rapid reaction and usually improves the firm's overall productivity.

Recreational activities have a great influence on organizational culture and nurture its creation. The majority of the interviewees remarked that such informal activities promote the process of people getting to know each other better, which improves the communication and thus, productivity.

Table 5 sums up the influence that the work environment may have on productivity at Rapal. Note that the factors presented in the table do not necessarily represent a consensus of all the interviewees as such, but highlight factors that were deemed interesting for the purposes of this research and that were mentioned as important by a number of interviewees.

Table 5. *The impacts of physical, virtual and social environment on productivity at Rapal.*

Rapal	Positive	Negative
Physical environment	Open-plan office: - more efficient communication - people know each other better	Open-plan office: - disturbances - restlessness - noise
	Flexible equipment and space	Un-assigned workstations: - Difficult for new employees to adapt and become acquainted with others - may increase restlessness
	Versatile spaces for different purposes	
	Ability to choose the best place to work	If there are problems in: - lightning - temperature - air conditioning
	Good ergonomics	
	Team members can sit close to each other	
	Comfortable environment	
Virtual environment	Mobile tools	Mobile tools: - mixing of work and personal time
	Mobile systems (both externally and internally)	
	Access to information regardless of the location	Problems with devices
	Communication tools enable communication regardless of location	Problems with software
		Problems with Skype
	Internet access	Problems with information sharing

Social environment	Management: <ul style="list-style-type: none"> - interested in employees' well-being - bonus system - focus on results - encouraging people to work where they want - well-defined objectives for employees 	
	"Fire brigade" approach to tackling issues: <ul style="list-style-type: none"> - rapid reaction - improves overall productivity 	"Fire brigade" approach to tackling issues: <ul style="list-style-type: none"> - interruptions
	Organizational culture: <ul style="list-style-type: none"> - good atmosphere - other people working enthusiastically - openness 	
	Working together for common goal	
	Written and unwritten rules	
	Recreational activities	

Whereas the table presents the effects of work environment, the focus in the next section is on the impacts of individuals' work practices.

6.2.4. Impacts of flexible and mobile work practices

Flexibility is a focal theme in Rapal's ways of working and it manifests in many ways and at multiple levels. In addition to having a choice when and where to work, the employees at Rapal also have the freedom to work in a way that suits each individual best. This is how one employee expressed it:

"The people are hired here to do things, and it's simple to tell whether the person has done it or not. In my opinion it doesn't matter if the person is standing on his head when he's writing the report, that's none of the employer's business."

This emphasizes that the focus should be on the outputs and results, not on the ways of working.

Each interviewee at Rapal, with exception of one, occasionally does telework *at home*. The majority of the interviewees work at home one day per week and the rest of the interviewees less frequently. There are generally three main reasons for working at home according to the interviewees. First, when certain tasks cannot be carried out at

the office. For instance, tasks that require concentration and perseverance and tasks that form larger entities are such tasks that are performed at home where the environment meets the requirements of the task at hand. Second, when working at home is useful for one's personal life, for example, when one wants to stop working earlier or one has some personal responsibility in the middle of the day. Third, when the deadline is approaching, which sometimes means working in the evenings at home after a day at the office. When the deadline is close other issues become meaningless, as one interviewee pointed out:

“If you have to get something done, the time and place are irrelevant. And the atmosphere doesn't matter either – you just need to have a place and a computer. “

In addition to actually working at home, many of the interviewees also do some headwork and thinking at home. This phenomenon has been called “third time” within this NewWoW project referring to the time when one is not at work nor completely off work, for instance, when browsing e-mails while watching TV with the family. Many of the interviewees recognized this phenomenon:

“I do that quite a lot, and somebody also calls it stress. That's pretty inevitable along with this remote working culture. I don't feel it's some holy thing. When I need to I can also go to the off mode.”

“I tend to think and brainstorm at home - that cannot be turned off. And I think I usually get some good ideas. It feels that the workday is so hectic that when I get some distance from work, then I'll come up with the good ideas!”

Some interviewees also claimed they had good ideas and solutions to problems at home when not actively thinking about them. One respondent said that some of the work-related things were among his interests, which is why the line between work and free time is sometimes challenging to draw.

The interviewees also utilize other locations for working. For example, trains, planes, cars, and cafés offer a place for carrying out some tasks. At Rapal every interviewee has tools that support mobile work and therefore mobile working is fairly well utilized. Most the Rapal interviewees also exploit the commutes and longer business trips. During the commutes they usually browse their e-mail on their mobile phones and read some material and documents. When on a business trip, for example, travelling by train or air, some of the interviewees mentioned preparing presentations or writing documents. One interviewee, however, argued that working, for example, on a train is not so efficient and concentration is difficult. The interviewee pointed out that tasks that do not require long-term concentration can reasonably be carried out in moving places. A few of the interviewees occasionally work in cafés or on customers' premises to minimize the unnecessary commuting.

The interviewees were also given a chance to identify other factors that may have an impact on their productivity. According to the responses, personal life and personal features have a major impact on their productivity. For example, exercising was perceived to improve their productivity. On the other hand, attitude counts for a lot in terms of productivity – even more than working conditions, as one respondent pointed out:

“I think that where you work is not the primary concern, satisfaction is more about a mental state. Sure, it bothers me if the computer is down the whole day, but that’s not the most relevant issue.”

Continuous stress decreases productivity according to some of the interviewees. A few also remarked that poor sleep or insufficient time to sleep has a negative impact on productivity. These directly decrease productivity since they have an impact on the way the brain functions. Some interviewees also remarked that if there are problems at home, it naturally affects the ability to carry out the tasks and thus, productivity. On the other hand, some respondents perceived that spending time with family gives employees distance from work, and has a positive impact on productivity in the long term.

6.2.5. The potential of new ways of working for improving knowledge work productivity

At Rapal new ways of working is already part of their everyday business. The physical as well as the virtual environment offers the opportunity to use different kinds of spaces and locations for different tasks. Thus physical and virtual environments enable the application of new ways of working, at least in theory. However, according to the interviewees, there is still room for improvement, for example in the social environment in order to improve productivity.

Rapal’s physical environment is very go-ahead and they have tried to design the office space according to different tasks. For example, there are different kinds of meeting rooms, quiet rooms and non-assigned desks. There is even a more informal space for social interaction and a touchdown area for mobile workers. Even though Rapal has such an advanced physical environment, it does not fully serve its purpose according to some of the interviewees. For instance, one interviewee pointed out that the aforementioned informal space for social interaction is not particularly helpful, as it is located in a way that is not conducive to the interaction and communication – centered on the open-plan office, making it difficult to relax while distracting others from their work. The same applies to a coffee-room located next to a glass-walled meeting room as some interviewees pointed out. Considering having a meeting in a space where it is possible to see others relaxing or enjoying a coffee while others are having an important meeting. The problems with such spaces affect both the productivity of the workers in the meeting room by distracting them and the mood of the workers currently having a

break. Thus, the *spaces for relaxing and informal communication* should be located and designed so as to really support their purposes; relaxing and taking a break from work.

Another issue related to the physical space is the *touchdown area for mobile workers*, entailing some problems with ergonomics as few respondents pointed out. Even though these mobile workers do spend the majority of their time outside the office, having more comfortable areas for them would be beneficial to productivity. In addition to the touchdown areas, the quiet rooms do not serve their purpose according to some of the interviewees. Some mentioned that even there one cannot work without constant distractions. Thus the quiet rooms are not quiet as such, detracting from the possible benefits of such rooms. This problem has its roots in the social environment, not in the physical environment. Thus according to some of the interviewees there should be *some ground rules and policies* for how different spaces are used so that the full potential of such spaces is exploited.

In spite of Rapal's multi-use office, many interviewees considered that there should be *more options to choose the best space* for the task at hand. *Team work especially should be supported* better with different kinds of spaces enabling more productive teamwork. Some interviewees pointed out that there should be *different types of meeting rooms*, for example, a more relaxed and innovative meeting room. One interviewee suggested that having a *more creative space* would support brainstorming and other creative tasks. Such spaces would promote creativity and thus have a positive impact on productivity.

According to the interviewees their work is mainly flexible regarding time and place. However, the *flexibility should be articulated more clearly*, as one interviewee pointed out. In order to be flexible, one needs also to have a set of clear goals and thus management should provide these. Thus *focusing more on results*, not time spent in the office, would increase productivity, as a few interviewees noted. Moreover, providing a clear set of goals would have a positive impact on motivation, which will ultimately result in improved productivity.

