

Managing Workplace Resources for Knowledge Work

Suvi Nenonen
Kaisa Airo
Petra Bosch
Renate Fruchter
Satu Koivisto
Nils Gersberg
Peggie Rothe
Virpi Ruohomäki
Matti Vartiainen

Summary	4
Definitions.....	6
Foreword	8
1. Introduction.....	10
2. Enabling Productive Knowledge Work	12
3. Challenges of workplace management: integrating ‘bits, bricks and interactions’	14
4. Case studies.....	15
5. Physical, virtual and social workplaces for knowledge work.....	19
6. Practicing workplace management	22
7 ProWork Toolbox	27
8 Future scenarios	29
9. Conclusions.....	31
References.....	32

Summary

This report is an overview of the ProWork project. The ProWork project (2006-2009) aimed to understand the requirements of productive knowledge work in physical, virtual, and social work settings towards developing workplace resource management. The research project was a joint project between Helsinki University of Technology (Facilities Services Research Group and vmWork Research Unit/BIT), the Project Based Learning Laboratory in the Civil and Environmental Engineering Department at Stanford University (USA) and NTNU (Norway). Industrial funding partners were HP, NCC, Nokia, Nordea, Senate Properties and Martela as well as Tekes, the Finnish Funding Agency for Technology and Innovation.

The case studies in organizations were performed to identify enablers and hindrances of productivity in knowledge work and to enhance workplace change processes. A variety of methods were used in the case studies, such as interviews, surveys, and shadowing. Additionally the development of workplace resource management tools was enhanced by organizing future workshops, task groups, user journey observations, interviews, and developing both the Workplace Resource Strategy Map and Probe tool.

Productivity of knowledge work varies a lot, therefore it was important to identify and understand factors influencing knowledge work productivity. When conducting our case studies, we observed the work and workplaces. We defined a framework to study productive knowledge work as a function of the following key elements: task factors, contextual factors and process factors at individual, team and organizational levels.

Productive knowledge work = task factors x contextual factors x process factors

The more complex tasks are, the more is required from built environment, supporting information and communication technologies and social support from colleagues and managers. We can conclude that knowing the complexity of tasks to be done and their inter-dependency in teams should affect to the workplaces provided for the teams.

Physical workplace provides a proximity to the knowledge work and networks, which people can easily access. People mainly come to the workplace to meet and socialize although they often are geographically distributed and collaborate from afar. Workplaces should thus be transparent and provide a choice of diverse spaces to support solo activities and collaborative interaction experiences.

Virtual workplaces provide connectivity through small, medium and large devices (e.g., smart phones, laptops, tablet pc, SmartBoard, HDTV) in a mobile and distributed knowledge work environment. That should be supported to ensure reliable, robust, accessible, affordable and available infrastructure anywhere, anytime. Choice and use of diverse multi-modal and multimedia communication channels is important.

Physical and virtual workplaces provide platforms for a variety of social interactions. Social places can create of sense of belonging of individuals, and interactions in teams and organizations. It is important to increase visibility of roles and activities; to create formal and informal interaction experiences; to facilitate serendipity and make emergent work practices and processes

determined by project teams visible to everyone. Speech and dialogue are characteristics of interactions in the social space: how do we talk about work in physical and virtual workplace. Discourse analysis indicated e.g. that people tend to frame the change in space based on relationships, territory, systems, or objects.

To refer to one interview on process factors:

“The key to the productive knowledge work is trust. Without trust you cannot share. Without sharing you cannot collaborate. Without collaboration you cannot be productive.”

In all, there are not only hindrances in work spaces and places but also enabling resources to work, manage and lead. The workplace resource management includes processes where different stakeholders strive towards the same direction: workplace supporting productive knowledge work. There are four workplace resource management orientations and agendas:

- Service management providing the hospitality flow, collaboration flow and concentration flow for knowledge workers.
- Change management providing the enablers of identifying the goals, drivers and processes of change and supporting knowledge workers in their mind shift from one-choice to multi-choice workplaces.
- Network management providing the collaboration among the physical, virtual and social resources and their stakeholders.
- Experience management providing the memorable experiences for knowledge workers to charge their mental batteries constantly in collaborative context.

The ProWork -toolbox was developed as a generic mapping tool to support the core business with the workplace resources. The toolbox developed in the project consists of two levels. The level A is identifying the success factors and measureable indicators. Level B of the toolbox presents the methods which can be used for alternative ways of investigating physical, virtual, and social workplaces.

Definitions

Knowledge work

Is defined as the creation, distribution or application of knowledge by highly skilled, autonomous workers using tools and theoretical concepts to produce complex, intangible and tangible results.

Space

Is the entity of physical dimensions and relations. It is the structure of the world; it is the three-dimensional environment in which objects and events occur, and in which they have relative position and direction. Focus of the space is on distances and measures – not so much on functions and qualitative features.

Place

Is space for functions. It is a space transformed by social relations and human activities. Place is observed and experienced space: a stage for human actions. Place is space for subject. And the functional and qualitative features are important for place

Environment

Is geographical, cultural, and historical space for interaction between human and nature/society.

Physical space/place

Is a built, tangible environment. Physical places are made for different purposes and different uses, e.g. in the office building one has meeting rooms, office areas, cafeterias etc. When these spaces are in use they are places, which can be classified in many ways: private, semi-private and public places, quiet places, etc.

Virtual space/place

Refers to an electronic collaborative working environment or virtual working space. The internet and intranet provide a platform for working places for both simple, e.g. e-mail, and complex communication tools, e.g. collaborative working environments. Virtual places are accessed by different interfaces and there are both individual and collaborative activities one can perform.

Social space/place

Refers to interactions for building shared mental spaces, which requires communication and collaboration, for example, exchanging ideas in face-to-face or virtual dialogues. 'Awareness', 'Presence' are important concepts linked to social spaces. Creation and forming of shared workplaces provide social places for interaction.

Mental space/place

Mental space consists of cognitive constructs, thoughts, beliefs, ideas, and mental states like emotions and sensations. They can be shared with others.

Workplace management

Is management of workplaces as quantitative resource including processes in design, change and use of workplaces.

Workplace resource management

Is integrated workplace management between the stakeholders of physical, virtual and social place and is using the defined programs in order to manage the workplace resource as the process enabling the core organization's goals and processes to achieve their goals.

Foreword

The ProWork project has not only been a project, it has been a process of learning, networking and development.

The process has been possible due to the funding of Tekes, the Finnish Funding Agency for Technology and Innovation and financial investment by partner companies HP, Martela, NCC, Nokia, Nordea and Senate Properties. The partner companies have additionally provided an access to case studies and data. Their interest to develop, learn more and steer the project have been the best success factors for the accomplishment the project.

The project was co-coordinated by CEM-Facility Services Research, TKK with Dr. Suvi Nenonen contributing the workplace resource management research. The productive knowledge work research was conducted by Professor Matti Vartiainen, BIT, TKK and his Virtual and Mobile Work Research unit. The virtual workplace research was conducted by Professor Renate Fruchter from Stanford University, USA. The knowledge workplace expertise partner is NTNU's knowledge workplace research group, Norway including Professor Siri H. Blakstad and Senior Researcher Kirsten Arge.

The three year process has had many researchers on board. The researchers have dedicated their time and effort to work towards common goals. Thanks to Kaisa Airo, Anssi Balk, Petra Bosch, Nils Gersberg, Satu Koivisto, Inka Kojo and Virpi Ruohomäki. Kati Rusanen and Kalle Airo have been an important technical, marketin and visualizing help in presenting the final outcomes of the project.

The connection with Stanford University has linked the project with New Ways of Working network. The founder of the network Joe Ouye has advised us and he has been an important knowledge resource bringing a vast expertise in corporate space design. The network members have been interested in the progress and shared many relevant perspectives during the three year period.

Additionally the facilities management networks in Europe (EuroFM) and Nordic countries have been important groups for delivering the interdisciplinary results and are for sure interested in sharing the final outcomes too. University of Salford in United Kingdom and Professor Keith Alexander has been a great help during the process.

We are very thankful to all of you, and we wish that this report with its attached numerous knowledge packages and the www-pages provide you interesting insights, ideas for development and future steps to be taken.

The report is structured as follows: the first chapter includes the introduction. It is followed by an overview of the elements which enable productive knowledge work and a discussion of physical, virtual and social workspaces. Chapter three is dedicated to workplace management. The case studies are presented in Chapter four. Chapters from five to eight summarize the main findings of the ProWork project and Chapter nine concludes the report.

