Working in Multi-locational Office – How Do Collaborative Working Environments Support?

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Abstract. Multi-locational, distributed and mobile work has increased much during last years enabled by wireless connections, mobile devices and internet. This development provides possibilities to arrange work in new ways by using physical, virtual and social spaces in creative manners. There are, however, some hindrances in these very same environments that prevent achieving all of potential benefits as shown in this study. The analysis of the first phase of a developmental process shows that political decisions, organizational culture issues, costs and availability of technologies, and missing competences may slow down the implementation of the 'Multi-ocational Office Model'.

Keywords: Working in multiple places, mobility, e-governance, CWE.

1 Purpose and Research Questions

This study explores the change of a local organization into a distributed organization whose employees can work and collaborate from many locations. Operating from different locations – and while moving between them - requires using of communication infrastructures and information and communication technologies to support both solo work and collaboration with others. Therefore, it is critical to find out, what kinds of physical, virtual and social/mental spaces enable rich communication and collaboration in a network of people doing project work that often requires access to joint data stores from afar and whose contents very much require problem-defining and -solving. Supportive collaborative working environments (CWE) are defined as a combination of physical, virtual and social or organisational infrastructures supporting people in their individual and collaborative work. The research question of the study is: What kinds of requirements the change from co-located work into multi-locational work sets for collaborative working environments?

2 Working from Multiple Places

Wireless networks, mobile devices and internet provide a lot of new possibilities to organize work and collaborate from afar. The need for new working solutions is evident as the prevalence of multi-located working has increased rapidly during the last ten years and will continue to do so. In Europe, telework, including home-based telework

(at least one day/week), supplementary home-based work, mobile eWork, and freelance telework from small home offices, increased from six percent in 1999 to 13 percent in 2002 [4]. The Fourth European Working Conditions Survey [13] gathered in 2005 showed that only 51 percent of the working population in the EU worked at their place of work all the time and that a total of 21 percent never worked at their workplace. This indirectly shows the increased portion of mobile working from multiple places. Furthermore, 9 percent of workers always work in locations that are outside the home and company premises. The WorldatWork 2006 Telework Trendlines report [9] shows that the sum of teleworkers (both employed and self-employed) working remotely at least one day per month in the U.S.A. had risen by 10 percent, from 26.1 million in 2005 to 28.7 million in 2006. Based on the U.S. government estimates of 149.3 million workers in the U.S. labor force, the 2006 data mean that roughly 8 percent of U.S. workers have an employer that allows them to telecommute one day per month and roughly 20 percent of the workforce engages in telework. It was estimated that 100 million U.S. workers will telework by 2010. The technological enablers are the increased use of broadband connections at home and wireless access to the internet from anywhere. Work has become multi-locational. The change into new way of working challenges not only technology that is virtual spaces but also the use of physical premises as well as social and mental spaces.

3   Types of Mobile and Multi-locational Work

Individuals working from multiple locations usually use virtual tools for collaboration with others; that is, they work in distributed virtual teams. Next, individual mobility and mobility as a feature of distributed work are discussed in more detail.

3.1   Individual Mobility

At the individual level, 'telework' and 'remote work' are terms that have been used to refer to all kinds of work and work arrangements carried out outside a main office but related to it [1,8,12,15]. The use of information and communications technologies as communication links between the teleworker and the employer was brought as a feature to the telework concept quite early, which often meant home-based telework [8]. Additionally, making full nomadicity possible by developing portable computers and communication devices was required [7]. In Continental Europe, the term 'eWork' was later used to refer to all those work practices that make use of information and communication technologies to increase efficiency, flexibility (in terms of time and place), and the sustainability of resource use. It is evident that most employees in post-industrial societies use information technologies in their work, though the degree of use varies a lot. eWork includes the following specific types of work, and one of them is mobile work [3,8]:

   (1) *Home-based telework* or homeworking [5,15] is the most widely recognized and best-known type of eWork and telework. Many teleworkers divide their time between the home and the office, and they are therefore called 'alternating teleworkers'. Individuals who spend more than 90 percent of their working time at home are called 'permanent teleworkers'. 'Supplementary teleworkers' are those who spend less than one

full day per week teleworking from home. They are also called 'occasional telework-ers', to distinguish them from regular teleworkers.