The virtual environment at Rapal is mostly perceived as advanced as everyone has mobile devices enabling flexible working. This virtual environment is constantly developed and the employees can choose the best tools for their respective tasks. However, there are some issues in the virtual environment that should be pointed out. First, the network drive used to share documents is not well organized, which makes it difficult to find the right information in time, as many of the interviewees pointed out. Thus *knowledge sharing should be supported better with more efficient information systems* and software that enables both storing and finding information easily. Second, many interviewees mentioned that the videoconferencing and instant messaging software used, Skype, does not function with conferences having more than two participants. The interviewees perceived that *more sufficient videoconferencing*

equipment would improve their productivity and promote flexibility since it would enable participating meetings remotely.

Derived from these aforementioned factors, three key themes emerged that were considered to have the most potential for improving productivity at Rapal (see Figure 13). The figure illustrates the factors that were seen as most important for improving productivity, related to the three key themes.

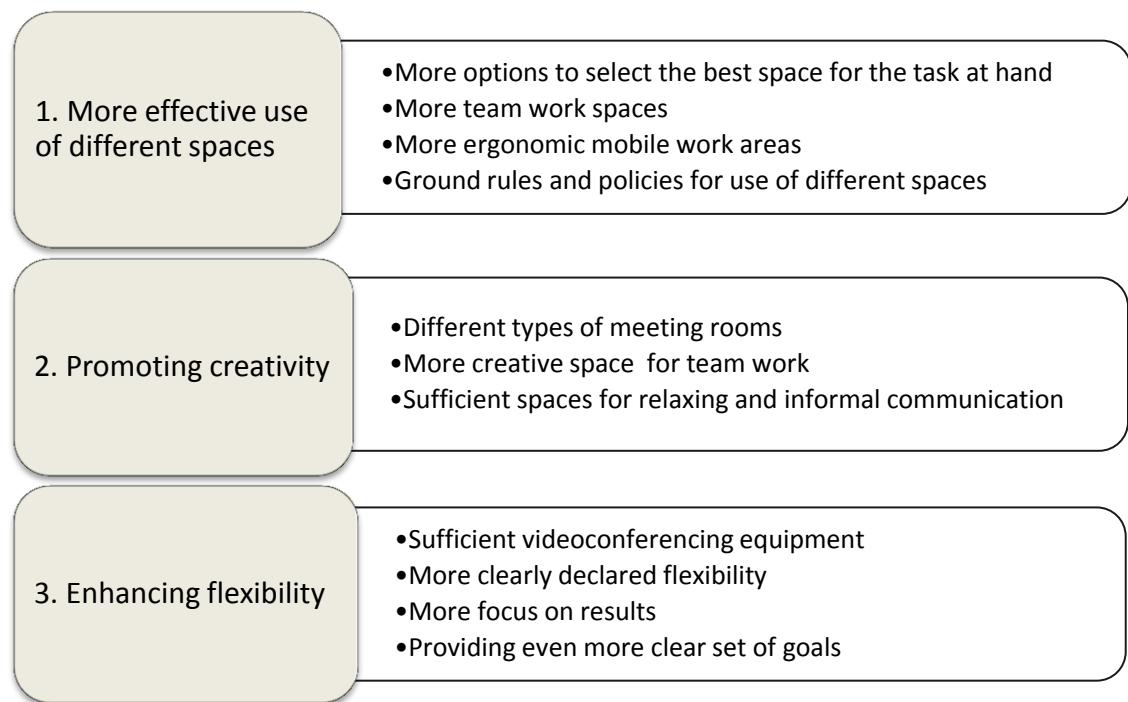


Figure 13. *The most important aspects regarding the potential of new ways of working in improving productivity at Rapal.*

First, *more effective use of space* would have a major impact on productivity. This includes, for instance, more different kinds of spaces, especially team spaces and policies for using the work environment properly. Second, *promoting creativity*, for instance, by providing employees with more creative and appropriate informal spaces, has a potential to improve productivity. Third, *enhancing flexibility* would lead to improvements in productivity, for example, by focusing more on results and declaring flexibility more clearly.

6.3. Case Granlund

This section presents the results from the interviews at Granlund. The focus in this section is on identifying the factors of new ways of working that are perceived relevant to productivity at Granlund. The impacts of the work environment on productivity are examined from each perspective (physical, virtual and social) separately. After that, the

role of flexibility and mobility are discussed in light of productivity. The aim is to identify which factors have either negative or positive influence on employee productivity. Based on the findings, the potential of new ways working are analyzed as regards the productivity of Granlund's workforce.

6.3.1. Impacts of the physical environment on productivity

As for the physical environment, at Granlund the main thing that would affect productivity positively is the correspondence between the space and the task performed in the space. This means that in order to support the productivity of the employees, the company needs to offer different types of spaces for different kinds of tasks. According to one interviewee:

“It depends on the task at hand. If you're writing a book you can do it anywhere. It's more that the physical environment should adapt to what is done in the exact space. Some things can be done in an open-plan office space, some things in a group space and for some tasks you'll need some peaceful place.”

In addition to the different kinds of working spaces (individual, group, quiet etc.), there should, according to the interviewees, be some proper, more informal places where people from different sections could meet each other. According to the interviewees, this would have an impact especially on the knowledge transfer within the company.

Compared to a more traditional office the open-plan office layout was often mentioned to have some positive impacts on productivity especially in terms of communication. It was acknowledged that knowledge sharing is easier in an open-plan office. One interviewee also said that it is easier for the new employees to adapt to the organizational culture in an open-plan office where they can see how other people behave.

Maintaining a peaceful working atmosphere is considered to be one of the key issues affecting productivity. The homelike atmosphere of the physical environment is also deemed important. According to some of the interviewees the physical environment should be stimulating enough to feed the creativity of the employees. When the environment is comfortable it is also more pleasant for the employees to come to the workplace, which in turn leads to increased productivity according to many of the interviews.

The way to work was also reported to have an impact on productivity. A few interviewees mentioned that this, in addition to proper social facilities, has an impact on how employees are feeling when arriving at the workplace. This is what one of the employees at Granlund stated:

“Of course, when the facilities are more comfortable, all the way from the social facilities, it’s much nicer to go to the workplace. It is important that already arriving at the workplace is pleasant. You can come by car or if you want to come by bicycle, you can take a shower. “

At Granlund the most important thing with a negative effect on productivity is related to the open-plan office. The noise and disturbances and constant interruptions were the most often mentioned elements having a negative impact on productivity. On the other hand, disturbing someone else and asking for assistance may have a positive impact on the disturber’s productivity, as one interviewee pointed out.

Some of the interviewees remarked that a messy and untidy, rambling office has a negative impact on Granlund’s employees. According to some respondents, employees’ workstations are spread around the office space, which has a negative influence on their productivity since they may not sit close to their other team members and so on. A lack of proper coffee lounges was also considered to have a negative impact on the overall atmosphere and through that on productivity.

Other aspects that may have a negative impact on productivity are temperature and ergonomics. According to some of the interviewees, these may affect productivity especially in the long run by affecting the overall atmosphere, as one respondent pointed out: *“Bad office chair, ergonomics... They absolutely have an impact, especially in the long run.”* According to the interviewees these aspects just need to be taken care of, as one interviewee put:

“Of course if it’s too hot or cold. That’s a thing that needs to be in order. It affects productivity if it’s not.”

6.3.2. Impacts of the virtual environment on productivity

At Granlund the primary ways to communicate internally and also externally are using mobile phone and e-mail. Most of the interviewees have laptops but some still have desktop computers. As for the mobile phones, similar balancing between the old and new exists. About half of the interviewees have smartphones, whereas some still count on the more traditional models. Almost everyone uses phones in a traditional way but those who have more modern ones also use them for reading e-mails and running calendar functions.

E-mail is used for many kinds of communication, both formal and informal. The employees use it for asking questions, informing, solving issues and sharing knowledge. It is the primary communication tool. Approximately half of the interviewees use Skype for an occasional internal communication. In addition to these, they use intranet for internal knowledge sharing in the company, team collaboration tools for project work and also videoconferencing tools.

The majority of the interviewees at Granlund think that the virtual environment does not affect productivity much. Virtual tools have a neutral impact on productivity, at least if they are working correctly, which was considered to be the most important issue. This is what one interviewee thinks about the effect of the virtual environment:

“The impact of virtual environment today is fairly small because the basic hardware and software tools are able to provide sufficient resources for productive working.”

However, if they are not working properly, it has a negative influence on productivity. According to one respondent, the best situation is this:

“The tools need to be such that when you don’t pay any attention to them everything is ok!”

According to few of the interviewees, if there are many overlapping systems and the same information is at multiple different locations in the systems it has a negative impact on productivity, since employees have to spend much time searching for the relevant information. Problems in the internet connection are also considered to affect productivity negatively. A few mentioned that not having a laptop has a negative impact on their productivity, since they cannot perform tasks that would require a peaceful environment at home. The most important thing, however, is having adequate tools that support work:

“It is important to get appropriate tools. It’s frustrating if you don’t get the tools that would help you in your work and you need to do everything by hand unnecessarily. That’s very negative!”