1. Introduction

The ProWork project focused on creating new knowledge for organizations about productive knowledge work and the requirements it sets for work environments and workplace management. The research journey covered physical, virtual, and social spaces and places having special interest in productive knowledge work at team level. Knowledge work is an activity people perform, not a place where one is going to. Knowledge work takes place in a variety of work settings: in Collaborative Working Environments (CWE) that are combinations of physical, IT-based and social or organizational infrastructures supporting people in their individual and collaborative work. We have been lucky to observe different workplace change processes and the enthusiasm in workplace making initiatives in organizations. What do we have to know in order to better support teams, the variety of social processes in the knowledge work processes with workplace resources?

The first goal of the research was to understand what the crucial elements for productive knowledge work are and what kind of requirements it sets for the physical, virtual and social work environments. We asked the questions (Figure 1): what is productive knowledge work, where does it take place and what are its hindrances and enablers?

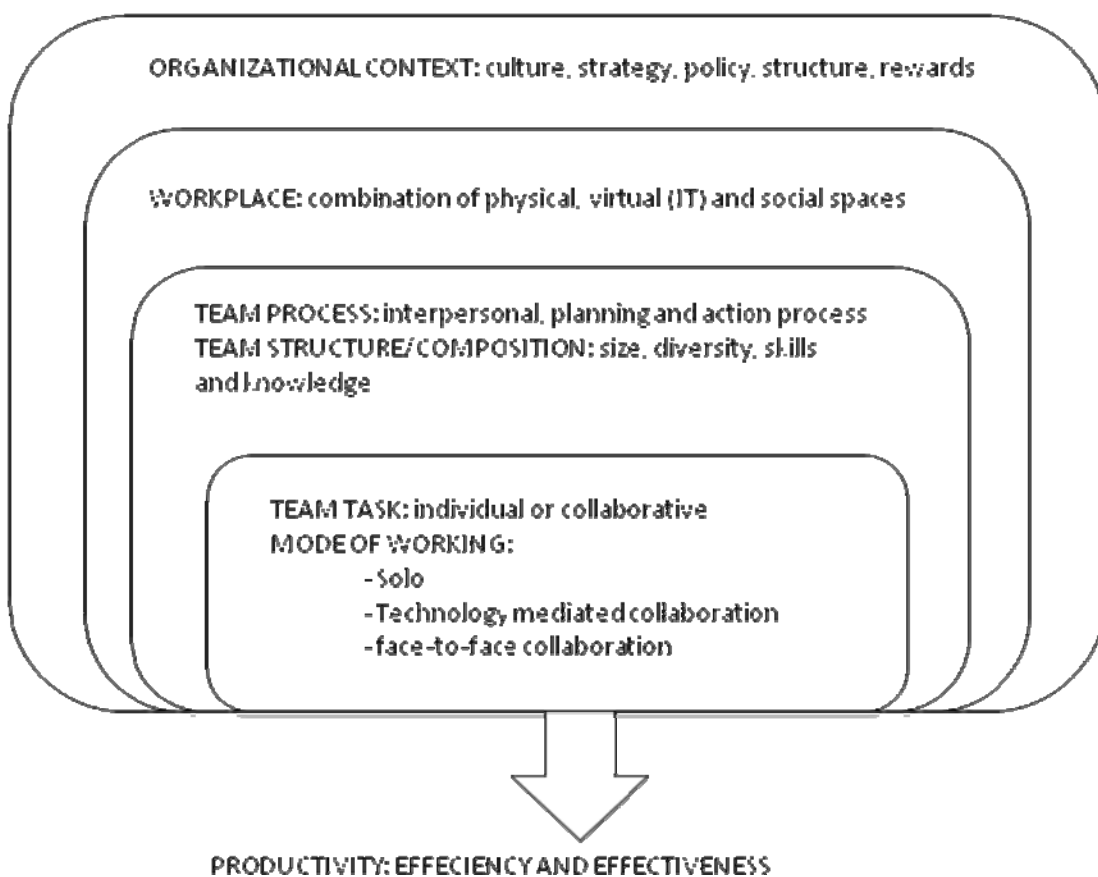


Figure 1. Framework for productive knowledge work

Individual processes tended to be the traditional unit for measuring productivity by input-output model. However, the knowledge work requires more collaborative processes and it is essential to

understand the team level productivity. It is more about measuring outcomes and knowledge transaction processes. The productivity at business unit and organizational level is typically presented in the form of balance scorecard as processes where goals are set and the achievements are followed. This research focused on team level productivity. The balance scorecard structure is applied in the workplace resource strategy map.

More questions needed answers: How to incorporate awareness and improve capabilities in workplace resource management to provide appropriate solutions for the needs of productive knowledge work? The second goal was to develop an evaluation and foreseeing method and tool for workplace resource management. We did not end up only to one tool but during the process; the total toolbox was developed.

The third goal focused on workplace resource management, which supports user organizations in developing the most efficient workplace solution for productive knowledge work. The workplace management processes have been researched, and challenges were identified. The identification of different kinds of workplace resource management agendas will be presented.

Knowledge work productivity on team level, physical, virtual and social workplaces and their management as resources were the units of our analyses. Knowledge work and its processes were investigated in our partner companies in detail but additionally our own work processes provided some reflections while we worked as an international, multi-locational and multidisciplinary researcher team. We also experienced learning by doing. Social place is nested in a physical and often virtual platform – trust can be build over the space of bits, however the space of bricks is also important. Both we and our research partner companies live in the world of multi-tasking in multiple locations with multi-channels. How to enable productive work?

We wish to provide new knowledge for organizations about productive knowledge work and the requirements it sets for work environments and workplace management. We present the set of tested methods and tools for existing workplace resources and future workplace resources. Furthermore, we give some guidelines how to transfer workplace management to workplace resource management.

The spectrum of cases in the research project includes companies working on diverse products and services in different areas of industries, e.g., government, banking, design and construction, and high tech. There are different ways to organize the workplace management from internal services and organizational standardized processes to external workplace services to clients. This spectrum provided us the wide variety of the cases. Some of the cases concentrated on productive knowledge work at team level while other cases focused on workplace change and workplace management processes. A variety of methods were used in order to answer the research questions in this study.

2. Enabling Productive Knowledge Work

Knowledge work (KW) is defined as the creation, distribution or application of knowledge by highly skilled, autonomous workers using tools and theoretical concepts to produce complex, intangible and tangible results. The product of a knowledge worker is typically intangible: knowledge is the addition of meaning, context and relationships to data or information. Many knowledge workers work often from afar and in multiple workplaces in addition to the main office (e.g., at a customer site, at home, hotels, travelling). This makes their working contexts dynamically changing and complex. Knowledge work is usually in practice not an individual task, but is performed in collaboration with others (teams or networks) on complex tasks, which they cannot perform alone. These distributed teams are defined as groups of geographically dispersed employees with a common goal carrying out interdependent tasks using mostly technology for communication and collaboration.

One of the big issues is the differences in knowledge work productivity. Productivity measures are usually based on the ratio of some input and some output, for example, the relationship of time used in developmental efforts to shortened product design time. Productivity is related to two other concepts: 'efficiency' and 'effectiveness'. Efficiency is a volume measure that is for example the number of produced mobile phones by a team in an hour. Effectiveness measures are ratios of output relative to goal or expectation, e.g., the ratio of satisfied service needs versus identified service needs. However, for knowledge work there is not necessarily a direct relation between input and output as there are often several intervening and transforming processes that influence on the relationship of inputs and outputs.

Due to the nature of knowledge work, we came to the conclusion that to understand factors influencing its productivity it must be studied as a system in its environment. The elements of productive knowledge work are task factors, contextual factors and process factors on individual, team and organizational levels. In complex tasks, the individual problem solving is less effective than the problem solving in teams. One company partner summarized: "The key to the productive knowledge work is trust. Without trust you cannot share. Without sharing you cannot collaborate. Without collaboration you cannot be productive."

Productive knowledge work = task factors x context factors x process factors

The reasons for variability in productivity can be found in three main factors. First, the task factor that is the knowledge work tasks performed vary from routine to creative. Second, the enabling and disabling contextual factors at work influence the possibilities to realize the work tasks at hand. These contextual elements from an individual viewpoint are, for example organizational and social factors such as culture, strategy, structure, reward and benefit structures, leadership and support from fellow workers; the physical environment of knowledge workers such as office or home where work takes place, and also the virtual environment, i.e., available communication and collaboration technologies influence. And, third, the process factors that are, on the team level, for example, trust and quality of communication, and, on the individual level, human resources

like skills and competences. In our research, we identified the hindrances and enablers of productive knowledge work connected to these factors.

