CoSPACE: Collaboration Barriers and Enablers of Employed IT Professionals in Co-working Spaces

In the ongoing negotiation of work policies in the information technology (IT) sector towards supporting a more flexible remote work [17] [18], coworking spaces (CWS) might play a significant role [23]. CWS can be described as a service where members are offered a physical space and their individual activities become part of networking activities with others [19]. Research on CWS often has a focus on groups that are self-employed or what Gerdenitsch et al. [3] label independent professionals. People who have the freedom to manage their own time to a great extent, and being involved in non-standard creative work [21] such as entrepreneurs, start-ups, digital nomads, and freelancers. However, there is a little focus on individuals being employed but still use a CWS for their daily work, holding what we in this application label multimembership. According to [22], a multimembership is about being a member of several different communities of practice (CoP), such as being a member of the organization employing IT-professionals as well as of the CWS.

The research found so far that to different extent can relate to multimemberships in CWS concerns (i) inter-organizational CWS and their members [1] [6], (ii) CWS as complement to existing office enhancing the wellbeing of employees and reducing the required office space per employee thus lower the rental costs [20], and (iii) the way managers make themselves visible, reaffirm their authority and restore their identity as managers in relation to employees working at CWS [10] and their use of management control systems [15]. To advance the understanding of the implications of CWS on remote-work, studies are needed on the multimemberships, and the ways organizational boundaries are blurred [25]. Thus, in this project *we explore social, technological, and organizational barriers and enablers of collaboration experienced by individuals with multimemberships in CWS. Moreover, we investigate the ways barriers could be managed and enablers further exploited.*

The point of departure for the project is that remote-work is a key factor to improve life- and work conditions in the county of Jämtland/Härjedalen [24], as well as a natural part of IT organizations engaging in globally remote work. For example in global software engineering, remote-work is the key to increase productivity, reduce costs, and take advantage of proximity to markets and customers. What further supports remote-work are the advances in communication and collaboration technologies which we are witnessing nowadays that will support creating effective and efficient remote-collaboration tools, and thus contribute to addressing the technological challenges. Indeed, recent research in computer-supported cooperative work has investigated novel technologies that support awareness and provide immersive telepresence experiences. For instance, *ImmerseBoard* is a tool for remote collaboration through a digital whiteboard that gives the collaborators a 3D immersive telepresence experience. The tool supports the ability to track the eye gaze, gesture direction, and intention of the remote partners [5]. *Mini-Me* is another example of work that uses advances in augmented and virtual reality to support remote work [13]. In particular, an adaptive avatar is used to enhance mixed reality remote collaboration between a local augmented reality user and a distant virtual reality user. *ReMotion* is an automatic robotic proxy that is created to support remote open-space activities [14]. It has been shown that *ReMotion* can improve the sharing of attention and the sense of co-presence between the remote collaborators.

Challenges in remote collaborations are considered beyond the scope of technology and tooling [8]. Indeed, despite the advances in collaboration technology, there still exist social and organizational

barriers raised by inevitable differences in e.g., local context, culture, language, and trust between the remote collaborators. Different studies investigated the effect of distribution on the social and organizational aspects and activities of IT professionals. The social and organizational challenges that are raised by the distribution of the collaborating teams are considered to form an obstacle to achieve effective collaboration [2]. It has been found that distance adversely influences the communication of developers and software engineers [4] [9] Miller et al. 2021] and reduces the effectiveness of their activities [8]. Different strategies are proposed by research to mitigate the social and organizational challenges: (i) establish trust between collaborators by arranging personal or virtual meetings or social events before the collaboration [9], (ii) establish common ground by exchanging interest, opinions, experiences, and expertise between the collaborators [8], (iii) introduce explicit triggers for effective communication (i.e., increased active or creative conflict discussions) into collaborations [8], (iv) understand the cognitive and motivational factors that hinder knowledge sharing between the collaborators [7], and (v) investigate methods that encourage or trigger knowledge sharing between the collaborators [7].

Aim and goal

The aim of this research proposal is to *explore the barriers and enablers of collaboration in coworking spaces*. First, we aim to build an understanding of the social, technological, and organizational factors that hamper an efficient collaboration between IT employees in a shared working space. Second, based on the understanding of the barriers from the first step, we aim to explore and research enablers in terms of approaches or frameworks that contribute to enhancing the efficiency and effectiveness of collaboration in coworking spaces.

The collaboration aspects that we will investigate include collaborative activities such as collaborative design and ideation, pair programming, and team brainstorming. Moreover, we will investigate knowledge sharing as well as interpersonal communication since they influence the effectiveness and efficiency of the collaboration.