(2) *Self-employed teleworkers in SOHOs* (Small Office Home Office) are private entrepreneurs, such as consultants or plumbers, working and communicating with their contractors, partners, and clients by means of new technologies. The critical difference between teleworkers in SOHOs and home-based teleworkers is their mar-ket position as self-employed.

(3) *Mobile workers* are those who "spend some *paid* working time away from their home and away from their main place of work, e.g. on business trips, in the field, travelling, or on a customer's premises" at least once per month. Lilischkis [9] calls this type of working in many places multi-locational work. Halford [5] used 'hybrid workspace' to describe the combination of organisational, i.e. 'office', and domestic, i.e. home, spaces mediated by cyberspace. Hislop and Axtell [6] added a third dimen-sion of 'locations beyond the home & office' to this concept of 'hybridity' and de-fined this type of multi-locational work as 'mobile telework'. *High-intensity mobile workers* are those who do so for 10 hours or more per week outside their primary workplace and use ICT for communication [4]. In conclusion, the terms 'mobile work' or 'multi-locational mobile work' or – why not? – 'mobile telework' could replace the traditional 'telework' in the case that work takes place with the help of ICT in and from multiple locations and while moving between them.

3.2   Mobility as a Feature of Collaborative Work

When considering mobility and the use of several places for working from the view-point of distributed group work and collaboration, mobility is just one feature, and it may concern one employee or all the team members [6,16] or the whole organization [14]. Bell and Kozlowski [2] proposed that the variety of goals and tasks, contexts, and processes needed for internal regulation "produces" different types of teams. Common goals and tasks vary according to their complexity, i.e. tasks are routine or creative, and they are interdependent to a greater or lesser extent. This results in dif-ferent communication richness needs; complex tasks require rich media. To illustrate the contextual requirements of collaborating groups, Vartiainen [17] used the follow-ing six factors, which each can be measured with several indicators, to describe and to profile the types of groups: 'location', e.g. the number and distribution of places from where team members work; 'mobility', e.g. the share of physically moving employees in a group; 'time', e.g. the degree of solo work and synchronous or asynchronous collaboration between group members; 'temporariness', e.g. the duration of coopera-tion and the number of groups each member participates in; 'diversity', e.g. differing cultural backgrounds among group members, and the 'mode of interaction', e.g. the frequency of face-to-face vs. virtual meetings for communication. Groups differ in these factors and multiple combinations are possible, producing groups and teams with different profiles and working requirements. The task content and the context characteristics of a group together create needs to communicate and organize intra-group processes in such a manner that the team can survive and prosper.

Summarizing, it can be seen that collaboration in groups and teams is complex, be-cause their purposes, tasks, working contexts, and the intra-group processes needed to adapt and work vary greatly. All these factors are inter-linked in such a way that a

change in one of them influences others. Therefore, only rough categories of group types can be presented one of them being mobile and multi-locational groups [18]. Conventional groups and teams differ from distributed, virtual, and mobile teams especially in three characteristics: the geographical distance between their members, the mode of interaction, and physical mobility. Conventional groups and teams are co-located, communicate face-to-face, and work towards a joint goal here and now.

The main types of non-conventional teams are: (1) distributed; (2) virtual, and (3) mobile virtual teams. Team members working in different locations and at a geographical distance from each other make a distributed team. A team becomes virtual when group members communicate and collaborate with each other from different locations via electronic media and do not meet each other face-to-face. The physical mobility of group members adds a new feature to distributed collaboration. Mobile, virtual teams are always distributed, but not all distributed, virtual teams are mobile. Virtuality, as in the use of ICT for communication and collaboration, makes a team into a distributed virtual team or mobile virtual team. It can be said that mobile virtual teams are the most complex types of teams to lead and manage.