The physical, virtual and social spaces and places form one entity, which has changed over time. Physical workplaces for office work were at first closed offices indicating a hierarchical structure of organisation. The evolution from closed one-room offices to open offices lead to combined structure – both closed and opened solutions in space were designed and the crucial question was how to use them. A variety of new ways of using the space started to interest organisations: hotelling, hotdesking, flexi-office, non dedicated workstations, mobile work – all this appeared. At the moment, the network of places has been recognised to be the interest. The work, time and places are disseminated.

This has been possible due to the evolution of virtual spaces and places. In the past, virtual tools were developed and learned to be used step by step from individual use for information to collaborative use of sharing the information. The interaction, social media and multiple communication channels have taken place. If the work is disseminated in many places definitely the virtual spaces are one of them. Three dimensional virtual meeting rooms are reality and the information sharing systems form more and more integrated systems.

Next to physical and virtual spaces and places the social places have gone through evolutions. The former organisation structure was hierarchical and the communication was vertical. The development towards horizontal communication took place when processes and teams were in the scope in matrix organisations. Now the focus is on network and virtual teams, where phenomena like disseminated and swift trust are important.

The evolution of physical, virtual and social workplaces can be identified as shown in Table 1.

Table 1 Evolution of workplaces (Nenonen 2009)

	SOCIAL	VIRTUAL	PHYSICAL
<i>PAST</i>	Hierarchical structure Vertical communication and trust	Virtual tools	Closed structure and space solution
	Processes and teams Horizontal communication and trust	Virtual platforms	Open and combined structure and space solutions
	Networks Disseminated and swift trust	Virtual collaborative platforms – e.g. social media Multiple communication channels	New ways of using different place solutions
<i>PRESENT</i>	Virtual teams Disseminated and swift trust	3D spaces Integrated systems	Network of places

The functions and productivity of networked and virtual teams are interest in our study as well as the use of virtual and physical spaces and places. Workplace management has its challenges in providing and managing this new entity.

3. Challenges of Workplace Management: integrating ‘Bits, Bricks and Interactions’

The workplace management is facing the need for the integration of support functions when providing the essential support of productive knowledge work. The entity of physical, virtual and social workplace is not only about square meters. Our researcher colleague Renate Fruchter (2001) stated the principle of “bits, bricks and interactions” indicating the organizational silos in the area of support functions. In this research we are looking for such workplace management, which aims to optimize the use of workplace resource in an appropriate way for knowledge work requirements.

Evolution of workplace management has its starting point from the times, when organizations still owned their own facilities (Table 2). The “times of janitor” included the workplace maintenance and services made in-house. However, in 1980`s the trend to outsource facilities services and give up from the ownership of the buildings and to concentrate on core business tended to be one phenomenon for the organizations. This created new markets and business opportunities for investors and facilities service and facilities management providers. In 1990`s the increasing understanding of corporate support management had its effects on the workplace management.

At the same time the knowledge-intensive work processes increased in different businesses and the use of physical, virtual and social place resources have been thought differently. The need for multidisciplinary approach and joint effort for combining resources is more and more developed in different organizations. This synergy has taken form of different workplace programs.

Table 2 Evolution of workplace management

	WORKPLACE MANAGEMENT	FOCUS
<i>PAST</i>	Management of owned properties	Management of property and premises
	Management of efficient workspaces	Management of physical spaces and their utilization
	Computer-aided workspace management	Management of physical spaces and their utilization
	Integrated workplace management Corporate resource management	Integration of support functions and management of virtual and physical places
<i>PRESENT</i>	Workplace programs	Integrated workplace programs for structuring the workplace management processes

The study conducted with New Ways of working network investigated the current state of alternative workplace programs among 32 companies from the USA, Finland and Germany. The results showed that only 50% of respondents have a formal alternative workplace program in place and additional 41% have a program under development thus showing the relevance alternative working receives from businesses. Nevertheless organizations still predominantly deploy traditional workplace solutions (70% of employees have an assigned seat).

With the drivers for the implementation of alternative workplace programs being strongly employee related, it is noteworthy that the lead for the running of the program resides in most cases with real estate/facilities management departments, followed by human resource departments with a huge gap. Other support functions are notably absent. Given the far reaching impact of alternative workplace programs on work and possibly business practices an integrated management approach deems necessary. (Gersberg, Nenonen & Ouye 2009)

4. Case Studies

During the research projects a variety of case studies were conducted. Part of the case studies focused on knowledge work productivity and part of them to workplace management. The common factors were the physical, social and virtual workplaces.

Agile innovations in Nokia

The case studies at Nokia focused on knowledge work, workplaces, and distributed teamwork in a global context. Data was collected using surveys, interviews, shadowing and observations of teams and their workplaces.

The case study in Finland concerned a design team and their workplaces. The HQ office provided diverse workspaces such as dedicated desks in team areas, team rooms, meeting room, and informal collaboration spaces. The office was perceived to support collaboration very well, and the most productive workplaces were project team areas. The main enablers in the workplace were people on site and face-to-face interaction with colleagues in close proximity. In the office, the reported main hindrances were noise and distractions. Technology mediated communication (e.g. mobile devices, e-mails, chat, teleconference, Halo-room) was intensively applied with remote sites and teams. Availability of appropriate ICT and knowledge of their use were relevant enablers of productive working in global context.

The US case study concerned a geographically distributed design team located in Finland, US and Asia. The team members in the US and Finland worked in an open office space with dedicated desks, large walls used as public, physical display surfaces for project content, modeling and prototyping labs.

The main enablers in the workplace were the proximity to colleagues and the large display walls embedded in the workplace, which played a central role in displaying and sharing the teams' ideas as well as supporting informal interaction. This workspace configuration allowed for a fluid flow and provided visibility and access to people and artifacts displayed on the wall.

The main hindrances (mostly in one of the cases) were the access to distant labs, lack of privacy that impacted concentration and being able to focus on individual work in an open workspace. An important global teamwork hindrance was that the teams had difficulty sharing their designs, stories, and work processes digitally with remote sites.

Knowledge work in distributed teams in HP

The HP study focused on knowledge work and workplaces in Finland and USA. Data was collected using interviews, surveys, shadowing and observations of teams and their workplaces.

The case study in Finland explored how a mobile and geographically distributed team of managers used different workplaces. They worked in multiple places: HQ office, home, at customer sites, and while travelling in airports and hotels. The main reasons to travel to the HQ office were to meet face-to-face customers, colleagues, and to identify with the team. The HQ office provided diverse workspaces such as dedicated and free-address desks, quiet rooms, meeting rooms, conference rooms, and informal areas. The mobile knowledge workers used and navigated in the office to find appropriate workplaces according to their tasks at hand. Hindrances reported by the team were related to difficulties to locate people, noise, and distractions in the office.

The US case study focused on a co-located large team working on prototyping, manufacturing, and procurement. The teams worked closely together with several remote sites in different countries. Their workplace is structured in cubicles and testing and prototyping labs embedded in the workspaces. The cubicle size did not afford to bring testing equipment or have meetings with colleagues. The embedded labs had a positive impact on productivity.

Hindrances encountered by the team included: lack of suitable IT tools and infrastructure to collaborate with remote site and teams (e.g. Wifi, webcams, and mobile phones); distraction and noise in the cubes coming from the prototyping labs that were embedded in the workspace.

Productivity enablers included the proximity to colleagues as well as proximity to tools, equipment, and the embedded labs.

Towards productive labor office, a case study of Senate Properties

The Senate case study was conducted in the labor office, which is one of their customer organizations. The focus was on customer and user orientations in the organization and in the workplace solution. The new workplace solution was focused on organizational transformation: it aimed to make visible both the new organizational structure and the new outlook of the labor office providing services for different customer segments. The future labor office is serving not only unemployed customers but it is also responding to the needs of companies looking for new resources, the intention is to make matches. The functional and dynamic labor office is a vital solution for this.

The development of the workplace concept was supported by a multidisciplinary team of experts. This network interpreted the organizational strategy to workplace solutions, set goals together with the management of the labor office, involved users to processes, made observations, conducted indoor air measurements, supported the removal of the social, physical and virtual

place and defined the visual outlook. The new labor office has an open customer lobby area. The employees have workstations which are connected to each other with the corridor on the backstage. This provides easy access from workstation to another. They also have a very multifunctional cafeteria for their use. The workplace solution provides also possibilities to improve the first customer contacts in order to define the relevant service solution individually.

