



## Enablers and Restraints of Knowledge Work - implications by certain professions?

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Our research area is information and knowledge management, with special emphasis on digital work environments and digitalization of business. Some of our previous topics include human-computer interaction, knowledge sharing, value creation in inter-organizational relationships, managerial issues of contemporary organizations and different aspects of knowledge work. This study combines our previous research interests and expertise and contributes to the body of knowledge work literature.

Additional information is available at the end of the article

## MANAGEMENT | RESEARCH ARTICLE

# Enablers and restraints of knowledge work – Implications by certain professions?

Jussi Okkonen<sup>1\*</sup>, Vilma Vuori<sup>2</sup> and Nina Helander<sup>2</sup>

**Abstract:** Knowledge work (KW) has risen to a significant role in modern societies, leading to an increasing number of the knowledge workers. Digitalization changes the work life, challenging individuals representing different professions as well as organizations. KW and the traditional professions are changing in many ways, opening up new vistas. The purpose of this article is to analyse and compare the enablers and restraints of KW in different professions: the medical practice, the clergy, the legal profession and the teachers. The article seeks the KW enablers and restraints similar or different between these selected professions, and further, discusses the impact of the identified enablers and restraints to work performance. The empirical data was gathered with unstructured interviews using a narrative interview method. Questions were open so that the situations were similar to a discussion. The interviewer posed further questions to deeper the interviewee's answers and to build the continuity of the interview upon them. This methodology puts in evidence on similarity of working habits, socio-technical systems and work-flows of within and between professions. The article also builds profession related taxonomy of key findings and discusses those from the performance and managerial perspective.

**Subjects:** Social Sciences; Behavioural Sciences; Economics, Finance, Business & Industry

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### PUBLIC INTEREST STATEMENT

Teachers, pastors, doctors and lawyers are professions requiring vast knowledge base, various skills and intensive training. The article describes the elements that either enable or restrain performance in these four knowledge-intensive professions based on data gathered by narrative interviews with representatives of each profession. The results indicate that the enablers are typically the elements that facilitate the professionals' core work, such as teaching or handling the legal cases, and helped the professionals to cope with their work pressure, handle the stress and cope with the heavy workload. The restraints were considered as the elements that hindered the professionals to carry out their core work, such as taking care of patients properly, and were seen as a reason for the heavy workload causing pressure. In all, both enablers and restraints were strongly related to the well-being at work, and should therefore gain attention in order to facilitate performance in studied professions.

| **Keywords:** Knowledge work; professions; performance; qualitative study

## 1. Introduction

Knowledge work (KW) (see e.g. Alvesson, 2001; Blackler, 1995; Drucker, 1999; Nonaka & Takeuchi, 1995) has risen to a significant role in modern societies, leading to an increasing number of knowledge workers. The requirements for the depth of the knowledge base and the special skills of the knowledge workers have grown remarkably in many professions. The formal education requirements have toughened and tasks that involve autonomous decision-making and non-routine problem solving have become more general. The life cycle of information and technology has become increasingly shorter, which challenges individuals as well as organizations to advance their knowledge and skills constantly in order to keep abreast of the developments. All this leads to a situation, where KW is changing in many ways, opening up new kinds of opportunities for knowledge workers, but also a set of challenges.

The term “professions” has been connected with highly respected and traditional occupations such as physicians, priests and lawyers. Profession can be defined as an occupation requiring some special skill that requires abstract knowledge base, extensive training and revised application of the skill according to each task and situation determined specific for that profession (Abbott, 2014; Erämaja, 2006; Helander, 1993). One may talk about a profession, when it has the well-established position, i.e. it has been professionalized and the certain tasks are defined exclusive to the profession (Brante, 2013; Cruess, Johnston, & Cruess, 2002; Erämaja, 2006). Consequently, the medical profession has a monopoly status in health-care system whereas teaching has a key role in the education system. Similarly, the legal profession enjoys the ruling status in the judiciary while clergy has an important role in religion. Some studies argue that teaching cannot be regarded as a profession but rather a semi-profession. According to Howsam, Corrigan, Denmark, and Nash (1976), the semi-professions have lower occupational status, shorter training period, they lack societal acceptance and autonomy. Furthermore, they possess a less specialized knowledge-base and skills and they do not take part in decision making process regarding the education system. (Howsam et al., 1976)