4   Analysis of Working in Multiple Locations

As shown above, physically mobile work is in fact fictitious, as it invariably takes place in some location, whether it is a car or a customer site. In the case study below, the requirements for the design of a new 'Multi-Locational Office' is explored by using the concept 'ba' proposed by Nonaka et al. [11] as the methodological basis for the requirement analysis. 'Ba' roughly means 'place', referring to a shared context in which knowledge is created, shared, and utilized by those who interact and communicate there. 'Ba' unifies the 'physical space', such as an office space, the 'virtual space', such as e-mail, and the 'mental' or 'social space', such as common experiences, ideas, values, and ideals shared by people with common goals as a working context. The key point is that these spaces are embedded. In this study, multiple workplaces of employees are analyzed by using these embedded space categories in the following manner [10,17]:

– A 'physical space' refers to those physical places that employees use for working while moving from one place to another. They are divided into five categories: (1) home; (2) the main workplace ('main office'); (3) moving places, such as cars, trains, planes, and ships; (4) a customer's and partner's premises or one's own company's other premises, and satellite and telework offices ('other workplaces'), and (5) hotels and cafés etc. ('third workplaces'). The use of physical places can be described by different indicators, such as their distance from each other (near – far), their number (one – many), and the frequency with which they are changed (seldom – often). The indicators can then be used to describe the degree of mobility.

– A 'virtual space' refers to an electronic working environment or virtual workspace consisting of various infrastructures, tools and media for individual employees, groups, and whole organizations. The internet and intranet provide a platform to communicate, collaborate, and find knowledge, both with different tools, such as e-mail, audioconferencing, videoconferencing, chat, group calendars, document management, and presence awareness and findability tools, and with integrated

electronic collaborative working environments, such as various groupware systems and combinations of social media such as blogs, wikis, instant messaging, chat, and other communications systems that host many-to-many interactions and support group and community interaction. The use of virtual workspaces can be analyzed and described by focusing on connections, devices, and services and on their purposes, functionality, and usability.

– A *'social space'* refers to the social context and the whole social network where working takes place; that is, for example, other team members, managers, and customers. Social space creates the social capital of an organization. Network analysis is often used to explore the ties and relationships of individual members, such as "advising" and "not advising" or "helping" and "not helping".

– A *'mental space'* refers to individual cognitive constructs, thoughts, beliefs, ideas, and mental states through which an employee interprets the other spaces. A mental space can be shared with others. Creating and forming joint mental spaces requires communication and collaboration, such as exchanging ideas in face-to-face or virtual dialogues. Social and mental spaces are usually studied by collecting individual perceptions, attitudes, and conceptions, and then analyzing their contents.

In conclusion, workplaces are combinations of physical, virtual, social, and mental spaces, especially in collaborative work. These spaces form a collaborative working environment, which can support or hinder working. The use of various spaces varies, depending on the type of work and the interdependence of the tasks to be done. Individual telework at home in solitude without virtual connections to others is an extreme and rather rare case. Usually, home-based teleworkers communicate sporadically with superiors and colleagues face-to-face by commuting to the main office.

When employees are working in multiple locations, the combination and emphasis of their spaces are different and variable from co-located employees, just because of the greater number of physical places they rotate through and use [6]. Still, they need not communicate virtually. The significance of virtual spaces grows when the members of a distributed team have to communicate and collaborate with each other from different locations. They are not only distributed in physical places but simultaneously use virtual places (videoconferencing and documents shared on the intranet), and are also related to other team members who must share common goals (social space) to be able to reach the aim, and possibly also share common ideas, beliefs, and values (mental space).