The productivity of knowledge work is based on the functional interaction between different persons. The task descriptions and the mutual understanding of defined tasks are also important for productivity. The results from the case study indicate that the connecting corridor behind the employees' work stations is supporting and enhancing the communication between employees. It is also providing a feeling of secure. The new areas for resting provide the areas for common, shared situations and relaxing in silent area.

Based on interviews and observations the customers seem to have possibilities for variety of self service. The interview results among management indicated that the amount of self service possibilities varies with the shortening of the employment times. Additionally the employees evaluated that their relationships and communication have improved due to the changes made to the new workplace solution.

Smooth change to a motivating work environment in Nordea case studies

In Nordea case studies the focus was on workplace change process as part of organisational change. The change process was studied in three pilot cases within Nordea's workplace development programme. Observations, workshops, surveys and interviews were conducted in order to investigate similarities and differences in the cases.

Firstly, change was studied from a contextual perspective, i.e. what were the aspects that affected the process of change and its outcomes. The aspects, which are important to identify in the starting phase of the change process are: time, power, scope of change, preservation, diversity, capability, capacity and readiness for change. Secondly, change was analysed as a process or a journey from the early expectations to the stage when the initial change resistance was converting into acceptance.

The conclusion was that a workplace change process can support other organisational changes, but it has to be well orchestrated. This effort demands collaboration among the Human Resource, ICT, and Workplace functions. Selection of the right methods for engaging employees in change processes should be based on the nature of the change.

The physical workplace in one of the cases served as a tool to start a dialogue on the simultaneous organisational change, where two different teams were merged into one group. The users in the workshop pointed out that the more open solution provides possibilities to support each other as employees better: They can share knowledge, but also share workload and increase trust in the social workplace.

Based on a discourse analysis of feedback collected from the employees, it was identified that people always choose between conforming and opposing ways of expression. They also tend to choose their orientation toward space related initiatives based on dimensions of artifacts, people,

systems and territories. Identification of these factors provides new possibilities to cope with change resistance.

Toward flexible and smooth work processes in NCC

The focus in NCC cases was in workplace change process within their own organizational units. The workstations are created and located based on their teams. The individual workstations are located to the areas, which are dedicated for teams and the amount of formal and informal meeting places is increased. The informal places are plazas nearby the team areas and additionally the multifunctional cafeteria area is designed for the use of whole unit.

The research methods were workshops, surveys and interviews. The space syntax analysis and the social network analysis were also conducted before and after the removal. The research results were supporting the design of the new office solution, the removal process and the use of new space. The interviews and post occupancy evaluations were used in order to gather data to investigate the functionality of the spaces. The research supported also the creation of workplace strategy for the organization.

The results indicated that new workplace solution has increased the comfort of the workplace. Communication is easier. The interior design with stress free approach is convenient. The workplaces for different types of working were taken into account and there was enough space for different phases of work processes. Social network analysis and space syntax analysis indicated that the workplace were not used aligned with the daily social activities – the social place was not always getting support from physical place. However the culture of working together has become stronger.

The workplace strategy supporting the core business was developed by testing the workplace resource strategy map. The map is based on a balance scorecard structure. The important factors in this case seemed to be the amount of flexibility and increase in communication. These elements were already achieved in two case studies and can be taken more into the considerations in following workplace changes. Workplace is not seen only as a stable solution, it is a process.

Supporting the physical and mental well-being of a worker in Martela

Martela case focused on requirements of new ways of work of their workplace solutions for their customers. Future workshops and trend analysis were made. The corporation's attempt to implement new solution was then investigated exemplarily through some of its new customer offerings.

The future solution should have a set of elements in order to facilitate productive knowledge work, collaboration and well-being. The well-being factor includes the symptoms based on the amount of use of virtual places as well as the amount of knowledge work, where the source of production is based on thinking and collaboration.

The results indicate that the company has set off to a path that will eventually take them to support workplace experiences through services and products. In tune with its values Martela has

with courage embarked on a journey to stimulate trust and motivation within the workplace. For them to prevail it sees physical and mental wellness of the workers necessary.

The physical place and its physical elements are signals, which can support processes and indicate the organizational goals and culture. Productive knowledge work emphasizes signals, which encourage people for variety of collaborative processes - both formal and informal. Additionally the needs of different generations in the work life are a driver both in service and product design.

5. Physical, Virtual and Social Workplaces for Knowledge Work

Based on the ProWork survey results in HP and Nokia case studies we were able to identify that knowledge workers had 50 % of their working time in collaborative tasks and 50 % in individual tasks. The other case studies support this finding, however, it is challenging for individuals to identify the variety of collaborative tasks.

The significance of proximity of colleagues is important for the knowledge work productivity and it seems important that social places are constructed for indicating the identity of individuals, teams and organizations. It is important to increase visibility of roles and activities; to create formal and informal interaction experiences; to facilitate serendipity and to make visible emergent work practices and processes determined by project teams.

The critical factors influencing knowledge work are connected to availability of physical and virtual places as well as ability to use them. The variety of places is more important while people are using mobile equipments. The connectivity to networks but also the connectivity to social communities is important. One important factor is time: how much time is used in physical and virtual settings and for what time is used. Additionally, it is relevant to consider how much time is used in order to find places, people or knowledge.

When describing places for knowledge work we found out that the case organizations provide a variety of workplaces for their employees. There is also a difference in the use of places – variety of workplace policies was identified.

The variety of workplaces includes dedicated workstations, mobile or not dedicated workstations and phone booths. Meeting rooms were provided with variety from different themes, furniture and interior design to standardized solutions. There were also facilities, where the technology mediated communication was available for teleconferencing e.g. in halo-rooms. The meeting areas for quick meetings were located in different areas in open offices and different kind of interior design had been used in order to indicate their purpose for instant discussions.

The variety of functions was embedded in offices and they provided possibilities for product design. The organizations with customer contacts had emphasized the customer interface in their workplace solutions – they provided also virtual interfaces for self service for their customers. In some cases there were showrooms of the products. The variety of informal areas was from coffee corners to kitchen and living room settings to different kind of cafeterias and restaurants. The retreat areas included e.g. gym.

There were differences in how to use the variety of workplaces from dedicated places to non-dedicated places with variety of reservation protocols. Additionally there was variety in the policies how to reserve and use the meeting rooms. The use of informal areas varies from official to lunch and/or coffee break to having meetings in those areas too.

To sum up the results collected with the surveys, interviews, and ethnographic observations shadowing individuals and teams in their workplaces. It is critical to take into consideration the direct relation among

1. The physical workplace.
2. The specific the tasks and activities performed in these workplaces, i.e., design, sales/services, manufacturing.
3. Interactions among people, content, and technologies.
4. Type and size of products, such as, cell phones, printers, prototypes, and customer relation services.

Additionally the research made by Design Probe indicated that the different parts of the knowledge creation process set different meanings for the physical and social workplaces. In the brainstorming phase both the physical and virtual workplaces play important role. During the work with explicit knowledge the physical place is preferred to be one or another way isolated when the virtual place serves as a channel to social community. The reflection, sharing the experiences and knowledge seems to demand more of the physical places for coming together and face-to-face conversations than what the virtual places can provide.

One of the overarching observations across all high-tech case studies is the importance of proximity of people. More specifically, we re-iterate the strong correlation between proximity to co-workers, content, products, modeling and prototyping labs with high productivity. The other case studies had similar findings. The areas designed for teams were improving the sense of belonging. When the physical work place is not a primary platform for daily meeting of colleagues the virtual platform provides platform for social community. However, the informal social communication is a challenge in virtual contexts for different generations in workplaces.

Three additional key aspects related to bricks/physical space are:

- Awareness of differences in working culture in the case when geographically distributed teams work with managers and head quarters that are remote.
- Ambient presence of offsite team members.
- Perceived co-location versus actual co-location or geographic distribution of team members.

Table 3 summaries the lessons learned about physical, virtual and social workplaces.