In particular, the following research questions (RQs) will be addressed:

- **RQ1**. What are the barriers that hamper an efficient and effective collaboration of IT employees in coworking spaces?
    - **RQ1.1** What are the technological barriers?
    - **RQ1.2** What are the social barriers?
    - **RQ1.3** What are the organizational barriers?
- **RQ2.** What are the current practices that enable an efficient and effective collaboration of IT employees in coworking spaces?
- **RQ3**. What strategies can be implemented to promote efficient and effective:
    - collaborative activities,
    - knowledge sharing, and
    - interpersonal communication of IT employees in coworking spaces?

Significance and societal contribution

This project will contribute with knowledge about how employees perceive multimembership and it will also contribute with knowledge about how to enable work in CWS.

The region of Jämtland and Härjedalen is dependent on innovation and growth (just as any regions) but the geographical locations make co-working spaces of extra importance for this region. This project will contribute practical knowledge about enablers and barriers for how to run CWS that in turn will facilitate companies to establish in the region of JÄmtland and Härjedalen. Establishment of IT-companies will lead to increased job opportunities and people moving in.

Project Description

As mentioned above, multimembership as a concept comes from research on CoP. CoP as such is defined as members' mutual engagement in joint enterprises and the sharing of a repertoire, e.g. tools, stories, history, etc. [22] . To the latter part of the CoP definition, information systems and IT artifacts can be related.

Orlikowski and Iacono [12] argue for the need for theories in information system research and present critique against the idea of studies that view information systems either as black-boxed or treated as a monolith. They present five premises that they think should be used as a starting point when discussing and designing information systems studies. In this project we will take departure from two of those premises.

1) IT artifacts are always embedded in some time, place, discourse and community [12]. The materiality is entangled with both historical and cultural perspectives of development. This means according to Orlikowski [11] that how for example employees engage with different types of IT artifacts when they are working, learning, and communicating have to become a central theoretical concern.
2) IT artifacts are neither fixed nor independent; instead they emerge in different social and economic work practices [12]. This view IT artifacts as complex and as technosocial processes that are complex and processes that will change. This means that we need new theories in order to understand for example the “dynamic and unprecedented technologies and uses comprising contemporary initiatives in virtual organizing” [12] (p. 132).

In practice this means that we will base our study on three different perspectives, social, organizational and technological since IT-artifacts are entangled with historical and cultural perspectives and also part of CoP. Since CWS have been developed rapidly lately it is important to consider several perspectives and this will in turn allow us to focus on multimembership. In this project this means that we will focus on the dynamics of collaboration both between employees within companies (internal collaboration - not collocated) but also with employees in different companies (external collaboration - collocated), and the more or less actively attempt to connect the different CoPs [22].

Method

Since the aim of this project is to explore the barriers and the enablers we will use a qualitative approach for both the collection and the analysis of data. The first two research questions are explorative and therefore we will use interviews and observations to answer those two. To be able to answer the last question we will use an action oriented method since we aim for creative and new ideas for how to build strategies to overcome the barriers. In this phase of the project we will use a workshop.

The project will include three different CWS, Gomorron Östersund, House Be in Åre and Co-work Almåsa. In those CWS there are several examples of companies that have system developers employed and since the study is explorative it is important to include different types of CWS environment to be able to study different kinds of environment and to be able to study different companies with diverse dynamics.

Interviews:
Approximately 14 system developers will be interviewed. The interviewee has to be system developer and employed at a company that is established in the CWS but have their parent company somewhere else.

Observations:
Approximately three weeks of observations will be performed during the project. This will make it possible to make informal interviews, put follow-up questions and observations of collaborations or exchanges that the employees are not aware of. Focus of the observations will be on collaborative activities such as design and ideation, pair programming and team brainstorming.

Example of questions (inspired by Orlikowski [11]).
-describe your everyday activities (what are the hindrance and possibilities with multimembership)
-describe how you work in your projects (especially in terms of collaboration with other employees in your mother-company)
-describe how you are organized (including terms of multimembership)
-describe the flows of communication (including terms of multimembership)
-discuss your regular use of artifacts (software tools, communication media, methodologies used, standards) when you conduct your ongoing work. Does multimembership require special tools?

Idea generation and workshop
Based on our new understanding of the barriers and enablers we will use different kinds of creative methods to generate ideas and strategies. The idea and strategies could be methods, tools, support for how to overcome the barriers for efficient collaboration in a CWS that include multi-membership. To validate those ideas we will use a workshop where we aim for validation of the new ideas. The workshop will also serve as a way to present our results and we will use the existing network within the co-work community in Jämtland to reach out.

Ethics

In this study, we considered the major ethical issues according to [16]: informed consent, beneficence– do not harm, and respect for anonymity and confidentiality.

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