Workplace Innovation in Swedish Local Organizations - Technology Aspect

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Abstract. Workplace innovation (WI) is important to provide better work opportunities and increase productivity. WI at the individual task level concerns the structure of individual work tasks. A number of surveys have been done that measured WI at the individual task level, however they paid little attention to work environment, in particular to supportive technology. This paper presents the case study of WI in two Swedish organisations with focus on the alignment of ICT and the individual work tasks. We carried out seven interviews of workers at different levels of job and in different sectors. The qualitative data analysis identified four themes: business processes, working roles, data sources, and technology. The analysis was facilitated by constructing BPMN (Business Process Model Notation) diagrams for the identified business processes. We discovered that the supportive technology in the organisations is adequate but downright traditional. We argue that technology is an important factor and enabler for WI. Finally, we present an architectural model that provides a direction for future work on WI taking ICT as the basis.

Keywords: Workplace innovation · Information and communication technology · Alignment of ICT and work process · BPMN

1 Introduction

Workplace innovation (WI) is believed to be important to enhance employers' work opportunities and lead to higher productivity. European has had a long history of programmes to promote WI [1]. Although there is currently no common agreement on the meaning of it [2], WI is often considered as a process to operate changes on workplace structures, flows, and practices so that performance and operative satisfaction within the organization are improved. All organizations, from large corporations to small and medium-sized enterprises (SMEs) in both private and public sectors can benefit from WI.

Narrow definitions such as the one provided by the European Agency for Safety and Health at Work (2012) [3] consider WI to encompass the renewal of work organization, labor and employment relations, and network relations. The agency definition does not explicitly cover non-technical innovation, part of a broader view of WI which includes business models, marketing strategies, and

open innovation processes. Furthermore, it neither considers social innovation, an even broader definition encompassing WI, the labour market, or social security policy making.

Both WI and social innovation in the workplace imply some degree of renewal at the organizational level. As organizations freely operate as part of an open environment together with other players, WI affects not only an organization's internal functions, such as its work organization and its labour relations, but also its external functions in the form of its network relations [3].

This view is further reinforced by the input-process-output-outcome-impact model of WI [4], which differentiates between a number of WI levels: at the *individual level*, employees and managers engage in WI; at the *individual task level*, the structure of the individual work tasks allows both employees and managers to engage in WI; at the *organizational level*, the organization itself provides help to produce WI at the previous two individual levels; and finally, at the *societal level*, organizations respond to external economic, social, or environmental challenges.

In this paper we focus on WI happening at the individual task level. At this level, people investigate how the structure of the individual work task supports employees' and managers' engagement in WI, and analyze individual tasks according to three main facets [4]: the *work task*, that is the activity an employee has to carry out; *work time*, or the time frame for work activities and the timing of work; and the *work environment*, the characteristics and features of the physical and digital environment within which a work task is carried out.

The measurement of WI is a significant and complex issue for many organizations. It is also important from an academic research perspective [5], as there is currently no common agreement on what indicators allow to best measure WI. The European Innovation Scoreboard (EIS) project (2013–2014) [4] conducted a review on surveys of WI carried out both within the European Union and in non-Member states such as Canada, the USA, Australia, and New Zealand.

The review shows that many of the surveys measured WI at the individual task level, but they did not pay much attention to work environment, particularly the aspect of supportive technologies. Today technology plays an increasingly important role in almost every workplace. It is not only an input but also an important factor influencing and enabling WI [6]. In particular, information and communication technologies (ICT) increase people's freedom to decide when, where, and how they wish to work, communicate and collaborate.

This plays into an additional set of challenges introduced by a new generation, that of the so-called Millennials or digital natives [7], beginning to enter the labor market. This is the first generation whose habits, behaviors, and expectations have been entirely shaped by growing up in a digital world defined by mobility, plenitude, and an open culture of sharing and remixing [8]. As a result, they communicate, integrate technology into their daily lives, and approach work very differently from previous generation, implying that organizations will have to innovate to create a balanced work environment that is both capable of catering to the necessities of Millennials and of functioning meaningfully for the older generations.

The review also shows that the surveys did not by and large consider the relations between the three facets of an individual work task. But the workplace has always been defined by the synergistic relationships between people, their work, the space and time of their work, and the technology they use to support themselves in their work [9]: it is important to recognize and identify this relationships when attempting to measure WI.