As for the things having a positive impact on productivity, mobility and location independence of the virtual tools were the most highlighted elements that would improve productivity. The mobility of the software and hardware was thought to be important both externally and internally. Most of the software used at Granlund is cloud computing based, which enables employees to use them when and wherever they want. This, however, also imposes requirements on the quality of the internet connection:

“If you have a good internet connection, everything is good and easy. On the other hand if the internet connection is poor, I think it’s even worse than not having a connection at all.”

The respondent referred to situations where the connection works sporadically and constant efforts are made to get it to work properly leading to frustration and waste of time. Mobile tools can also have some other, more indirect impacts, as one interviewee put it:

“When the tools are appropriate it motivates people to use a wide range of different kind of spaces and locations. And that, on the other hand, brings more variation and stimulation to the day. And variation is lightsome!”

6.3.3. Impacts of social environment on productivity

The social environment is considered an important factor for productivity at Granlund. Both organizational and managerial cultures are considered to have positive or negative impacts on productivity.

At Granlund the leadership culture is in a state of change since their CEO changed during the last two years. The managerial culture is now less hierarchical and more open and transparent, which, according to the interviewees, has a positive influence on the productivity of the employees. Some interviewees noted that since it is easier to go to talk to the management, things progress faster, which directly improves productivity. Generally it was emphasized that productivity can be improved through well-defined goals and a clear job description. When the employees are shown interest and support, it is also considered to have a positive influence on motivation and hence productivity.

If operations and people are managed poorly it directly affects productivity according to most of the interviewees. According to one interviewee, the management culture has an impact on productivity, especially at the project level. Supporting different ways of working is also important according to the responses. According to one interviewee, the managers sometimes focus on the wrong issues:

“The overall atmosphere is that they are not very favorable to remote working. It is not supported at all. There’s just that kind of stalking atmosphere.”

In addition to managerial culture, organizational culture influences productivity. According to a few interviewees, common rules play an important role in organizational culture. According to some interviewees, there should be more general rules related to the most essential working methods. This would make the ways of working more uniform, which in return would improve productivity. For example, the way people behave in an open-plan office has an impact on their productivity – usually negative due to the noise and interruptions as one employee put it:

“I think that the behavior in an open-plan office is the most important thing affecting productivity. There should well-defined, communicated rules of what is appropriate to do in an open-plan office and what is not.”

Openness in the organizational culture has a positive impact on productivity as one of the employees pointed out:

*“It improves productivity when it’s easy to go talk to people and you get along well.
And the communication doesn’t need to be too official and serious.”*

One thing that was considered to affect the open culture is informal interaction, for example, in the form of recreational activities. Some interviewees pointed out that when people know each other better, they enjoy being at the workplace more, which in turn improves their productivity. At Granlund this is perhaps one of the most emphasized aspects, to which more attention should be paid in the future. According to the interviewees, they should have more opportunities for informal interaction, for example, during coffee breaks. At the moment one of the limiting factors is the physical environment and the lack of appropriate informal areas such as lounges, which was emphasized many times during the interviews.

The overall atmosphere is also considered to have a considerable impact on productivity. When the atmosphere is good and relaxed it is nicer to come to work in the morning. Some of the respondents highlighted that it is also more fun to work in a good atmosphere. On the other hand, when there are some problems, it directly affects productivity negatively as some of the interviewees pointed out.

Table 6 sums up the impacts of physical, virtual and social environments on productivity. It needs to be taken into account that the factors in the table do not represent the opinion of all interviewees at Granlund. Instead, it highlights the issues that are of greatest interest in the light of this research and that were mentioned by a number of respondents.

Table 6. *The impacts of physical, virtual and social environment on productivity at Granlund.*

Granlund	Positive	Negative
Physical environment	Open-plan office: - knowledge sharing is easier	Open-plan office: - noise - disturbances
	Informal spaces would support knowledge transfer	Messy and rambling office
	Different spaces for different kind of tasks would better support working	Placement of the workstations is not designed on the basis of the team structures
	Peaceful work atmosphere	Gloominess of the office environment
	Cozy and stimulating environment would enhance productivity	Lack of proper coffee lounges
		Bad ergonomics
		Temperature
Virtual environment	Sufficient virtual tools that support different tasks	Problems with the virtual tools
		Problems with the internet connection
	Mobile tools and systems (both internally and externally) would support productivity	Overlapping systems: - same information in many places
	Cloud computing based technology	Not everybody has laptops
Social environment	Management: - More open, transparent and less hierarchical - well-defined goals for employees would support productivity - showing interest to the employees would be beneficial - support for different ways of working would improve productivity	Management: - overall atmosphere for remote working is not favorable
	Organizational culture: - common rules would improve productivity - openness - informal interaction - recreational activities	Organizational culture: - the way people behave in open-plan offices - lack of informal interaction due to physical environment
	Overall atmosphere	Overall atmosphere

The factors presented in the table create the foundations for new ways of working. In the next section the impacts of individuals' ways of utilizing different environments and work practices are discussed.

6.3.4. Impacts of flexible and mobile work practices

At Granlund flexibility is considered to be an important factor influencing productivity. The interviewees emphasized that flexibility had a decisive impact, especially on their well-being. Nevertheless, flexibility is still in its infancy at Granlund, especially as regards the ways of working and being independent of place and location. The employees, however, think that flexibility would bring more change in their routines and therefore improve their productivity. Flexibility also affects motivation as one interviewee at Granlund pointed out:

“When there is an opportunity to work regardless of time and space, and you can make the choice yourself, that’s enough for me, I’ll find the best way to work. And that motivates me!”

As mentioned before, only about half of the interviewees have mobile tools, which is one the reasons why the amount of remote work is small. Most interviewees do not work at home at all (mainly since the tools and culture do not support this) or do so only occasionally. One interviewee works approximately two or three days a week at home, whereas some work at home for shorter periods.

At Granlund two reasons for telecommuting emerged. Firstly, the main reason is reconciling work and personal life. If a person has personal plans for the afternoon (e.g. dentist) it saves time to work the whole day at home instead of traveling back and forth. One interviewee emphasized the impacts of remote work on the quality of life:

“In the discussion of remote work, the focus is often on its impact on efficiency. Although this naturally is an important aspect I think that the most important is its impact on improving the quality of life. This removes the need for unnecessary commuting and gives you more personal time. Through improving the quality of life work motivation and quality of work increases which in return has a positive impact on efficiency.”

Secondly, some of the interviewees pointed out that some tasks can be accomplished better at home, for instance those requiring concentration. Some of the interviewees work a few hours at home in the evenings, for example, when preparing for the next day. However, some of the interviewees also try to avoid thinking about business at home although a few interviewees recognized the “third time” phenomenon. Some of the interviewees admitted thinking about work related issues round-the-clock at some subconscious level. However, this is not necessarily considered a bad thing, as one interviewee noted:

“I remember this one time when I had spent a whole day trying to solve one problem, banging my head against the wall and working late, and still I couldn’t solve the problem. Then I went home, slept and came back to work the next morning and wondered what the problem was. And solved it. I think I processed it while I was asleep and then it just dawned on me!”

A minority of the interviewees at Granlund make use of commuting. Those few who do so utilize it by checking up their e-mails and preparing for the day. One makes phone calls while driving a car and occasionally uses cafés for working. During longer business trips some of the interviewees use laptops for working, for example, on the train.

At Granlund the interviewees considered that personal life greatly influences productivity. On the one hand if family life is hard it can have a negative influence on job performance as some respondents pointed out. On the other hand it also provides a way to escape the stress caused by work and may thus improve productivity. Furthermore, if work and family life are too much merged with each other this also affects productivity negatively according to some interviews. Some also perceived that in order to be productive one has to sleep well or it directly affects one’s productivity. Instead, exercising and other hobbies were considered to have a positive impact on productivity by giving more energy and strength.

One interviewee also pointed out that the right amount of haste improves productivity. If one has some tasks that are pointless or otherwise dull it was seen to decrease productivity since the motivation to carry out such tasks decreases. Personal characteristics and attitude were seen to have a major influence on productivity as one respondent stated:

”As long as the basic stuff is taken care of, it all depends on your attitude towards working!”