5   Case: Requirements for Multi-locational Office

Next, findings of a case study concerning the first phase of a change process in a government agency are shown. The agency is to move from Helsinki metropolitan area to the other part of the country based on the government's decision. The whole process of moving the office is scheduled to take place in four years 2008-2011. As there are also other agencies of state to be moved in the future, this case is used to create and test the new model of 'Multi-Locational Agency'. In order to create favorable conditions for working in new ways, a careful requirement and need analysis was first done in order to identify critical hindering and enabling factors in collaborative working environments. This

knowledge can be used to design future physical premises, information and communication tools and infrastructures as well as organizational structures of the multi-locational office.

5.1 Background of the Change

The object of analysis is a governmental agency (n=~206) moving from Helsinki metropolitan area to a small city in the western part of Finland during 2008-11. The decision to move was based on the government's decision to distribute and transfer state workplaces outside the metropolitan area. The moving agency belongs to the Ministry of Agriculture and Forestry. Its task is to provide and monitor economical support to farmers all around country. Moving is planned to be finalized till 2011 when most of the employees should have their workplace in the new location. A research project was set up to explore possibilities to realize a new type of 'multi-locational office' that is working together but operating from many different locations. The study is carried out as a follow-up study and action research. In the first phase, the prerequisites of multi-locational working were studied by organizing a future workshop, by collecting existing documents, e.g. work descriptions, by interviews and a survey for all the personnel. A future workshop was meant to build a joint vision and a model of new ways of working. In the second phase 2010, the interventions and the change in all will be evaluated. The purpose of the first phase was to study hindrances and enablers to change the mode of working. This paper focuses on the physical, virtual, social and mental prerequisites of the whole work system to transform it into a new type of multi-locational office.

5.2 Hindrances and Enablers of the Multi-locational Office

Physical spaces. During the first phase of the change, the agency was already partly working in a distributed manner as its main premises are temporary and many employees work in different places. In the target city, the temporary office premises have been hired based on the needs and number of moving employees expecting the new main office building to be ready in 2010. The agency provides possibilities to some of its employees to do home-based telework. In addition, in the future there will be three areal offices in three cities for distributed work. Employees also use and will use other premises of the state employer like the Employment and Economic Development Centres (T&E Centres) around the country. Also trains and other moving vehicles are used as working places. Additionally, some employees visit farms for checking the use of monetary support. They should have access to the agency's data resources and possibilities to communicate and collaborate with their colleagues wherever they are. Moving to the new workplace will be finalized in 2010 when the new office building is ready in the new working site. Critical questions concerning the new premises are: what kinds of workplaces are needed by those who travel a lot and visit the main office only occasionally for important face-to-face meetings, as well how to create places for those who collaborate from afar? The future structure of the agency is given in Figure 1.
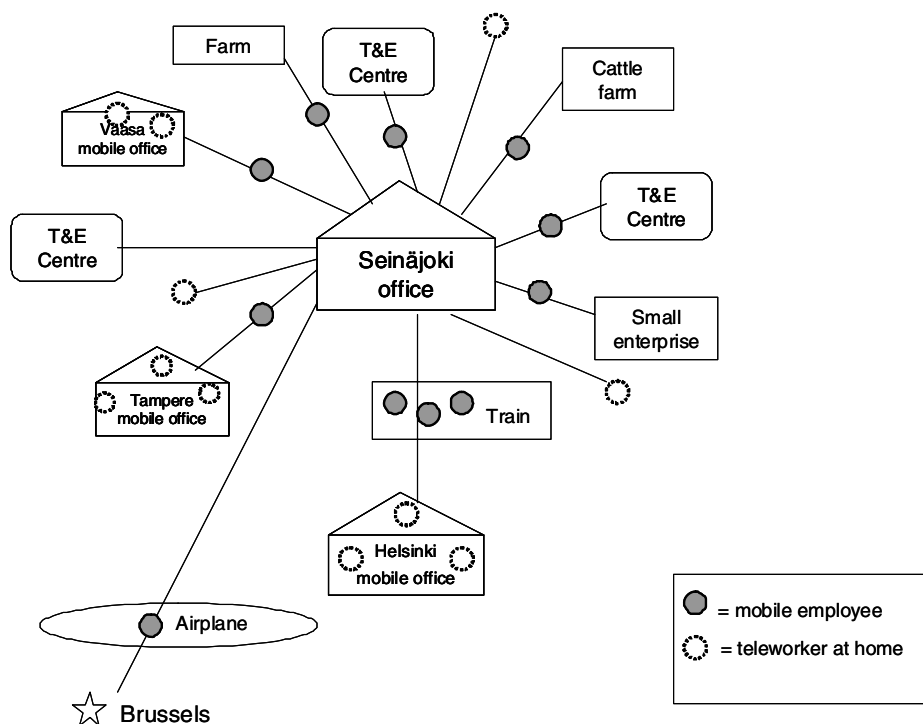
Farm