The paper illustrates the results of a measurement of WI in two Swedish local organizations, Länsstyrelsen in Kalmar and Pdb in Jönköping. The first organization is fairly large county administrative board while the second is an SME local IT-consultancy company. Together they represent two very different workplace organizations providing a limited, but yet representative, test environment. Specifically, we carried out a case study in the aforementioned organizations. The purpose of the case study is to gather an in-depth exploration on the usage of ICT and the alignment between the ICT and the individual work tasks in the organizations. The methods used for the study and the data analysis are described in Sects. 2 and 3. Section 4 presents our findings from the case study. Not surprisingly, we found that the supportive ICT in the organizations are adequate but downright traditional. We argue that technology is an important factor in WI. Technology can act as a facilitator and enabler for WI [6]. On the other hand, it is not enough just to provide employees or managers with new technologies, and wait for WI happen. In conclusion we present our preliminary thoughts on how to approach WI taking technology as the basis.

2   Study Methodology

We chosen case study as the study method, since it suits well to explore an area where issues are not yet well understood or properly identified. We employed "semi-structured" interviews. It involves a number of open-ended questions defining the area topics under investigation. Interviews are effective in examining a phenomenon in a real life context, in particular in bringing to the front the experiences and perceptions of individuals from their own perspectives.

The principle of "semi-structured" interview is to have minimum structure and maximum depth, and therefore to keep a focus on the purpose of the study and at the same time avoid the researchers' preconceptions [10]. The general open-ended questions we identified for the study purpose include: (1) how does different actors work in an office today; (2) which tools, methods and processes are they relying upon; and (3) which IT-tools and sources of information are available to the employees today.

We started each interview with mild and easy questions, such as the questions about the background of the interviewee and his/her job. As the interview proceeds, we move to more complex and specific questions, in order to gain insights into peoples opinions, feelings and experiences of the usage of ICT in their workplaces. This arrangement is to minimize the affect of the questions on the results of the interviews.

Samples in qualitative interviews are usually purposive, rather than random. Participants are carefully selected because they are likely to generate useful data

for study purpose. Seven participants were suggested by the organizations. The wide experiences of the participants in usage of ICT in their work will provide deep knowledge about the study issues. They also represented a cross section of workers in the organizations, such as level of job and sector of employment. Participants include administrative worker, knowledge workers in different sectors, managers and a CEO, who work in an office environment some or all of their work hours.

Despite we considered only two organisations and interviewed seven people, the interviewees were rather representative of ICT use at workplace. A typical company or governmental organisation would include administrative and knowledge workers, managers, CEO or a director. To analyse the workplace for such workers is crucial for innovation. By addressing these typical levels in the organisational structure, we have obtained samples of technology usage across an organisational workplace. Therefore, the information we gained can be relevant to the study issues in general.

3   Interview Data Analysis

In this section we present the methods used for interview data analysis. First, we carried out a phenomenological analysis of interview data following the guidelines in [11]. A key of the phenomenological analysis is understanding the meaning of what participants are saying, rather than what the researcher expects that person to say. An important step in interview data analysis is to identify the common issues that recur, and identify the main themes that summarize all the collected data. The four themes were identified after observing in detail the data,

– *Business (Work) Processes:* a collection of related activities or tasks that produce a specific service or product to serve a particular goal
– *Working Roles (Responsibilities):* the description of what people do when they perform their tasks or activities in a work process.
– *Data sources:* the data (in any format) that are required to perform tasks or activities in a work process.
– *Technology:* the ICT used to perform tasks or activities in a work process.

Table 1 presents the technologies commonly used in day-to-day work at the organizations in the case study. In order to better understand the relations between the use of technologies and people's work process and work roles, Business Process Model Notation (BPMN) [12] was used to facilitate the data analysis. A BPMN diagram was built for each business process identified in the interview data. Working roles of people in the business process, required data sources and the use of ICT in the business process are also represented in the diagram, if applicable. Figures 1, 2 and 3 present example BPMN diagrams of project management, unit meeting and office work, respectively.

Figure 1 shows that the use of technology in project management is limited to tools such as Outlook, it includes plenty of interactions with different subgroups, which could be better supported by IT. A typical unit meeting shown in Fig. 2