6.3.5. The potential of new ways of working for improving knowledge work productivity

Granlund is still at the beginning of the process of changing their ways of working. Thus new ways of working offer significant potential for improving their work practices and productivity. According to the interviews, *flexibility* would increase productivity of the employees at Granlund. At the moment, none of the aspects of the work environment fully support flexible working. The physical environment is not flexible since everyone has their own designated desks, which does not support flexible working. On the other hand, not everyone has laptops and mobile devices, which impedes working from home and other places. Thus *providing employees with mobile tools* that would enable access to files and systems would (from that perspective) enable flexibility. According to the interviewees, home would provide a better environment for

carrying out some tasks, for example, those requiring concentration. Thus *working from home* would improve employees' productivity due to the peaceful environment. In addition to this mobile tools would also enable the efficient use of dead time.

According to the interviewees, remote working is not well supported at Granlund. Instead of monitoring employees' working hours management should *focus on the results* instead. As for productivity, the hours spent at the office are irrelevant; instead, what matters is the results and outputs achieved. *Well-defined goals* for employees would support this. When employees know their responsibilities and the results expected it is possible to utilize different ways of working. However, *management should encourage* employees to try different ways and places for working. They should also *support remote working* and make some general policies for remote working, since remote working was considered to enable carrying out certain tasks efficiently. Other *common rules* (such as behavior norms in an open-plan office) would also improve productivity according to the interviews.

One of the problems at Granlund is the physical environment and the layout of the office building, which imposes some restrictions on the design of the office space. At the moment people working on the same project may be located far from each other, which has a negative effect on communication and thus productivity. *More flexible and multi-use work settings* would ease this problem and enable more efficient and reasonable use of space. According to the interviewees, there should be more *different kinds of spaces for different purposes*. Some interviewees emphasized that there should be *freedom of choice* regarding the best space for the task at hand. Different spaces would better support different kinds of tasks, which would increase productivity. For example, if there were quiet rooms for tasks requiring concentration it would improve productivity by removing the distractions and noise. According to some interviewees, *team work especially should be better supported* by different kinds of group spaces. A *more stimulating work environment* would promote creativity and innovativeness according to some of the interviewees. Since creativity and innovations are considered to be one of the key elements in determining knowledge work productivity (see e.g. Drucker 1999) this would result in improving productivity.

The lack of appropriate coffee rooms and lounges was seen to have a major negative impact on productivity. Coffee lounges were considered to be important spaces for informal interaction and communication. Thus *appropriate lounges* would increase productivity since it would increase knowledge sharing between employees and lower the boundaries between different sections. Such informal interaction improves the overall atmosphere which was perceived to have an impact on productivity.

As for the virtual environment, *harmonizing the information systems* would improve productivity. A few interviewees mentioned that currently some systems are somewhat overlapping and the same information is in multiple locations, which leads to people are

spending too much time seeking information. This directly decreases productivity. However, if the information systems were uniform and integrated the time spent searching for information would diminish. Some interviewees mentioned that a tool for *instant messaging* would promote informal interaction between people and have a positive impact on productivity. Another thing with the potential to improve productivity is videoconferencing equipment and remote meetings. At the moment there are some spaces and equipment that enable videoconferences. However, some of the interviewees perceived that there should be *better practices and facilities for holding videoconferences*, since at the moment the potential is not well utilized. Videoconferences would promote flexibility, and was seen as a means to increase productivity. However, this requires a comprehensive view since all physical, virtual and social environments should support remote meetings. All in all, it would be beneficial to approach new ways of working from all aspects, including physical, virtual and social, and consider the interrelations between these aspects, since the comprehensive approach is the key notion for whole new ways of working.

In conclusion, three key themes with the greatest potential to improve the productivity of the workforce at Granlund can be identified (see Figure 14).

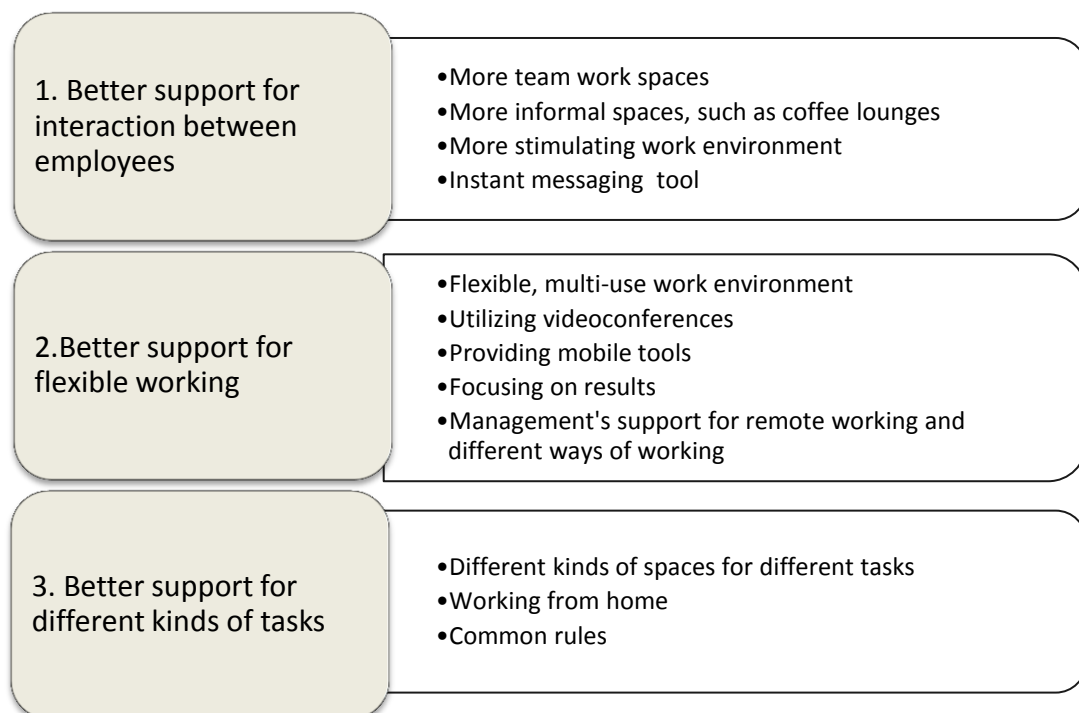


Figure 14. *The most important aspects regarding the potential of new ways of working in improving productivity at Granlund.*

First, the importance of *social interaction between employees* was one of the most emphasized issues during the interviews. This can be enhanced, for example, by having

more informal spaces and team spaces that better support interaction. Second, *flexible working* was considered to be crucial to productivity, thus providing better conditions for flexible work has the potential to improve productivity. This includes multiple factors, such as mobile tools, flexible office space and different kinds of changes in managerial culture. Third, it was considered important that the *space and location support the task at hand*. For instance, the work environment can support this theme with different kinds of spaces and some common policies for using these spaces.

6.4. Overall findings

In this final results chapter the most important factors emphasized in both cases are discussed. This section presents an overview of the factors of the work environment and work practices that were perceived to have an impact on productivity. The differences between the cases are also discussed to gain a deeper insight into the context factors of new ways of working.

6.4.1. Impacts of the physical environment on productivity

In both cases the physical space was perceived to have an indirect influence on employee productivity. The physical environment was usually considered to have an impact on productivity via job satisfaction or employees' motivation. It was reported that the physical environment may also affect the mood of the employees, which in turn affects productivity. Consequently, it can have both positive and negative effects on the productivity of the workforce.

According to the interviewees, many of the elements in the physical environment have both negative and positive impacts on productivity (depending on the state of the element). For example, having a peaceful environment to work in was considered to have a positive impact on productivity in both cases. On the other hand, when the environment is restless it has a negative impact on productivity according to the respondents.

According to both cases, the most important thing that needs to be considered in the physical work space is that it must support the work task at hand. It was noted that the physical space needs to meet the requirements of the task performed in the space. This means in many cases that there need to be different kind of spaces in the office to fulfill the different needs of different employees. According to one respondent the office space:

“[It] should enable different ways of working: working in groups, working alone. It should have a space for speaking on the mobile phone, or with Skype or space for arranging videoconferences.”

According to the interviewees, employees should have options to use different workspaces so that they can choose the best place to work – this may also in some occasions mean working at home or other places outside the conventional office building. This is how one of the interviewees put it:

“You have to have an option to listen your feeling and settle in a safe space in accordance with the feeling, or if you have a feeling that you need to force yourself to complete the task then you can go to a place where you can do it.”

The interviews show that there are various different spaces that are needed in order for the office space to fulfill the requirements of knowledge work. These spaces include:

- Individual work spaces
- Group spaces
- Meeting rooms for formal meetings and negotiations
- More casual places for having more creative meetings and brainstorming
- Quiet rooms for tasks that require concentration and peace
- Appropriate space for more informal communication and ad hoc discussion
- Appropriate social spaces such as coffee lounges

In both cases the issues relating to open-plan offices were highlighted. As for the positive impacts, the most often mentioned feature was that knowledge sharing and communication are easier in an open-plan office and this was perceived to be the major issue affecting productivity. On the other hand, noise and interruptions were commonly mentioned as the negative sides of an open-plan office impairing productivity.