Table 3 Lessons learned from physical, virtual and social workplaces from case studies

Lessons learned about physical, virtual and social workplace		
	High-tech cases	Other cases
Physical place	<p>Awareness of differences in working culture in the case when geographically distributed teams work with managers and headquarters that are remote.</p> <p>Ambient presence of offsite team members.</p> <p>Perceived co-location versus actual co-location or geographic distribution of team members.</p>	<p>Open and transparent workplace providing multi-use spaces increases communication. It also widens the perspective: the social awareness of each other and the information flow is accessible.</p> <p>Relevant workplace design unit is a team – team identity for internal and external users can be made visible.</p> <p>Service areas (cafeterias etc.) provide variety of places but so far they are only occasionally used for variety of working.</p> <p>Mental distance can be longer than physical distance within office.</p>
Virtual place	<p>Connectivity: anywhere, robust and reliable, faster</p> <p>Standard up to date mobile hardware to stay connected with people and content</p> <p>Enterprise wide ICT protocols, norms, policies should support the activities, tasks, and interaction among people, content, and products.</p> <p>Knowledge repository of present and past projects as well as the whole process of developing / prototyping /brainstorming that allows team members to share, search, and retrieve content across time, space, and project teams.</p>	<p>The ability to use virtual tools needs constant training as much as the ways of behavior in virtual places. The training need to take into account different user segments.</p> <p>The personalization of virtual tools is as significant as personalization of the dedicated workstation is.</p> <p>The security policies are not as agile as the development of variety of virtual tools.</p> <p>The connections between servers become as relevant as the connections between physical places. Transferring knowledge and experiences is depended on the virtual sharing systems.</p>

	High-tech cases	Other cases
Social place (Interaction/ Productivity and culture)	<p>Work overload: the amount of work for knowledge workers is high and little time is left for reflection</p> <p>Information overload</p> <p>Awareness of local conditions and context</p> <p>Awareness of activities and access to information and resources when geographically distributed teams are remote from headquarters and /or senior management.</p> <p>Alignment of work practices, processes, and terminology across time, space, and cultures</p> <p>Finding human resources – who, where, what – need dynamic e-org charts linked to social network and spatial locator</p> <p>Availability constrains to schedule meetings and access global team members</p> <p>Communication protocols “got it” increase social aspects to virtual places</p> <p>Building and maintaining proactive work relationship (for both the remote and local groups)</p> <p>Sharing the pain of global teamwork</p> <p>Travel and its demands</p>	<p>Social space can be captured by listening what and how people talk about the workplaces:</p> <p>People tend to see social space from the perspective of both territory and solid relationships. The way of talk about the workplaces includes also the “powertalk” indicating the structures of social place.</p> <p>One element of social place is constructed with architecture of time: slow and agile places have different rhythm of time.</p> <p>The centre of social place is mobile: mobility can be supported by locating the physical meeting points according to the people flow in facilities and by using support areas, like cafeterias as one source for social places.</p> <p>New ways of work need learning as much as new ways of identifying, using and designing social places to physical and virtual platforms.</p>

6. Practicing Workplace Management

The case studies indicated that there are many workplace management practices. The workplace management processes varied from operational workplace practices to defined workplace management processes. The workplace management processes varied also in the practices of linking the relevant support functions with each other.

The workplace management measurements included user e.g. definitions of user profiles, user satisfaction measurements, time utilization studies, evaluations before and after the change. The methods tested in ProWork cases are adding value for the typical measurements in organizations

Workplace is a resource as a social, virtual and physical system and it can be managed in aligned manner. However, the alignment process has many hindrances and enablers. The most significant hindrance is expressed as the question: to what purpose the square meters are used?

The measurements are still linked to concrete square meters and the intentions are to decrease the amount of them: however it is important to ask how the relevant use of square meters is developing? From the perspective of knowledge work the significant unit to design workplaces is a team and/or the project. The physical workplace design requires simultaneously the digital workplace design to provide connectivity. The third important aspect is to use service design in order to provide quality and experiences in workplaces. Based on case studies we identified four different orientations to workplace resource management: they are service, change, network and experience management.

Service management – service designed workplaces

The goal of the service management is to provide the hospitality flow, collaboration flow and concentration flow for knowledge workers. The emphasis is on rethinking the traditional support areas in offices and to develop them as workplaces. The object of service management is multi-use and utilization of service areas. The important stakeholders are the service providers and workplace resource managers including the human resource management, ICT-management and workplace management.

The main questions to be asked and answered are: How much formal and informal meeting places can be located to hospitality zones? How are the hospitality zones located within the building and/or campus? What kinds of house rules encourage people to work in the hospitality zones? What kind of ICT-infrastructure supports the use of hospitality zone for working? How does the increase of multiuse of hospitality zone effect to use of office areas?

The success factors are:

- Ensuring a smooth service chain with actions like aligning support service processes with core business needs, providing supportive service scape and ensuring service quality.
- Offering multifunctional platform for working with actions like supporting a constant and flexible workflow, offering agile work platforms, enabling mobile and remote work, offering comprehensive and efficient virtual communication tools that support collaboration, encouraging social interaction and providing training for users of different platforms.
- Offering high quality work environment with actions like offering stimulating and attractive work environment, offering healthy and ergonomic work environment, offering work/lifetimeservices and providing sustainable work environment.

The relevant methods for service management are usability walkthrough, brand analysis, Design Probe, user journey method, service blueprint, customer satisfaction survey, content and discourse analysis, SERVEQUAL analysis and indoor air measurements.

Change management – workplace is a process

The goal of the change management is to identify the workplace change process as a part of organizational changes. The emphasis is on the goals, drivers and processes of change. The object

is to involve users to the change process and facilitate them in their mind shift from old ways of working to new ways of working and from old ways to use workplaces to new ways to use workplace. The main stakeholders are the human resource management, ICT-management and workplace management.

The discourse analysis in ProWork project indicated that when speaking about the change people choose sides regardless of their opinion. In other words they use either conforming or opposing discourses although their opinion on the matter would be neutral. In many cases, neutral opinion in content would be either conforming or defending in framing. The ways of persuasion are the same regardless of the viewpoint. Opposing and conforming opinions were in fact structured similarly. People frame the sentence, in other words persuade the opponent much more heavily when talking about the change than when talking about the space.

The main questions to ask and to answer are: What is the schedule of change? How quickly is change needed? What degree of change is needed? Does the change affect the whole organization or only part of it? To what aspects of the organization are you focusing the change effort? What is the extent to which the status quo within an organization needs to preserve? What assets, characteristics and practices need to be maintained and protected during change? Are the different staff / professional groups and divisions within the organization relatively homogeneous or more diverse in terms of values, norms and attitudes? What role do the different cultures play? What is the level of organizational, managerial and personal capability to implement change? Is there a need to improve this capability before the change process can be started? How much resource can organization invest in the proposed change in terms of cash, people and time? How ready for change are the employees within the organization? Are they both aware of the need for change and motivated to deliver changes? Where is the power vested within the organization? How much latitude of discretion does the unit needing to change and the change leader possess?

The success factor is supporting change with actions like communicating change aims and processes, training for change (training the workplace resource managers for change and training the representatives of core business - change agents - to change), continuous interaction with participatory processes and by allowing diversity and capturing change experiences.

The relevant methods are the change kaleidoscope, future workshops and scenarios, user journey the discourse analysis, the participatory workshops and post occupancy evaluations.

Network management – integrated workplace solutions and programs

The goal of the network management is to ensure the collaboration among the stakeholders of workplace as physical, social and virtual entity. The emphasis is on achieving a shared vision among all corporate support functions and on defining the roadmap how the integrated workplace solution can support knowledge workers in their processes to work in a more productive way both in collaborative and individual tasks. The object is to identify the stakeholders of physical, virtual and social workplaces and identify the common interest areas to develop the common workplace resource program. The main stakeholders are workplace managers, human resource managers, and ICT-managers connected with a network of different interest groups.

The main questions to ask and to answer are: How to integrate the functions of physical, virtual and social places? Who are all the stakeholders and change agents connected to workplace

resources? What is the network providing the relevant integrated workplace solution? What is the status of new ways of working in the organization? How much training is needed connected to physical, virtual and social aspects of work and workplaces? How is the time used in work and in both physical and in virtual workplaces? What kind of time architecture is needed? What kinds of policies are used in order to support new ways of working? Is there reward systems connected to physical, virtual and social places? How the human resource management can use physical, virtual and social workplaces as a source for recruiting, training and developing people as well as for well-being of knowledge worker?

The success factors is supporting networks including continuous development of shared work environments, ensuring physical and virtual accessibility to people and knowledge, supporting the use of physical and virtual environments

The relevant methods are social network analysis, space syntax analysis, shadowing, user journeys and employee surveys.

Experience management – managing the network of places

The goal of the experience management is to provide the memorable experiences for knowledge workers in one of their network of places. The emphasis is on understanding the network of places where the knowledge work takes place and on providing office experience as one part of place experience chain. The object is to use the physical, virtual and social places as stages for work to be done – it is analogical with the theatre stages and acting there. The office serves the knowledge worker as a stage because of its people and facilities. They tended to be the main reasons to come to the work.