Professionals work typically with humanly important themes, such as illness, guilt, grief, education and guidance. In such situations, people may even become somewhat dependent on the professionals (Abbott, 2014; Mykkänen & Koskinen, 1998). Consequently, institutional forms, such as associations, licensures and ethics codes, have been established to guarantee the relations between professions and their clients (Abbott, 2014). In addition, the anthropocentric nature of the work requires certain communication and interaction skills from professionals (ibid.).

KW has gained increasing interest among scholars since 1990s (Alvesson, 2001; Blackler, 1995; Bosch-Sijtsema, Ruohomäki, & Vartiainen, 2009; Drucker, 1999; Efimova, 2004; Holsapple & Jones, 2004; Reinhardt, Schmidt, Sloep, & Drachsler, 2011; Ruggles, 1998). KW is understood as creating, sharing and applying knowledge (Bosch-Sijtsema et al., 2009). The role of tacit knowledge (Nonaka & Takeuchi, 1995) is often emphasized in knowledge work, as the tasks usually require in-depth understanding and experience on ambiguous issues in a way that is not easily expressed explicitly. Knowledge work requires understanding causalities and implications of information (Blackler, 1995), and therefore such work is usually done by talented, highly educated and autonomous individuals who use different information tools and models to generate complex, intangible and tangible results (Bosch-Sijtsema et al., 2009). These individuals are consequently called knowledge workers. In literature, KW is often compared with manual work or something between those abstract, planning—doing, ends of a continuum of work (Okkonen, 2009). According to Okkonen (2009) KW is more issue of the ability to comprehend than conduct. Recently discussion on KW has shifted from work itself to enablers and macroergonomics of KW. Mark (2015) discusses the issue from the perspective of human computer interaction, or more general in digital context and especially how communication affects people. Moreover, KW is also about socially constructed conventions and individual habits, it is more and more dependent on self-

management and coping skills as discussed in Franssila, Okkonen, and Savolainen (2015). Franssila et al. (2015) also draw attention to information ergonomics as a vehicle to enhance environment, organization and use of information and communication technology (ICT), i.e. macroergonomics.

The purpose of this article is to analyse and compare the enablers and restraints of KW and their relationship to work performance in different professions. The article is structured as follows: After introduction to the theoretical basis, research methods of the empirical study are described. Then, the findings of the study are presented, followed by discussions and conclusions.

## 2. Theoretical background

### 2.1. Knowledge work enablers and restraints

Based on the literature, several different aspects that facilitate KW can be identified, for example, physical work environment (e.g. Bosch-Sijtsema & Postma, 2010; Heerwagen, Kampschroer, Powell, & Loftness, 2004), organizational culture (e.g. DeLong, 1997; Sveiby & Simons, 2002) and motivation (e.g. Björklund, 2010; Diefendorff, Brown, Kamin, & Lord, 2002; Sharabi & Harpaz, 2010). They can aid different KW actions, such as acquiring, analysing and generating information as well as learning, thinking and collaborating.

One of the key enablers is **physical work environment**. Peterson and Beard (2004) discuss that the workspace needs be organized concerning two variables, autonomy and interaction. The autonomy and privacy are crucial for knowledge workers to perform their tasks. For example, learning and analysis may require private workspaces. In addition, planning and thinking are knowledge work actions that require concentration (Bosch-Sijtsema et al., 2010). Appropriate workspaces also help knowledge workers to maintain the cognitive flow and concentration (Heerwagen et al., 2004). In addition to tasks that require autonomy, knowledge workers typically have tasks related to collaboration and communication as well as knowledge acquisition and sharing. These tasks may call for interactive workspaces (Bosch-Sijtsema et al., 2010). Collaborative workspaces enable the intangible knowledge to become explicit through conversation and information sharing. Heerwagen et al. (2004) explain that collaborative workspaces improve also group decision-making, increase the ability to get help when needed and contribute to the process integration across different work units. Moreover, the interactive workspaces offer the increased awareness of who knows what, which in turn enhances the acquisition of knowledge (Heerwagen et al., 2004).