6.4.2. Impacts of a virtual environment on productivity

Comparing the virtual environment with the physical environment the former was considered to have very different role from the productivity perspective. Virtual environment and virtual tools are particularly important in knowledge work since they are the key tools that are used for working. Therefore, in order to be productive knowledge workers need to be provided with sufficient tools. According to the interviewees in both case organizations, in many cases the virtual environment does not affect productivity positively. Instead, it is the minimum requirement without which knowledge workers cannot be productive. However, a virtual environment can have negative impacts when the tools do not work as they should or if there are problems, for example, with the internet connection as one interviewee pointed out:

“If the Internet does not work properly it’s like a carpenter trying to work with a hammer made of rubber”

Since the case organizations have different kinds of workers including mobile workers the mobility of the virtual tools was one of the most emphasized aspects since it enables

the communication regardless of the location of the employee. According to the interviewees, the systems need to support both internal and external mobility.

6.4.3. Impacts of the social environment on productivity

In both cases the social environment was considered to be the most important aspects affecting employee productivity, especially in a positive way. The social environment including, for instance, organizational culture, managerial and leadership culture, and overall atmosphere lays the foundation for productive knowledge work, although the physical and virtual environments should not be ignored. According to one interviewee:

“It all starts with the social atmosphere. If there’s a hang-up, it doesn’t matter what you’re doing here. Of course, the physical and the virtual environment need to support it, they cannot be forgotten.”

Thus social environment is perceived to have the most significant impact on motivation and job satisfaction. One interviewee also stated that the overall atmosphere the employees create together plays an important role:

“I think that the most important thing affecting the productivity of people is the vibes, more than some physical environment or tools.”

According to the interviewees, one the most important productivity enhancing elements is well-defined goals and clear job descriptions. It was perceived that when managers are interested in their employees’ well-being and continuously want to develop it, it improves productivity of the employees. Support for different ways of working was also considered important at both Rapal and Granlund. An open organizational culture and a good atmosphere were also seen to have a positive impact on productivity. It was also emphasized that there should be some common rules and procedures, for example, for different ways of working (such as remote work). One of the most important things affecting the well-being of the workforce and thus productivity, according to both cases, is recreational activities and other informal interaction between employees. Those were considered to enhance productive work in multiple ways. Table 7 summarizes the features of the physical, virtual and social environment that were perceived to affect productivity positively or negatively.

Table 7. *General impacts of physical, virtual and social environment on productivity.*

	Positive	Negative
Physical environment	Open-plan office: - knowledge sharing	Open-plan office: - noise - disturbances
	Different kinds of spaces for different kinds of tasks	Problems with temperature and ergonomics
	Comfortable office environment	
	Freedom to choose the place according to the task	
Virtual environment	Mobile tools and systems (both externally and internally)	Problems with: - internet connection - systems - tools
Social environment	Management: - interested in employees well-being - well-defined goals - support for different ways of working	
	Organizational culture: - openness - good atmosphere - common rules	
	Recreational activities and informal communication	

In addition to work environment, the individual work practices need to be taken into account as well.

6.4.4. Impacts of flexible and mobile work practices

Flexibility was considered to be one the main factor having a positive influence on productivity in both cases. According to the interviewees, flexibility may have both direct and indirect impacts on productivity. It can affect the satisfaction and motivation of the employees thereby improving productivity. Flexibility was also perceived to have an impact on the work-life balance, since it is to some extent possible to adapt the working time and place according to the requirements of the home. One interviewee also emphasized that flexibility should be seen as a two-way agreement:

“I would like to emphasize that we are always talking about what our bosses should do to improve employees’ satisfaction so that they would enjoy their work more, but we also should take into account that this new ways of working means that the employees also need to be flexible and trustworthy.”

Using other locations for working is also one type of flexibility. There are generally two reasons for working at home and these were recognized in both cases. Firstly, it was considered that the environment at home provides a peaceful place for carrying out tasks that require sustained concentration. Accomplishing such tasks at the office is usually difficult (or even impossible) due to distractions. Thus working at home can improve productivity in respect to these kinds of tasks by eliminating the distractions. Secondly, the interviewees saw remote working as a way to enhance the work-life balance since working at home affords more opportunities to take care of personal affairs in the middle of the day. Working at home was perceived to improve quality of life and motivate people and thus ultimately to improve productivity.

The interviews also revealed the impacts of “third time” on productivity. Thinking about work related issues at home was not necessarily seen as a bad thing. Instead, the interviewees noted that they might have some good ideas and find solutions to problems when not actively thinking about them. Thus the subconscious processing of business issues can improve productivity. However, the interviewees pointed out that if the boundaries between work and personal time become too much obscured the effect may be counterproductive.

Other locations are used (variably) in the cases. Browsing e-mails and preparing for the day at work, for instance by reading some documents are habitual activities during commutes. During longer business trips, for example, by train or air laptops are commonly used for carrying out some tasks. However, it was perceived that only certain types of tasks can be accomplished efficiently in such environments. Sometimes work can be conducted in cafés or, for example, on customers’ premises to avoid unnecessary commuting and to make use of otherwise dead time, which in turn has a positive impact on productivity.

In addition to these features related to the work environment and ways of working, some non-work related issues were considered to have an impact on the productivity of the workforce. Personal life was seen both as a source of productivity losses in case of problems at home and also as a way to escape work issues. Thus it can have either a negative or positive influence on productivity. Continuous stress and problems with sleeping were perceived to have a direct negative effect on productivity. However, exercising and other hobbies were seen to improve productivity by gaining distance from work and making the individual feel better.

6.4.5. Analyzing the differences between the cases

In the preceding section the overall findings emphasized in both cases were analyzed. However, there are also some differences between the cases which require more attention at this point. Analyzing the dissimilarities between the case organizations gives more insight into the contextual factors that may have had an influence on the findings. It can also help to identify which factors are more context specific and which on the other hand more general.

Generally, both cases considered the same kinds of issues to be important as regards productivity. It is even somewhat surprising that the same issues were highlighted in both cases although the starting points of the firms are very different with respect to new ways of working. While Rapal has already been engaged in new ways of working for few years, Granlund is still at the beginning of their change process. Thus it is interesting to note that in both cases the same issues were considered to be important even though companies are in different evolutionary stages of utilizing the potential of new ways of working. This raises a question: if a company is advanced or newly involved in utilizing new ways of working, why do the same productivity issues persist. It is clear that such productivity factors are relatively common, but when evolution is taken into account, it could be assumed that these factors should either evolve or become unimportant, raising a set of new factors (or refined factors) and goals for the next maturity level.

Although many of the positive drivers were same in both cases, the negative issues were more organization specific. These, however, are more related to different organizational cultures and structures, which cannot be resolved with new ways of working. Considering the potential that new ways of working has for improving productivity, some significant differences can be identified. Whereas at Rapal the potential of new ways of working relies on minor adjustments (such as more rules for using different spaces), at Granlund the potential is in more extensive changes in their ways of working (such as creating different spaces for different tasks) since many factors have not even been taken into account so far. This is because at Rapal many of elements of new ways of working are part of their work practices, whereas at Granlund they have not yet been taken into consideration. Therefore at Rapal the proposals for changes focused on developing the work practices further and making their ways of working more consistent and transparent. In contrast, Granlund should embark on a more radical development process where the practices and principles of new ways of working are adopted and implemented. However, both cases require a comprehensive approach to fully utilize the potential of new ways of working.

This full potential is not easily harnessed in a single change project. Visible changes can be made in a short time, but the changes required in the beliefs and values of personnel take more time to develop. Hence as at Granlund the most important changes at this

point entail greater and visible changes (for example in the physical environment) they can achieve significant improvements in a relatively short period of time. However, as Rapal has already made most of the visible changes and the potential of new ways of working relies on further developing the behavior, organizational culture and other socially constructed elements related to new ways of working, the potential will take more time to be fully utilized.

6.5. Discussion

If the results are examined separately they largely support the findings reported in the literature. For example, for some years both positive and negative impacts of the open-plan office have been well recognized in the literature (see e.g. Zalesny & Farace 1987; Haynes 2007; Davis et al. 2011). However, if the results are studied at a higher level there is some new information that has not previously been emphasized in the literature. The results regarding the physical environment largely corroborate those of earlier studies, but the emphasis on the impacts of the social environment on productivity increased. The social environment was perceived to have the greater influence on productivity than the physical and virtual environments. In the literature the focus is usually on the other two dimensions, physical and virtual (see e.g. Kaplan & Aronoff 1996; Davis 2002; Hassanain 2006; Haner et al. 2009; Peponis et al. 2009; Appel-Meulenbroek, 2010; Davis et al. 2011). According to the interviewees, the virtual environment was not perceived to greatly improve productivity. Compared to the earlier literature, where the focus is on how technology can improve productivity (see e.g. Kaplan & Aronoff 1996; Haner et al. 2009) this research highlights that nowadays virtual tools rarely have positive impacts since they are the basic elements of knowledge work. Instead in the worst case they have negative impacts on productivity.