Table 1. Technology used at workplaces

Used in daily work	Used during meetings	Used outside office rooms
- desktop computers,	- desktop computers,	- mobile phones,
- laptops,	- laptops,	- special devices like GPS,
- printers,	- printers,	- paper print-outs
- paper print-outs,	- paper print-outs,	
- file shared on a company's server,	- projector and screen,	
- servers and services outsourced to another actor,	- Microsoft Lync or similar	
- scanners (incoming documents on paper are scanned and stored in a database)		
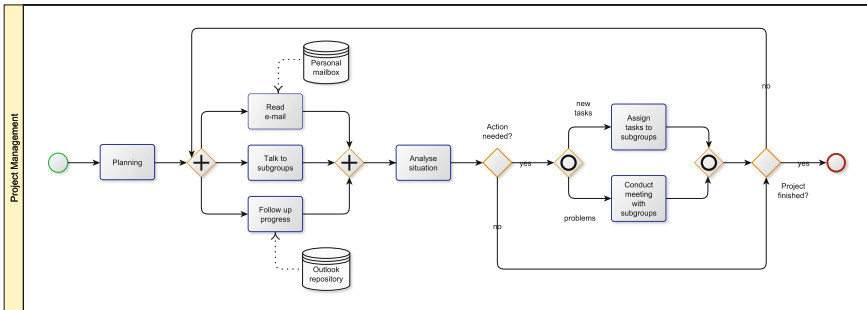
Fig. 1. A project management work process
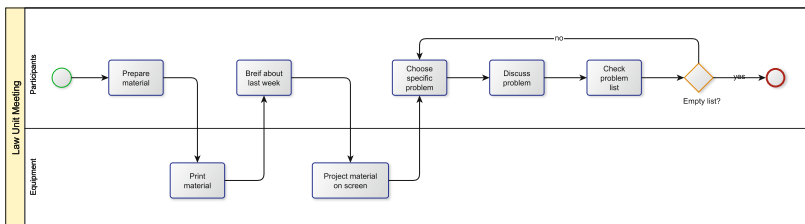
Fig. 2. An unit meeting process

relies on very traditional use of technology in the form of printed papers and data projectors. Figure 3 provides an example of an office work process with a more advanced use of IT including several databases and an issue registration system. Overall, the BPMN diagrams show the technology use is rather traditional and there is space for innovation.
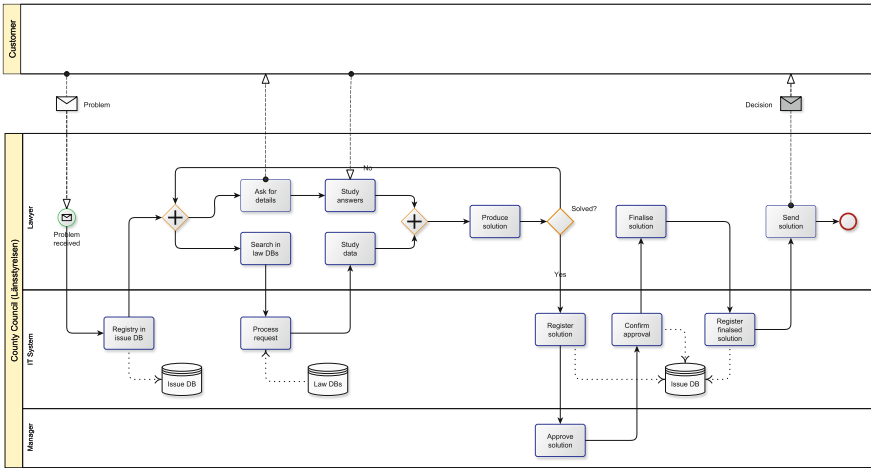
Fig. 3. An office work process

4   Findings and Discussion

In this section we present our findings on the usage of ICT in the Swedish local organizations, and discuss the role ICT plays for WI.

People work in teams. All the interviewed participants work in teams some or all of their time, in different shapes and forms. Team work require the ability to interact with each other to achieve objectives through a shared understanding of resources, such as members' knowledge, skills, experiences, and explicit goals and objectives. The support for teamwork we found in the course of the study was adequate but downright traditional, with email, phone communication, and face-to-face meetings being the main conduit for managers and employees to communicate with each other and share information and knowledge. Social media support or use was almost totally absent and generally used for official or semi-official communication at the network level and not to support internal workflows.

No special support for work-on-the-move or other kinds of mobility. No special support for work-on-the-move was found in the study. Tablets and smartphones are used, but not in any structured or officially sanctioned manner. While employees expect their workplace to offer a high level of freedom and flexibility, physically from the constraints of the office and technically from the constraints of the desk computer, the work-on-the-move stirs up mixed feelings with a few people fearing that fuzzier boundaries between home and office will result in increased work hours.

Project managers do not have desired support from ICT. Support for project management was also found to be very traditional. Productivity software such as Microsoft Excel and email threads are still the prevalent tools used for day-to-day project management. Specialist project management applications are not

usually considered as they do not strike a useful or convenient balance between the complexity they necessarily introduce and the size or time limitations of a typical small-to-medium project: the effort needed to plan and manage projects using such applications often becomes an unmanageable overload that adds to the project workload.

Papers are still very often used in the workplaces. Although the arrival of the paperless office has been predicted for more than two decades, a lot of paper is still produced in the workplaces today. Documents are very often printed out for different reasons: (1) it is a tradition to keep paper records; (2) signed paperwork is a necessity; (3) people like to bring papers to discussions and meetings; (4) people are used to work with paper.