Another KW enabler is related to **organizational culture**. From KW perspective, it can be stated that the organizational culture defines the value of knowledge and explains to large extent the innovative capability in the organization (De Long, 1997; Sveiby & Simons, 2002). Co-operative organizational culture contributes to the KW actions such as collaboration, communication and knowledge creation. The organizational culture is also related to the willingness to share knowledge (Alavi, Kayworth, & Leidner, 2006). A positive organizational culture can generate a collaborative climate in which open communication is typical to the whole organization. Sveiby and Simons (2002) discuss that a positive organizational culture supports team work so that knowledge workers are more willing to share work experiences informally and formally within the team and help each other to learn new skills. In addition, knowledge workers' own attitude to work affect the organizational culture considerably. Within the transparent organizational culture, knowledge sharing deepens knowledge workers' own as well as their department's knowledge. Moreover, employees understand that their expertise will develop further as a result of co-operation with colleagues. New ideas and solutions can be generated by combining the existing knowledge of several knowledge workers. Management has a key role in creating and developing organizational culture. In a favourable culture, supervisors encourage knowledge workers to come up with new ideas and to innovate new solutions. The supervisors may enable the positive culture by encouraging open communication and knowledge sharing with one another, and by assuring that all the employees are kept informed. (Sveiby & Simons, 2002)

**Motivation** can be looked also as one of the key enablers of KW. Enhanced motivation, job involvement, loyalty and commitment are the key issues to contribute to work performance. Moreover, these elements have a positive impact on the actions of an entire company. (Sharabi & Harpaz, 2010). Knowledge workers, who have a high job involvement, have higher job performance, are more immersed in their job and more committed to their organization. Furthermore, these employees are typically more motivated to their work. (Diefendorff et al., 2002) Individual motivation can be classified to intrinsic and extrinsic motivation (e.g. Ardichvili, Page, & Wentling, 2003; Rossi, 2004). According to Ryan and Deci (2000) intrinsic motivation is a drive to do something that is self-rewarding, whereas extrinsic motivation is a drive to do something for external sanction. The intrinsic motivational elements facilitate knowledge sharing more effectively than the extrinsic factors (Jeon, Kim, & Koh, 2011; Vuori & Okkonen, 2012). Hence, intrinsic motivation can be argued to be more important for knowledge workers, as sharing, receiving, interpreting and utilizing knowledge is a focal part of their work (Despres & Hiltrop, 1995). Despres and Hiltrop (1995) and Ho (2009) argue that organizations should create an incentive and compensation program that affect employee motivation and contribute to individual performance: Incentives should not only emphasise the extrinsic sources of motivation, such as cash and other monetary incentives, but also the intrinsic motivation factors, e.g. autonomy, independence, personal and professional growth, recognition, appreciation and acknowledgement.

**Information and communication technology (ICT)** is naturally also a key aspect in KW, especially when looked from the viewpoint of digitalization and changing working life. Knowledge work is particularly dependent on interacting with other actors, and thus co-creation is a central determinant of knowledge work. Co-creation can take forms of one-to-one, one-to-many or many-to-many communication, and the tools to support and enhance co-creation need to take this diversity into account (Okkonen & Vuori, 2017).