Moving from the aforementioned dimensions to a higher level of analysis, exploring new ways of working as a whole and not just from a single aspect, this research does offer new insight. The literature provides little information on the impacts of new ways of working on employee productivity since most publications on the subject focus on impacts at the organizational level (see e.g. van der Voordt 2004a; Felstead et al. 2005; Ruostela et al. 2012). Thus the findings of this research offer new insight into the impacts at individual level taking into account all aspects as a whole. This research also identifies the potential of new ways of working to improve the productivity of knowledge workers.

Moving on to examine the impacts of individual features, one of the factors considered to have both positive and negative influence on employee productivity is the *open-plan office*, and issues related. Knowledge sharing was perceived to be easier and more efficient in such an open environment, which is one of the most positive features of an open-plan office emphasized in the literature (see e.g. Davis et al. 2011). Knowledge flow is arguably one of the key issues in knowledge-intensive organizations with respect

to productivity (see e.g. Peponis et al. 2007, p. 816). On the other hand the negative sides of an open-plan office, such as distractions and increased noise levels identified in this research, have long been discussed (by scholars) (see e.g. Haynes 2007; Roper & Juneja 2008; Roelofsen 2008). Thus this research adds no new information to the literature from this perspective but corroborates the existing findings.

According to the interviewees, it is important to have a *choice in space* and location for accomplishing different tasks. It was perceived that in order for employees to be productive space and location need to suit the task, which is also supported also by Hislop & Axtell (2009). Gibson (2003) also acknowledges that knowledge workers require a variety of different spaces depending on the task at hand. A flexible working arrangement suggests that employees can move at will between these different spaces in order to find the most appropriate for the task at hand. (Gibson 2003, p. 17-18.) Therefore different locations and different places should be used for different kind of tasks (Hislop & Axtell 2009).

The interviewees emphasized that in an open-plan office it is almost impossible to accomplish tasks requiring sustained concentration due to the continuous interruptions that hinder productivity. Instead, as already noted in the literature home provides an environment for conducting such tasks (Harrison 2002, p. 257; Hislop & Axtell 2009). In addition to tasks requiring individual concentration, home is also seen as a place for routine tasks not requiring collaboration with others (Harrison 2002, p. 257), which is complemented by the findings of this study.

However, *teleworking* was primarily seen as a way to enhance the work-life balance and thus improve job satisfaction. The interviewees reported using the option to work at home especially in situations when they had some other responsibilities in the middle of the day. Harrison (2002) among others also claims that working from home may occasionally provide employees with work-life balance benefits, for example, in terms of avoiding unnecessary commutes or providing flexibility in dealing with other responsibilities (Harrison 2002, p. 257). Therefore in this respect the findings of this research confirm the outcomes of earlier studies. These benefits of remote working were emphasized particularly at Rapal, where remote working is more common.

It is understood that *mobile work* has positive effects on productivity as regards the removal of time and space constraints from knowledge work (Davis 2002, p. 69). Furthermore, mobile work has the potential of making use of dead time by transforming non-value adding activities (e.g. transportation) into use (Perry et al. 2001, p. 334). This was also noted in the interviews, especially at Rapal, where mobile work was seen as useful as the idle time can be used for work activities. For instance, the interviewees read their emails and prepared (themselves) for work during commutes, which was seen as beneficial to productivity. This underlines the relation of mobile work to performance and productivity (Breu et al. 2005).

However, mobile tools may also have their downsides. It was considered that if work and personal life are too much mixed with each other the effect on productivity is negative. This is one of the negative aspects of mobile computing also discussed in the literature (earlier). It is recognized that it can affect the boundaries between work and personal time, ultimately affecting productivity (Davis 2002, p. 70). Such all-time availability can lead to *information overload* which in turn may cause stress and problems in the work-life balance, and decrease productivity, which eventually affects organizational profitability (El-Farr 2009, p. 7; Karr-Wisniewski & Lu 2010; Bontis 2011). This is a somewhat complex phenomenon since at the same time as mobile working is considered to have a positive influence on productivity it is also seen as a possible negative factor affecting productivity in some cases. The balance between the negative and positive influence of mobile work, however, depends on the individual and his/her perceptions of the matter. Thus individual factors and preferences need to be taken into account when designing these new working practices since the same methods are by no means universally appropriate.

Virtual tools were mainly not seen as a means to improve productivity in this study. Instead, virtual environment was often seen as a source of productivity losses, especially when there are problems with hardware and software. Usually information technology is discussed as a way to improve the productivity of knowledge workers (see e.g. Kaplan & Aronoff 1996; Davis 2002; Haner et al. 2009). However, Karr-Wisniewski & Lu (2010) propose that information technology can also have negative impacts and may lead to productivity losses. This phenomenon is called *technology overload*, referring to the situations where, instead of enhancing productivity, IT begin to hinder productive knowledge work. (Karr-Wisniewski & Lu 2010.)

The relationship between knowledge sharing and productivity in the knowledge work context is much discussed in the literature (see e.g. Appel-Meulenbroek 2010). This is partly because knowledge is the major input of a knowledge worker. Therefore problems in knowledge sharing and knowledge flow may cause decreases in productivity as employees need to search for the relevant knowledge. (Antikainen 2006, p. 23.) The importance of knowledge flow for productivity was also apparent in the interviews. Many of the features considered to have positive or negative impacts on productivity were related in some way to knowledge sharing, such as mobile working enabling continuous communication or an organizational atmosphere that affects knowledge flow within an organization. This research therefore confirms the connection between knowledge sharing and productivity.

According to Haas & Hansen (2007) *different types of knowledge affect task performance* in different ways. For example, sharing high-quality explicit knowledge (e.g. electronic documents) increases time savings in searching for knowledge and thus improves productivity. On the other hand no improvements in the quality of results were perceived. Instead, sharing tacit knowledge increased the quality of the output but did

not achieve time savings. (Haas & Hansen 2007, p. 1149.) The same paradigm was recognized at Rapal. As for knowledge sharing, two technology-related problems were identified: network drive that makes the sharing of explicit knowledge somewhat difficult and Skype that does not function properly and thus impedes tacit knowledge sharing. It was also perceived that difficulties with network drive especially lead to wasting time, suggesting a similar relation to productivity as the findings of Haas & Hansen (2007) imply. Hence the findings of this study corroborate the findings of Haas & Hansen, suggesting that different kinds of knowledge have different kinds of impacts on productivity.

In addition to such formal knowledge sharing, *informal communication* is also seen to be beneficial to productivity (see e.g. Peponis et al. 2009). The importance of informal interaction was also emphasized, especially at Granlund. It was perceived that such casual communication would improve employee productivity since it would be beneficial to the overall atmosphere and social environment. One of the problems related to informal communication is the lack of proper coffee lounges at Granlund. Maier et al. (2008) also argue that hallways or coffee lounges, for example, are important nodes for informal face-to-face conversations. They also acknowledge the significance of such interaction in respect to knowledge sharing and creating social relationships. (Maier et al. 2008, p. 510.)

It is widely understood that there is a *connection between job satisfaction and productivity*, but the connection is usually discussed through other relations, not as a direct relationship (see e.g. Origo & Pagani 2008; van der Voordt 2004b). However, this research argues that this relationship is indeed direct, as the interviewees explicitly stated that job satisfaction leads to improved productivity. However, the existing research was complemented by the notion that many factors improving job satisfaction, such as organizational culture, lead to improved productivity. This shows that the many interviewees saw job satisfaction and productivity as interchangeable terms, as they mentioned issues and ideas pertaining to job satisfaction when responding to questions concerning productivity.

The research on new ways of working has pronounced undesignated workstations to be valuable, since they provide ways to make office space more efficient and enhance the flexibility of the working environment (see e.g. Elsbach 2003; Gibson 2003; Maier et al. 2008). With this in mind, it can be argued that undesignated workstations have a positive effect on productivity. However, this research suggests that this effect is not entirely positive. First, some interviewees mentioned that undesignated workstations make it difficult for new employees to adapt and become acquainted with others as they do not feel secure since the people around them are always changing. One might assume that this would actually increase the chances to adapt and become acquainted, but according to some interviewees at Rapal, the effect is actually the opposite. This has a negative effect on job satisfaction and thus on productivity. Second, continuously

changing workstations were said to make the working environment even more restless, having a negative effect on productivity.