The main stakeholders are workplace resource management stakeholder's human resource management, ICT-management and workplace management and specially marketing manager. The main questions to ask and to answer are what kind of brand strengthens the organizational goals and commitment of users to the organization? What are the elements which are the magnets for users to come to the office? What are the physical and virtual platforms, which provide the social and virtual connectivity for users? How to build the values visible to the brand offer and workplace resources? How to mass customize and/or tailor-made the workplaces for different user groups?

The success factor is supporting the brand with actions like aligning the environment with organizational values, managing customer journeys, branding spaces and showrooms and ensuring usability.

The relevant methods are brand analysis, future workshops, scenarios and design probe.

The orientations are not excluding each other; neither do success factors nor the actions listed in them. The workplace resource management orientations put emphasis on the chosen perspective: it is important to give weight, prioritize and evaluate different success factors in workplace resource management.

One common success factor for all these orientations is the financial approach. Whatever orientation is relevant one has to make the workplace resource management profitable. There are two success factors: cutting costs and smart investments.

The cutting costs consist on actions like cutting down space costs by increasing space density, subleasing or surrendering unused space, or by relocation, lower utilities consumption, re-negotiating leases and service agreements or decreasing workplace services and/or their quality. Smart investments in physical space or virtual space can be made as well as the investments for multiuse of space, alternative use for unused space, alternative use in different times of the day, investments to support virtual collaboration, investments in mobile working; investments in social space.

The relevant methods next to ongoing calculations and simulations are document analysis and observations. However, it is important to accept that the financial success factors are not adding value for the core business without a linkage to understanding the entity of organization and workplace resource management: the intention is to focus on success factors and activities which are not having the negative impact to productivity.

The workplace resource management orientations were identified along the case studies and in the process of generating the workplace resource strategic map in the case organisations. To sum up, we were able to draw some conclusions:

- Service management orientation takes place in all companies. However, the use of service zone is still more or less service dedicated: the hospitality zone is not used at its full volume and the hospitality zones are not designed for different ways of working, they are more for retreatment even though the usage rate is high only in certain times of the day.
- Change management is the most common workplace management orientation. However, there is a need for training and educating people to survive in the workplace change process as participants and as leaders of the process, the change history, former, present and becoming change experiences should provide important framework for successful changes and the change agenda should be open agenda.
- Network management orientation is on the progress but there are many grey areas between the stakeholders of physical, virtual and social places. This is due to the organisational structures and different professional cultures among the stakeholders. However, the common interest is to support both the new ways of work and the new ways of use the workplace.
- Experience management is an evolution of service management. It is relevant to mobile workers who are more depending on virtual places than physical places. The experience is a promise in brand. The tools and methods to analyse the network of places are still rare, and the success of the mass customisation, open source practices and identification of user profiles need to be developed.

Workplace resource management needs cross-disciplinary approach to understand changing work in workplaces and in the service business so that it can control and develop physical, virtual and social work places at the strategic, tactical and operative levels. Workplace resource management needs to be able to respond to the changes taking place in the work: no longer can we base our thinking on the main place of work or on cutting costs by condensing space utilization and using open offices. Work, especially knowledge work, is being transformed at the level of the employee into multi-spatial and multi-placed, and at the level of the teams, into dispersed and virtual

cooperation. Companies utilizing the operating spaces should therefore recognize the situation and needs of their working processes and workforce in relation to flexible working arrangements. Hence the companies are planning and constructing such spaces, should they be able to recognize the circumstances of their customer companies in order to provide suitable facilities and services. The following workplace resource management business model gathers the drivers, enablers, value adding elements and outcomes to one framework (Figure 2).

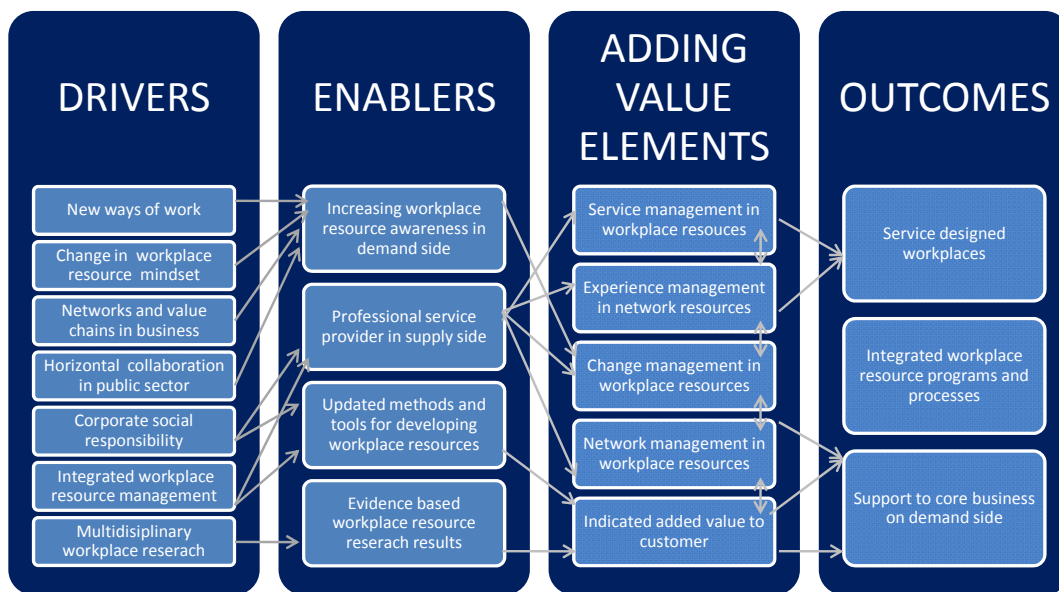


Figure 2. Business model for workplace resource management

One outcome of ProWork research is a model and a tool for workplace resource management with variety of methods for workplace resource management. This ProWork toolbox is described in the following chapter.

7 ProWork Toolbox

The ProWork toolbox consists of two levels. The first level provides a framework for workplace resource management (Strategy map for workplace resource management), which is based on the balance scorecard approach. The second level presents the methods tested or identified in the ProWork project.

The strategy map of workplace resource management links workplace resource management with the competitive strategy of organization's core business. It helps to find the critical actions to be taken within workplace resource management, in order to support the core business. It provides a

pool of measures and methods that one can apply in workplace resource management and which was tested in the ProWork project. It illustrates the cause-and-effect relationships between actions taken in workplace resource management and organizational performance.

The strategy map for workplace resource management (Figure 3) was developed based on findings from the ProWork project’s case organizations. It is based on Kaplan and Norton’s Balanced Score Card where the "balance" in the balanced scorecard refers to the insight that to achieve a comprehensive view of an organization's performance, it needs to be seen from different perspectives. These perspectives are:

1. Learning and development
2. Customer
3. Process and productivity
4. Finance.

The workplace resource strategy map links core business success factors and actions with workplace resource management success factors and actions from all these four perspectives.

CORE BUSINESS STRATEGIC GOALS			WORKPLACE RESOURCE SUPPORTIVE GOALS
BALANCE SCORE CARD PERSPECTIVE	SUCCESS FACTORS	SUCCESS FACTORS	PHYSICAL, SOCIAL, VIRTUAL
Learning and development	Competence development	Development of organizational culture	Supporting networks Supporting change
Customer	Strengthening the image and brand	Producing a high-end customer experience	Supporting the brand Ensuring smooth service chain
Product, Process and productivity	Managing resources	Managing collaborative and individual processes	Offering high quality work environments Offering multi functional platforms for working
Financial	Cutting costs	Smart investments	Cutting costs Smart investments

Figure 3. Workplace resource management strategy map

The Prowork toolbox includes the more detailed description of workplace resource management methods, which can be used in investigating different success factors. The methods consist of surveys: ProWork survey and post occupancy evaluation surveys; observations (shadowing and user journey); calculations based on social network analysis, space syntax analysis and queuing simulations. Additionally, there are model and evaluation tools like change kaleidoscope and service blueprint. Interviews consist of data gathering for content analysis and discourse analysis. Future workshops and Design probe are methods which are gathering data by reflective way. Figure 4 summarises the structure of the toolbox and more detailed information is provided on the www sites of the project. The methods are increasing the variety of ways to gather data from the workplaces in use. The toolbox is also a multidisciplinary collection of methods, which are

suitable for workplace research. They have their significance also related to workplace resource management strategy map. The service design methods can be used both in designing and maintaining workplaces. Many methods are suitable also in strengthening the linkage between core business performance measurements and workplace resource management performance measurements.