ICT tools supporting KW include, for example, knowledge management systems, i.e. a combined set of different tools and technologies for knowledge management purposes (Evangelou & Karacapilidis, 2005; Offsey, 1997). Social media based tools, e.g. wikis and social networking sites, are increasingly used in KW activities (Bolisani & Scarso, 2016; Bredl, Groß, Hünninger, & Fleischer, 2015; Jackson & Klobas, 2013; Mauroner, 2016). A focal group of KW supporting ICT tools concentrate on enabling and enhancing collaboration and networking by, for example, facilitating simultaneous co-creation of documents (Hasgall & Shoham, 2007; Syed, 1998). ICT encourages the emergence of looser and more spatially distributed organizational structures, which favour networking and mobile work. According to Davis (2002) this contributes to removal of time and space constraints in communication and in doing cognitive KW, as well as improves the connection between the colleagues in the organization. Today's knowledge worker is typically deeply immersed into the digitally rich, ubiquitous work space during most of the wake hours. Technological tools enable asynchronicity, spatial dispersion and mobility, and therefore knowledge workers are not tied to a certain location and time to perform communication and collaboration activities (Davis, 2002; Okkonen & Vuori, 2017).

It even promotes polychronicity and set free from spatial restraints and enables individual work patterns and habits. Indeed, knowledge workers may work outside the office environment, still being in touch with colleagues and decision-makers. This also releases knowledge workers from performing tasks within the normal office hours and they may take an advantage of the mobile work when they actually feel productive.

These same aspects—physical work environment, organizational culture, motivation and ICT—can naturally also act as restraints to KW. For example, the changing nature of KW due to digitalization has created pressure to modify the physical work environment in the organizations. In fact, the **physical work space** is changing as blended space of virtual and physical elements. Many organizations lack the workspaces that support knowledge work efficiently. Poor physical work environment may prevent the tasks that require concentration, such as planning, thinking,

learning and analysis. Due to this problem, knowledge workers may want a different work environment for themselves. Some knowledge workers may work at home to carry out demanding and challenging tasks that require concentration and privacy. However, not every organization provides this kind of flexibility for their employees. In addition, poor meeting areas may hinder collaboration and interaction with colleagues (Peterson & Beard, 2004). This affects negatively team work performance which is an integral part of knowledge work. Interaction and distraction are stated to have the most positive and the most negative effect on knowledge work (Haynes, 2008). The office layout enables the interaction with one another but it also may cause the distractions within the organization. Hence, there exists a tension between interaction and distraction. The interaction may support ones knowledge work but at the same time it may challenge or even hinder another's work execution. (Haynes, 2008)

Riege (2005) explains that if the organizational culture is unfavourable, employees may believe that sharing knowledge could jeopardize their job security. This indicates lack of trust in people and in the organization. An unfavourable organizational culture may decrease knowledge workers' willingness to share knowledge. One element that hinders knowledge sharing in an organization is a general lack of time to share it. Moreover, employees may not even understand the value and benefits of knowledge sharing. (Riege, 2005) If an organization does not support open knowledge sharing, knowledge work actions such as learning, collaboration, analysis, knowledge acquisition and application of knowledge, employees may not understand or want to do them voluntarily. For example, learning happens often through socialization in which interaction and sharing of tacit knowledge have a fundamental role. Hence, if organizational culture does not encourage collaboration, learning process may be restrained.

**Motivation and job satisfaction** are correlated with one another (Björklund, 2010). If a knowledge worker has no purpose and lacks satisfaction to work, he/she may not be motivated to achieve the set objectives. Therefore, both collaborative and individual work may become more unattractive to carry out. According to a known relationship between autonomy, stress, control and salary, higher autonomy may increase stress and tighter control at work. Stress and tight control of work also affects negatively job satisfaction and may hinder the key knowledge work actions, such as learning and analysis. Moreover, this is mentioned to be a problem with young knowledge workers, who typically are the productive core of the entire economy (Pyöriä, 2006). Under pressure and control, they are required to perform better and better in order to receive autonomy and higher salary. This may lead to unfavourable competition between young knowledge workers. (Pyöriä, 2006)