T&E
Centre

Cattle
farm

Vaasa
mobile office

T&E
Centre

T&E
Centre

Seinäjoki
office

Small
enterprise

Tampere
mobile office

Train

Helsinki
mobile office

Airplane

⬤ = mobile employee

◌ = teleworker at home

Brussels

Fig. 1. The structure of the multi-locational office in the future

Virtual spaces. The agency is a workplace requiring high standards and quality of information security. IT-department consists of 25 employees responsible for electrical processing of data needed for providing economical support to farmers and monitoring its use for the state and European Union. As well the department acts as the support function for employees in their use of information and communication technologies. This role will strengthen in the future when tools are implemented. The implementation of the multi-locational office will require a new place-independent virtual private network (VPN) to guarantee secure at least partly wireless connections from remote places and for remote users. In addition to this investments are needed for such mobile devices like smart phones that guarantee access to data bases and virtual meetings from afar, for example when an employee visits a farm for inspection. Already now there are videoconferencing systems to be used for virtual meetings between sites. When new technologies are purchased its reliability is critical as well as training employees to use it.

Social spaces. The agency has a short history as it was formed just a couple of years ago by merging units from other establishments. This brought along different organizational cultures creating sub-cultures without joint identity in the existing agency: the organizational climate is seen as open and based on trust by others and as closed and bureaucratic by others. The organizational climate survey shows differences in

satisfaction with leadership, support for developing, and information flow between the units of the agency. In order to guarantee a high-quality performance during the change and after it, the management of the agency has developed operating principles for telework, distributed work and work time flexibility. The telework agreement is provided for some employees who mainly work at home. The agreement defines the suitable jobs as autonomous without continuous need to be available to others and working on public documents. Because the agency handles every year about 2,2 billions EUR of monetary support, its operations are highly confidential and require high standards of information security. This limits the possibilities to telework at home in the agency, which is now two days per week. Distributed workplaces are provided in three areal offices. The employees are, however, requested to work at the main office on weekly basis. Some flexibility in working times are provided for employees during the change process: starting work between 6-10 AM, on Mondays 6-11 AM, and finishing 2-7 PM, on Fridays 1-7 PM. During the six-month period, the working time balance should be +40/-10 hours.

Mental spaces. One third of the present employees have not been willing to move, and the turnover has been 16 percent during the first 18 months of the change. As well one third is willing to telework and distributed work, others prefer an old working style. This has created the challenge of how to preserve expertise in the agency as the tasks require it. There is not only resistance to change but also missing competences of how to work in the flexible manner and how to lead and manage employees who are not under direct supervision. In all, attitudes and motivation for change are not very high.

6   Conclusion

The analysis of the first phase of the change process in this case study shows that implementing new ways of working and organizing meets many hindrances, which seem difficult to surpass. The hindrances can be found in all the four spaces that form the collaborative working environment. In practice, the new multi-locational office is a compromise of old ways or work and new possibilities enabled by ICT.

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