The findings listed above are certainly not completely new nor unexpected. Mobility, remote collaboration, flexibility, were radical ideas that have already become mainstream.

Employees do not just get to work together when in meeting and conference rooms. Because of the constant flow of information running through an organization and of the possibility of real-time notifications on personal devices, collaboration happens all the time everywhere, at the desk and in the hallway, and between different rooms or even countries thanks to Internet instant messaging, tele-conferencing, and smart phones. This collaboration is often spontaneous and informal, rather than organized and planned in advance. The workplace in the future must also transfer some of the implicit, synchronous knowledge possessed by individual employees to shareable platforms, making it an explicit textual and visual record of progress, challenges, and solutions, and thus helping these informal groups reach a shared and transmissible understanding faster and more effectively.

The mainstream penetration of ICT into every aspect of day-to-day life has increased our freedom to decide when, where, and how we want to work, communicate and collaborate. A new generation of digital natives is also entering the workplace, bringing forth a completely different outlook on what it means to communicate, integrate technology into our daily lives, and work. The workplace in the future must attract digital natives and respond to their different needs and expectations, but at the same time be still meaningful to older generations.

Many software applications on the market can help with project management tasks. However, it is a often difficult to find available tools that can directly support peoples' particular management needs. No single project management tool meets all complicated project management needs. The workplace in the future need provide more flexible solutions for project management. Such solutions can offer handly way for collaboration and integration of different kinds of management tools and technologies, so project managers are able to build up their own package including all of the functionalities they care about.

Paper use is deeply rooted in our culture and has had a profound impact on the civilization of our society [13]. More realistic vision of the workplace in the future is less-paper office, instead of paperless office. The devices, such as tablets and e-readers could help to lead toward less-paper office, because
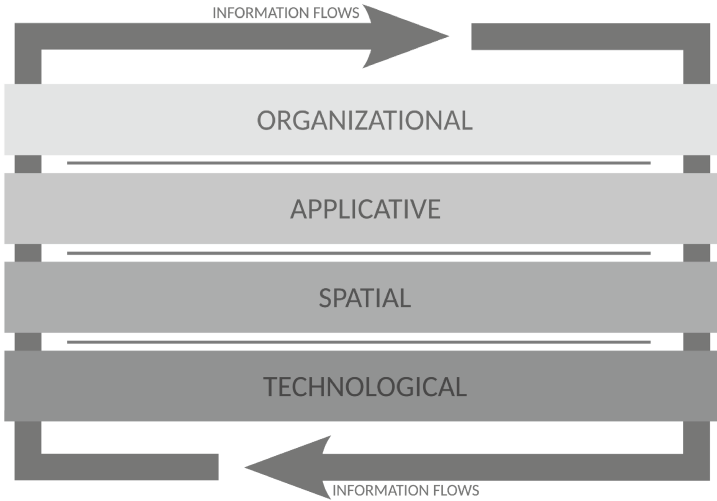
Fig. 4. A synthetic architectural model

they can provide a portable and flexible way for reading documents, and also for annotating documents and taking notes. More importantly, less-paper office is not just friendly for our environment, but also increases collaboration and improves mobility.

5   Conclusion

The current discussions in WI are often about non-technical innovations, such as organisational innovation and process innovation. Some case studies of WI in the Netherlands also describe the occurrence of WI without technology change [6]. In our study of two Swedish local organizations, we investigated how technology meets peoples' needs in the workplaces, and identified key issues in the usage of technology in these workplaces. We found that the supportive ICT in the organizations are adequate but downright traditional. We discussed that in the organizations ICT plays an important role in increasing collaboration and improving mobility and flexibility. On the other hand, supply of new technologies to workers will not automatically lead to innovation in organization. Other factors, e.g. people, work process, organization culture, and etc., all together decide the WI in reality, which has been reinforced in [4].

Figure 4 presents an architectural model which gives a hierarchical description of our thoughts on how to approach WI, taking technology as the basis. The model consists of four levels:

– *The technological layer* holds the base infrastructural foundations, for example, access to mobile broadband.

– *The spatial layer* accounts for the physical environment and the spaces and objects in the physical environment that participate to, shape or modify the concept of workplace and how people work.
– *The applicative layer* is the tools layer. Application software, office gear, personal devices, they all belong to this layer.
– *The organizational layer* is the people's layer. It considers how individuals and groups organize and interact with the workflows by means of the underlying layers.

The future of our work is to investigate how different types of technologies, both old and new ones, can be incorporated into office environment, and then lead to a WI.

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