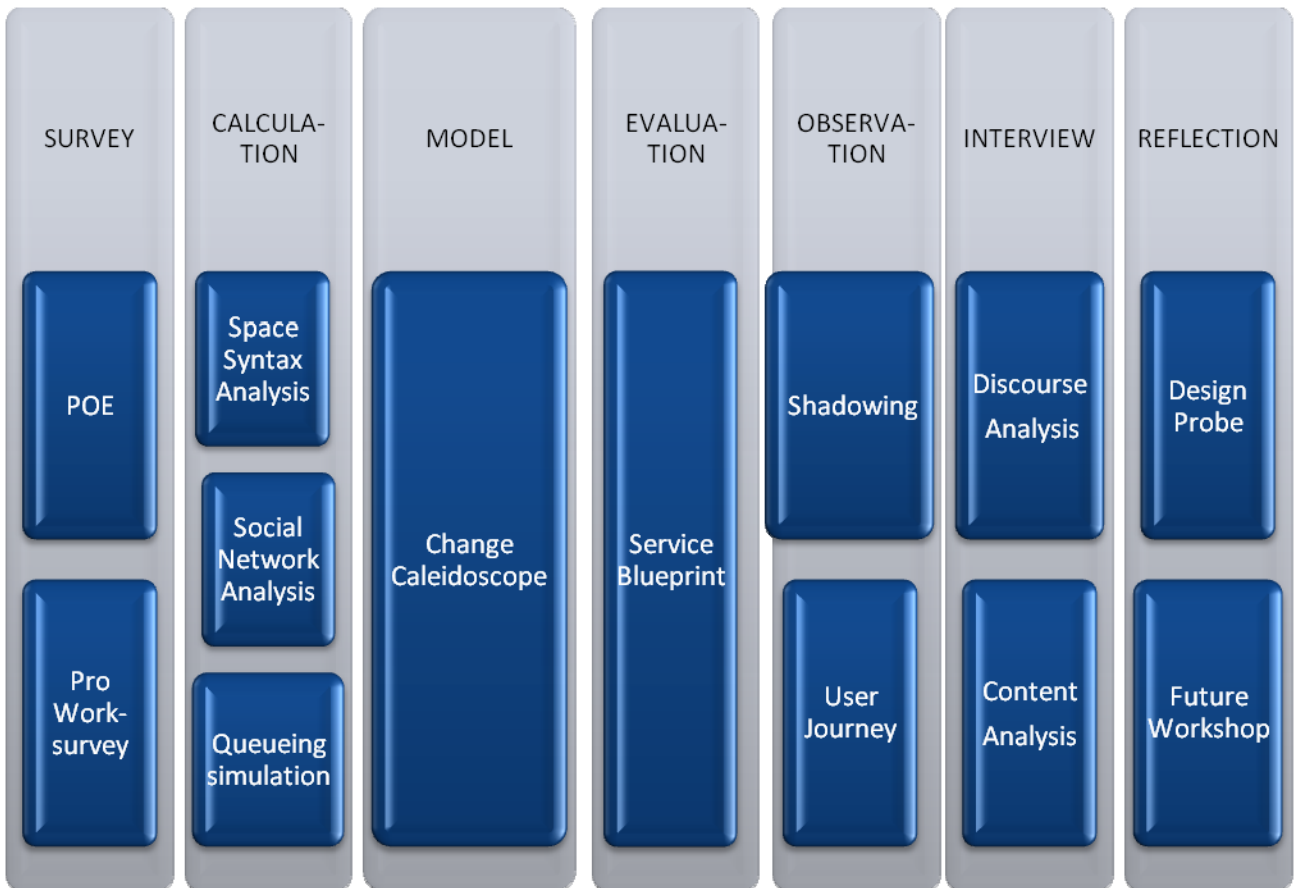


Figure 4. ProWork toolbox level 2 methods used

The guidebook for making a workplace resource strategy map as well as descriptions of methods can be found from the ProWork www.proworkproject.com.

8 Future Scenarios

The work is in change from spatially focused and only partially dispersed towards work, which is dispersed in time and space and is mobile, multi-locational and virtual by its nature. Productivity based on individual performance is now more based on collaboration. Workplace tended to be an expense and in future it is more a resource, which is not any more based on individual's work input but more on input of the groups, teams and networks. Workplace management is not for managing the functionality of buildings but more managing the usability of the operating spaces and supporting different working contents and styles, offering variety of workplace solutions and network of places. The health, joy and happiness are important values in work as well as values linked to corporate social responsibility.

During the ProWork project series of future workshops were conducted. Based on their analysis the four different scenarios are presented. In general, future workplace includes variety of social, virtual and physical platforms for individual nomads in networks or expert intensive communities.

Scenario 1 Safetybox

What if we cannot reduce the environmental impacts?

This scenario is based on the decreasing role of physical place. The environment is polluted and the mankind has not succeeded in decreasing the carbon footprint. The virtual world is the most functional reality and social connections are taken place in the second and third life. Physical place is protecting people. The postcard written from this reality includes e.g. following news:

"We are living in post-period of ecocatastrophe. My little safety box is providing me the shelter from polluted environment. I am working in the second life and my social life takes place in the third life. My safety box has nice digital interior design with smart surfaces and tomorrow I will decorate my home office to be a place in Greece Islands. We will work together with our team – I am glad to meet all their avatars soon. Today I was simultaneously working with four meetings – the avatars of me were so productive that I am very happy to report this on my companies' workbook, why not in facebook too?"

Scenario 2 First life

What if the digital environment will be polluted?

This scenario is based on the decreasing role of virtual place. The physical places are in the full use without the facilitation of virtual worlds. The ecocatastrophe took place in digital reality and the information and communication infrastructure did not overcome from the climate changes. The real estate platforms for live and work and different generations try to learn old ways to work. There are lots of trainings for writing the letters and new kind of time management trainings are famous. The social places are important in order to transfer old ways to work to younger generations who have not ever seen mobile phones. The postcard from this reality includes e.g. following news:

"This was my first day at work when I was allowed to send letters. It was surprisingly slow but luckily I managed to do it well. I have also learned how to achieve papers. We are now working in the office, which has far too small tables for our typewriters, but we are planning the new solutions. The touchdown screens will be replaced with whiteboards soon. Little by little we get our office much more functional. The building itself is nice and we have heard nice stories how it has been developed to be like that. Before digital ecocatastrophe it was called a place for mobile workers – I wonder how they had time for being mobile?"

Scenario 3 Care and love

What if the care culture is a basic driver in organizations?

This scenario is based on increasing need of social place. The knowledge intensive society has caused variety of symptoms for the knowledge workers and they gather to workplaces in order to be retreated. The driving force for working is sharing the work in a way that the goals are achieved. Individual performance is rewarded only as part of collective outcome. The physical and virtual places are designed in the way that they enforce variety of social activities and are

providing all possible support for well-being of knowledge workers. The postcard from this reality includes e.g. following news:

“My serendipity community provided me so much energy that today I was able to work full day. Our community is finalizing three projects this month, and we are submitting the results in virtual globe expo. Those expo days are fully taken care of our avatar-manager, meaning we can have the treatments all day. It is important, because new projects are starting soon and we are expecting to collaborate with our two new communities. We are not sure yet if we use our community or digital community, but we will decide that soon. I have heard that they have a new lifestyle service package and it would be nice to try that one too. We might go there if our carbon footprint manager assures it is possible.”

Scenario 4 Network nomad

What if the future is fully for individuals in networks?

This scenario is based on the decreasing role of organizations as infrastructure. The work is taking place in networks and individuals are managing themselves. The physical places is providing platforms for different network activities, while the virtual place is the office base for individual entrepreneurs and social places occur in both realities. The postcard from this reality includes e.g. following news:

“I found a nice meeting place from downtown today – my customer was very satisfied, not only due to the report he got from me but due to the facilities we had: it was a full service meeting package with perfect service. I will for sure use that in the future too. I stayed there longer time than I had planned and held my teleconferences there too. It is too bad that they were not able to transfer their aroma-effects to the other sites in teleconference, but they are working for that. By the way, the aroma-effect they were using was the “smell of money”. The meetings from this week are over and I have booked the seminar venues for next week’s workshops already from the place which was last time providing us also the lifestyle package as a part of the workshop. It is good adding for our workshop. “

9. Conclusions

Knowledge is profoundly social and working with knowledge is based on this conviction. However, the organizations seem to be still on their way to identify the new ways to work with knowledge and use the physical and virtual workplaces at their best for creating mental and social places. ProWork project concludes that the productive knowledge work needs physical places for meeting, virtual places for knowledge sharing, not only for information sharing, and that social places are in transformation due to the learning of new ways of working and learning to use both physical and digital places.