The literature discusses both direct and indirect *impacts of flexibility* on knowledge worker productivity (see e.g. Roper & Kim 2007; O'Neill 2010). It is understood that flexibility improves the productivity of the workforce indirectly by increasing job satisfaction, enhancing the work-life balance and directly by decreasing absenteeism (Origo & Pagani 2008, p. 540). The present findings also support these positive impacts of flexibility, especially those emphasizing the effects on the work-life balance and job satisfaction. Thus the present research adds nothing new to earlier studies, but highlights the indirect impacts of flexibility.

Instead, the concept of “*third time*” has not been studied earlier. In this research, too, the findings merely scratch the surface. However, the interviewees noticed the positive impacts of such time on their productivity. They noted that for instance when they are not actively contemplating some work problem that needs to be resolved they sometimes come up with the solution suddenly when not even trying to. The interviewees also perceived that they usually had some good and innovative ideas at home. Hence third time can enhance employee productivity but it needs to be acknowledged that in some cases bringing business home continuously can lead to stress, which in turn has a negative impact on productivity.

Finally, research and practice have usually perceived new work practices in terms of the physical environment and virtual environment (e.g. Hassanain 2006; Hardy et al. 2008; Gorgievski et al. 2010). Such a perspective usually overlooks the values, beliefs and culture that actually make it possible to utilize the potential of new ways of working. According to this research, designing a perfect virtual environment for mobile work, or creating a flexible office space is not sufficient if the management practices and culture do not support the very ideology of working with a new set of practices and methods. For instance, if management is concerned about working time, instead of results, it is impossible to reap all the benefits from new ways of working. The same goes for organizational culture, as it should support such new ways of working, creating a culture that nurtures openness and creativity. In conclusion, it should be acknowledged that it is the *individual's responsibility to utilize new ways of working*. Even though the environment and culture enable new ways of working, it is the individual knowledge workers who need to make use of them.

7. CONCLUSIONS

7.1. Conclusions of the research

This research focused on two key aspects; identifying the factors of new ways of working that have an impact on productivity and analyzing the potential of new ways of working as a way to improve productivity of knowledge workers. Considering the work environment and work practices, there are factors that can have a positive effect on productivity, but there are also so-called hygiene factors that may affect productivity in a negative manner (e.g. internet connection, basic tools), if not taken into account. Furthermore, the factors also vary in the scale of how immediate the impact on productivity is as some factors may result in a decrease or increase in productivity after a long period of time (e.g. ergonomics).

Despite the difference in the nature of the factors identified, it is possible to improve productivity with a comprehensive approach to work practices and settings, harnessing the potential of new ways of working. For example, *flexibility* was perceived to be important for productivity in both cases. Flexibility in working hours, location and ways of performing tasks were considered to have an influence on job satisfaction and productivity. However, in order to improve productivity, flexibility imposes certain requirements on the work environment. Firstly, the physical environment needs to support the flexible use of different spaces. This usually means different kinds of office solutions, such as non-territorial working including non-designated workstations. Otherwise it could even lead to decreases in the organization's productivity when office space is not used efficiently. Secondly, the virtual devices and services need to be conducive to flexible working. They need to support communication and knowledge sharing regardless of place and sometimes even of time. Usually this means mobile tools (laptops, smart phones) and software (e.g. cloud computing technology) that can be used wherever the work is accomplished. However, if there are some problems with the virtual environment it could on the other hand be counterproductive if knowledge sharing is impeded. Thirdly, the social environment needs to be favorable to flexible working. In order to improve productivity via flexibility, management as well as the overall social atmosphere needs to support the idea of flexible working. Otherwise its potential cannot be fully utilized. However, an advanced work environment is not intrinsically valuable; the employees need to utilize the potential it provides so that the potential of new ways of working is fully harnessed.

The importance of the social environment was emphasized especially in this research. Usually the focus is on the other two dimensions of work environment, physical and virtual, and the change process usually starts from reorganizing spaces and introducing new virtual tools. One of the reasons for this is that such changes are tangible and visible. However, it can be claimed that changes in the physical and virtual environment are already possible and under way, but the changes in people's behavior is a more complex phenomenon, since people's thought and mental models are invisible and intangible. However, a comprehensive change is not possible without a shift in the social environment and employees' ways of working. The social environment can be seen as the glue that binds these things together and enables the use of different spaces and locations enabled by ICT.

According to the findings of this study new ways of working has the potential to improve knowledge work productivity. However, it does not directly affect the traditional productivity measures, such as outputs and the quality of outputs (Drucker 1999; Ramirez & Nembhard 2004, p. 617). Instead, new ways of working is seen to have an effect on more intangible factors, such as motivation, job satisfaction and the work-life balance. Such factors are considered to affect the productivity of the workforce indirectly. On the other hand certain key factors that are used to determine productivity especially in the knowledge work context, such as knowledge sharing, creativity, time and work flow can be affected by new ways of working. For example, spaces that support different kinds of tasks can improve the work flow and mobile tools can make time usage more efficient by making use of otherwise dead time (e.g. while traveling). Table 8 summarizes the potential of new ways of working to improve productivity. It ties the factors perceived to have an impact on productivity to the consequences (discussed earlier in this paragraph) that these factors may have.

The main purpose of the table is to illustrate the potential of factors related to various new ways of working. Therefore the negative impacts of these factors are not presented, although some negative aspects were identified in the research (e.g. distractions in an open-plan office). However, regarding the work-life balance, the negative issues are taken into account as well as it appeared to be a complex issue. For instance, flexibility and mobile tools are considered to be important factors in improving productivity, but they also have the potential to encroach on employees' personal time too much, having a negative impact on productivity. Thus it is essential to acknowledge this possible opposite effect when redesigning work practices and to find ways to reduce the risks it carries.

Table 8. Effects of different productivity factors of new ways of working.

Dimension	Productivity factor	Affects
Physical environment	Open-plan office	+ knowledge sharing
	Different kinds of spaces for different kinds of tasks	+ work flow + motivation
	Comfortable and stimulating office environment	+ satisfaction + motivation + creativity
	Freedom to choose the place according to the task	+ work-life balance + motivation + satisfaction
Virtual environment	Mobile tools and systems (both externally and internally)	+/- work-life balance + motivation + knowledge sharing + time
Social environment	Managerial culture:	
	Interested in employees well-being	+ satisfaction + motivation
	Well-defined goals	+ motivation
	Support for different ways of working	+ motivation + satisfaction
	Focus on results	+ motivation
	Organizational culture:	
	Openness and good atmosphere	+ knowledge sharing + satisfaction
	Common rules for work practices	+ work flow
	Recreational activities and informal communication	+ knowledge sharing + satisfaction
Flexibility	Time flexibility	+/- work-life balance + motivation
	Location flexibility	+/- work-life balance + motivation + time
Mobility	Working at home	+ work-life balance + work flow
	Working while commuting	+ time
	Working at other locations (e.g. cafés, customer's sites)	+ time + motivation
	"Third time"	+ creativity

Most of the aforementioned productivity factors related to new ways of working are perceived to have a more indirect influence on productivity, for instance via job satisfaction and the work-life balance. In the literature, too, the productivity of knowledge work is discussed in terms of such issues (see e.g. van der Voordt 2004a; Peponis et al. 2007; Origo & Pagani 2008). The literature also constantly addresses the problems of applying the traditional concept of productivity in the knowledge work context but is still constantly trying to find new approaches to tackle the issue (see e.g. Davenport 2008; Bosch-Sijtsema et al. 2009; Laihonon et al. 2012). With this in mind, the whole concept of productivity originating from the industrial era can be questioned: Is the concept of productivity applicable in the knowledge era where the nature of work is nothing like it was a few decades ago, stretching the boundaries of time and place?

It would be intriguing to question the whole concept of productivity in the light of knowledge work. However, suggesting that the concept of productivity is irrelevant is not a valid argument, since the quantity and quality of outputs do matter in knowledge work as well. Moreover, these outputs also need be in line with the time and competences of knowledge workers use to produce them, reinforcing the importance of productivity in a knowledge work context. After all, since the ultimate purpose of knowledge work is to produce value to a beneficiary, it would be as deleterious to question the notion of productivity as it would also question the concept of outputs and thus value itself.

Although the nature of work has changed since the industrial era, the concept of productivity remains relevant. The difference is that productivity is now a more complex concept that is much more difficult to manage and measure. As a result, the importance of managerial activities, principles and methods designed to improve the productivity of knowledge workers will continue to flourish in the 21st century.

7.1.1. Scientific contribution

This research increases the understanding of the relationship between new ways of working and employee productivity. Although many of the findings are not new as such, they promote the potential of new ways of working in improving knowledge work productivity by enhancing the understanding of the dynamics of the concepts.