Workplace resource management can provide programs ensuring that the workplace is not only a stable solution: it is a process, a learning process, and it is integrated to support navigation through change. Services and experiences enlarge workplace design to be also service design. The business model and strategy map for workplace resource management map provide tools for working further towards future workplaces.

When the social core of knowledge work is identified to be a productivity factor, the workplace management has to consider which workplace decisions are not effecting on this productivity factor. We can carry our individual workplace with us, but the social places cannot be put into the backpack in the similar way. What stays in offices is the meeting: formal and informal. That is why the workplaces are. Work is something what you do, it is not something where you go.

References

- Alho, J., Nelson M-M., Nenonen, S. & Rasila, H. (2007) Full service facilities. In Nenonen, S. & Tanskanen I. (toim.) Työtä, tietoa ja tutkimusta tänään – innovaatioita tulevaan. Turun ammattikorkeakoulun raportteja 43, pp. 92-106
- Balk, A., Gerserg, N. and Nenonen, S. (2008) The Impact of workplace redesign on customer perception. Proceedings of CIB W070 International conference in Facilities Management: Healthy and Creative Facilities. Heriot Watt University. Edinburgh, UK. pp. 321-328. www.fmresearch.co.uk.
- Bosch-Sijtsema, P., Ruohomäki, V. & Vartiainen, M. (2008) Knowledge work productivity in distributed teams: a review on elements affecting productivity of knowledge work. Academy of Management (AOM 2008) in July, LA, USA.
- Bosch-Sijtsema, P.M. & T.J.B.M. Postma (2009) "Cooperative innovation projects: Capabilities and Governance Mechanisms", in Journal of Product Innovation Management, 26 (1): 58-70.
- Bosch-Sijtsema, P., Ruohomäki, V. & Vartiainen, M. (2008) "Knowledge worker mobility: the effect on productivity in the workspace". Paper presented in the European Group of Organization Studies, July 10-14, Amsterdam, The Netherlands.
- Bosch-Sijtsema, P., Ruohomäki, V., & Vartiainen, M. (2009) Multi-locational knowledge workers in the office: findability, disturbances and productivity. Submitted article to New Technology, Work and Employment, 1/2009
- Bosch-Sijtsema, P., Fruchter, R., Ruohomäki, V., & Vartiainen, M. (2009) Challenging new ways of working for remote managers. Presented in EGOS2009 conference, 2.-4.7.2009, Barcelona, Spain
- Bosch-Sijtsema, P.M. & T.J.B.M. Postma (forthcoming 2010) "Governance factors enabling Knowledge transfer in Interorganizational Development Projects", forthcoming in Technology Analysis and Strategic Management.
- Bosch-Sijtsema, P.M., V. Ruohomäki & M. Vartiainen (2010) Knowledge Work Productivity in Distributed Teams, forthcoming in Journal of Knowledge Management, 14 (1).
- Fruchter, R. (2001) Bricks & Bits & Interaction, Eds. Takao Terano, Toyooki Nishida, Akira Namatame, Yukio Ohsawa, Shusaku Tsumoto, and Takashi Washio, in Lecture Notes on Artificial Intelligence (LNAI) 2253, Springer Verlag, December 2001, 35-42.
- Fruchter, R., Bosch-Sijtsema, P. & Ruohomäki, V. (2008) Tension between perceived collocation and actual geographical distribution in project teams. Paper presented in the 7th International Workshop on Social Intelligent Design (SID), December 3-5, 2008, Puerto Rico.

Fruchter, R. & P.M. Bosch-Sijtsema (2009) "The WALL: participatory design workplace supporting creativity, collaboration and socialization," proceedings of *Social Intelligence and Design 2009, SID09 conference* Kyoto, Japan (November 2009)

Fruchter, R., P.M. Bosch-Sijtsema, & V. Ruohomäki (*forthcoming 2010*) "Tension between perceived collocation and actual geographical distribution in project teams". Forthcoming in *AI & Society, Journal of Knowledge, Culture and Communication*.

Gersberg, N., Ouye J. & Nenonen S. (2009) Alternative workplace Programmes – a Mapping of the Current State, EFMC2009, Amsterdam 17.6.2009.

Gersberg, N, Kauttu, Nenonen (2008) Methods for workplace processes - How to achieve relevant workplace solutions for user? Proceedings of European Facility Management Conference 10.-11.6.2008, Manchester, UK. pp.125-136. [link](#)

Gersberg, N. & Nenonen S. (2009) The Impact Of Spatial Location On Social Position – A case study of a Finnish construction company's office before and after relocating, EFMC2009, Amsterdam 17.6.2009

Koivisto, S., Ruohomäki, V. & Vartiainen, M. (2009) Multiple roles of distributed team leaders. Abstract and symposium presentation, the 14th European Congress of Work and Organizational Psychology, May 13-16, Santiago de Compostela, Spain.

Nenonen, S., Junnonen, J-M & Kärnä, S. (2007) Customer Journey – A method to investigate an user experience, Proceedings of European Facility Management Conference 10.-11.6.2008, Manchester, UK. pp. 45-59. http://www.cibworld.nl/website/W111_Pub.pdf

Rasila H. & Nenonen S. (2008) Intra-Firm Decision-Makers Perceptions of Relocation Risks. *Journal of Corporate real estate*. Vol. 10. Iss 4. (pp. 262-272)

Ruohomäki, V. & Vartiainen, M. (2009) Meaning of multiple workplaces for a distributed and mobile team. Abstract and symposium presentation, the 14th European Congress of Work and Organizational Psychology, May 13-16, Santiago de Compostela, Spain.

Ruohomäki, V. & Bosch-Sijtsema, P. (2008) Where does knowledge work take place in the office? An observation method. Book of abstracts, International Symposium on Activity Analyses for Developing Work of the International Ergonomic Association, May 13-15, Helsinki, Finland.

Ruohomäki (2009) Eurooppalaista työ- ja organisaatiopsykologiaa – globaaleja ja lokaaleja näkökulmia. Timonen, H. & Ruohomäki, V. (2009) Tietotyö tämän hetken työelämässä. Työryhmän kuvausteksti. Työelämän tutkimuspäivät, 4.-6.11.2009, Tampere.

Vartiainen, M. (2007) Analysis of Multilocal and Mobile Knowledge Workers' Work Spaces. In: Harris, D. (Ed.) *Engineering Psychology and Cognitive Ergonomics*, Proceedings of 7th International Conference, EPCE 2007, held as Part of HCI International 2007, Beijing, China, July 22-27, 2007, pp. 194–203. Berlin, Heidelberg: Springer-Verlag.

Vartiainen, M. (2008) Facilitating Mobile and Virtual Work. In: Wang, C. (Ed.) *21st Century Management, A Reference Handbook*, Vol. II, pp. 348-360. Thousand Oaks, CA: Sage.

Vartiainen, M. & Andriessen, J.H.Erik (2008) Virtual team-working and collaboration technologies. In: Chmiel, N. (Ed.) *An introduction to work and organizational psychology – a European perspective*, pp. 209-233. Oxford: Blackwell Publishing.

Vartiainen, M. (2008) Hajautettu mobiili työ tietoyhteiskunnassa. Teoksessa: Eloranta, V. (toim.) Silmät auki! Tietoyhteiskunnan uhat ja mahdollisuudet, ss. 102-115. Eduskunnan tulevaisuusvaliokunnan julkaisu 1. Helsinki: Edita Prima.

Vartiainen, M. (2008) Liikkuva ja hajautettu työ osaamisen haasteena. Teoksessa: Helakorpi, S. (toim.) Postmoderni ammattikasvatus – haasteena ubiikkiyhteiskunta, ss. 131-154. HAMK Ammatillisen opettajakorkeakoulun julkaisu 1. Hämeenlinna.

Vartiainen, M., Ruohomäki, V., Hakkarainen, K., Jalonen, S. & Kosonen, K. (2008) Studying hindrances and enablers in knowledge work with CASS-method. Book of abstracts, International Symposium on Activity Analyses for Developing Work of the International Ergonomic Association, May 13-15, Helsinki, Finland.