One of the most significant scientific contributions of this research is the identification of factors considered most important in respect to productivity. In some cases the findings corroborated the findings of earlier studies whereas in other cases they complemented and added some new perspective on the matter. In addition to these, some new emphases concerning the importance of different dimensions were found. Whereas the literature mainly discusses new ways of working from physical and virtual viewpoints, in this research the focus was on the social environment. The importance of support from the social atmosphere to productivity emerged clearly in this study. It was

also perceived that the work environment is not intrinsically valuable: ultimately the potential depends on individuals' work practices and abilities to utilize new options for working. Another significant observation in this study was the importance of taking account of contextual factors. The potential of new ways of working is closely related to an organizations' level of maturity, which may lead to very different productivity benefits.

7.1.2. Contributions for the case firms

Moving on from scientific contributions to a more practical view, this research has implications for the case companies and other firms considering engaging in new ways of working. Considering the case specific factors there are two main contributions for the two case organizations. Firstly, key issues (both negative and positive) affecting the productivity of the employees were identified, which helps the case companies to focus on the most important factors when designing their work practices and settings. Secondly, the potential of new ways of working in improving productivity was analyzed in both cases. This directly pointed out the most important issues that management should focus on in order to improve the productivity of the workforce.

However, as emphasized in this research, the starting point of the organization in relation to the potential of new ways of working is important and has implications for the potential. Rapal and Granlund were in very different maturity phases considering new ways of working, which affected the potential of new ways of working to improve their productivity. Thus the objectives are dependent on the organization and its readiness to adopt new ways of working. Another important issue is a comprehensive approach needed to fully utilize the potential of new ways of working. In addition to a holistic view on the work environment the individual knowledge workers need also to be taken into account. As individuals may have different perceptions of the best ways of working it was considered important to have many options for the work environment and work practices.

7.2. Evaluation of the research

Looking first at RQ1: *“What are the most important elements of ways of working that have an effect on knowledge work productivity?”*, answer was given on a case-by-case basis in Chapters 6.2 and 6.3. Important elements that have an effect on knowledge work productivity were found, but they were mostly somewhat predictable and hence complemented the existing research. Therefore this research did not make its major contribution in finding radical new elements of new ways working, but rather in providing a more in-depth understanding of the concept and providing a good basis for future research.

The second research question RQ2: “*What is the potential of new ways of working for improving the productivity of knowledge work?*” was based on the findings from RQ1, where the most important elements of new ways of working were identified. This was continued by a case-by-case analysis of the potential productivity improvements provided by new ways of working, discussed in Chapters 6.2.5 and 6.3.5. The quality of the findings was different in the two case organizations, as the organizations were in different stages of utilizing new ways working. Therefore Rapal, the company more advanced in terms of utilizing this potential, would have needed a more in-depth analysis of the matter, whereas the findings at Granlund clearly show the potential of new ways working to improve the productivity of their knowledge workers. Thus it can be argued that the findings of this research are more relevant to those organizations that are not advanced in their utilization of new ways of working.

In general, this research was somewhat steered through the knowledge and experience of the researcher. Having an understanding of new ways of working as well as knowledge work productivity might have caused some limitations to the researcher’s capability of thinking ‘outside the box’, anchoring the perspective to research done previously on the subjects. However, dependence on the researcher is one of the basic characteristics of qualitative research (Creswell 1994).

Since all of the interview sessions were unique, the way the questions were phrased as well as the order of the questions also varied, which is also one of the advantages of using thematic interviews. However this has some impact on the answers and therefore the uniformity of the results. In addition to this, the interviewees were very different and they communicated in different ways, consequently the researcher had to adapt to different situations. This meant that the questions needed to be framed in different ways depending on the interviewee in question. Moreover, some interviewees needed more follow-up questions when answering on a certain theme whereas others took a more conversational approach to the interview and provided insight without such additional, assisting questions.

Although the interviewees differed in their communication styles and thus required the researcher to adapt to each situation by using supplementary questions, the answers were linked to the themes presented in the original interview structure without endangering the reliability of the research. This is in line with the ideology of thematic interviews, where there is no static list of questions but a clear idea of the themes to be addressed. Therefore it can be argued that the reliability of the findings was not compromised, but it is safe to acknowledge that using such an approach would yield varying results if the research were repeated. Moreover, repeating this research in a different setting might also result in fluctuation in research findings because case studies in general are dependent on the given situation and context, suggesting that each piece of research is always different.

7.3. Further research themes

This research was focused on the potential of new ways of working as a whole, obtaining somewhat broad results from the empirical research. Moreover, using two case companies from the same branch of industry may not give insight on such new ways of working that are either universally generalizable or specific to a certain type of organization. Hence future research could benefit from analyzing a) a variety of organizations within a variety of industries – yielding a universal understanding, or b) specific organizations in terms of new ways of working – yielding an understanding that would help a specific beneficiary more practically.

Another approach that would increase the understanding of the potential of new ways of working would be to research a given case organization undergoing a project related to the concept. Analyzing such an organization before a new ways of working project would give insight into the state and key issues of the organization's ways of working in relation to productivity. This would give a point of comparison, which would then be analyzed against the same factors when the project is completed. Such research would show explicitly how new ways of working could affect productivity.

When analyzing productivity using such a before-after comparison, it would also be beneficial to examine the organization's total productivity, not just labor productivity. This would have implications for how new ways working could affect productivity on an organizational level. Such an approach could provide information on the impacts of new ways of working on the organization's tangible factors, such as internal operating costs and space usage efficiency and also more intangible issues, such as corporate image, as well as taking into account the impacts on the productivity of the workforce. Providing a view of the total productivity impacts through research might also help organizations to adapt new ways of working, when realizing its full potential.

This research was basically related to identifying the factors and the potential of new ways working in improving productivity. However, future research should also seek insight on how these factors and their impacts on productivity should be measured. The concept of measurement is important here. Providing an understanding of how the productivity of knowledge workers and contemporary organizations is measured would significantly improve the opportunities for measuring the impacts of new ways working as well.

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APPENDIX 1: The original interview structure

I: Taustatiedot

1. Nimi:
2. Tehtävä/nimike:
3. Työprofiili:
4. Mikä on työnkuvasi?
5. Mistä asioista työpäiväsi koostuu? Minkälaisia työtehtäviä sinulla on?

II: Työn tekeminen tällä hetkellä

6. Miten työskentelet tällä hetkellä?
 - Työkalut
 - Työtavat
 - Työympäristö
 - Työaika
7. Millaisiksi koet nämä?
8. Teetkö asioita oikein tavoitteidesi kannalta?
9. Teetkö oikeita asioita tavoitteidesi kannalta?
10. Mitä tuloksia saat aikaan työssäsi?

III: Työn tuottavuus ja siihen vaikuttavat tekijät

11. Mitä työn tuottavuus sinulle tarkoittaa? Miten määrittelisit työn tuottavuuden?
12. Mitkä tekijät vaikuttavat tuottavuuteesi?
 - a. Mitkä asiat vaikuttavat negatiivisesti tuottavuuteesi?
 - Fyysinen ympäristö (tilat)
 - Työvälineet, ICT
 - Organisaation toimintatavat
 - Organisaatiokulttuuri
 - Johtamiskulttuuri
 - Muut tekijät
 - b. Mitkä asiat vaikuttavat negatiivisesti tuottavuuteesi?
 - Fyysinen ympäristö (tilat)
 - Työvälineet, ICT
 - Organisaation toimintatavat
 - Organisaatiokulttuuri
 - Johtamiskulttuuri
 - Muut tekijät
13. Miten tuottavuutta voitaisiin kehittää?
 - a. fyysinen ympäristö
 - b. sosiaalinen ympäristö
 - c. virtuaalinen ympäristö

APPENDIX 2: The interview structure translated

I: Background information

1. Name:
2. Title:
3. Profile:
4. What is your job like?
5. What kind of tasks does your job include?

II: Ways of working

6. In which ways are you working at the moment?
 - Tools
 - Methods
 - Working environment
 - Working time
7. What is your opinion on these?
8. Do you do things right relative to your goals?
9. Do you do the right things relative to your goals?
10. What are the most important results you achieve?

III: Productivity knowledge work

11. How do you perceive 'productivity'? How would you define it?
12. Which factors have an impact on your productivity?
 - a. Which factors have a negative impact on your productivity?
 - Physical environment
 - Tools, ICT
 - Organizational practices
 - Organizational culture
 - Managerial and leadership culture
 - Other?
 - b. Which factors have a positive impact on your productivity?
 - Physical environment
 - Tools, ICT
 - Organizational practices
 - Organizational culture
 - Managerial and leadership culture
 - Other?
13. In which ways productivity could be improved?
 - a. Physical environment
 - b. Social environment
 - c. Virtual environment