In general, **ICT tools** have immense potential to support and enhance KW. However, regardless of all the benefits and support these tools are designed to bring to KW, they also seem to cause negative symptoms and disturbances of well-being (e.g. Mark, Iqbal, Czerwinski, & Johns, 2014; Mark, Vaida, & Cardello, 2012; Pirkkalainen, Salo, Makkonen, & Tarafdar, 2017). Digital communication is an integral component of KW (Wajcman & Rose, 2011), but at the same time the expectation of availability and the implicit pressure to reply immediately are often experienced strenuous (Barber & Santuzzi, 2015; Barley, Meyerson, & Grodal, 2011; Brown, Duck, & Jimmieson, 2014; Wajcman & Rose, 2011). For example, mobile technology tools provide access to information and contacts while a knowledge worker is working outside the office environment. While mobile devices provide ubiquitous access to information they simultaneously may cause unnecessary and unproductive interruptions (Davis, 2002) which may prevent the knowledge workers to focus on their tasks (Fischer & Otswald, 2001). In addition, there is more information available than the knowledge workers have attention to understand and apply leading to information overload, scarce attention, inability to recognize what is important (Fischer & Otswald, 2001) and consequently the reduction in productivity on both the individual and organizational levels (Ben-Arieh & Pollatscheck, 2002).

In addition, if the ICT tools are difficult to use, the knowledge workers may stay in old patterns (Pawlowski & Robey, 2004), which may hinder creating new information, delay acquiring and sharing information effectively and finally hold back analysis and application of the knowledge. There are, however, also several other aspects related to digitalization and increasing ICT that may restraint the KW in different professions, as technology can also pose barriers that hinder the flow of knowledge from source to recipient (e.g. Paulin & Suneson, 2012). One element that hinders knowledge sharing in an organization is a general lack of time to share it (Riege, 2005). That refers to cognitive facet of information ergonomics that is one of the key enablers in individual performance in KW. Mark (2015) claim that constant connectivity and “always on” mentality affect personal achievement and overall performance negatively, further causing also negative emotions (Pirkkalainen et al., 2017).

## 2.2. Knowledge intensive professions

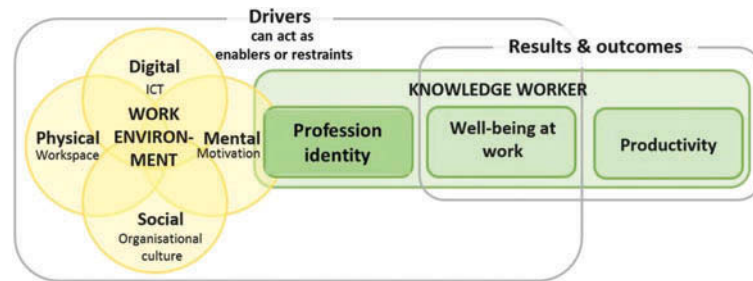
Profession can be defined as a knowledge-based occupation. Professionals use an abstract knowledge base in different tasks and situations which are determined specific for that profession (Helander, 1993). The professions were arisen gradually to the context of the university system during the middle Ages. In those days, the most important profession was the clergy, but there were also two other important professions, namely medical practice and legal profession, in the medieval university system. (Mykkänen & Koskinen, 1998) These professions were considered as older professions (Helander, 1993). Some studies argue that teaching cannot be regarded as a profession but rather a semi-profession. According to Howsam et al. (1976), the semi-professions have lower occupational status, shorter training period, they lack societal acceptance and autonomy. Furthermore, they possess a less specialized knowledge-base and skills and they do not take part in decision-making process regarding the education system (Howsam et al., 1976).

The professions can be defined with a typological and a functional definition (Helander, 1993). The typological definition refers to the theoretical knowledge-base of professionals that is achieved through several years of education, vocational training and experience. Moreover, a qualification test is required in order to perform the profession and professionals are guided by ethical codes and a set of norms. Due to the nature of the professional work, altruism is typical for professionals. In addition, professionals are usually members of professional associations. (Helander, 1993)

In addition to this typological definition, a profession can be understood by seeing the segregation of different professions and the social operating systems. Accordingly, one may talk about a profession, when it has got the well-established position, which means that it has been professionalized and the certain tasks are defined exclusive to the profession. (Erämaja, 2006) As a consequence, the medical profession has a monopoly status in health-care system whereas teaching has got a key role in the education system. Similarly, the legal profession enjoys the ruling status in the judiciary while clergy has an important role in religion. According to Erämaja (2006), professionals work typically with humanly important themes, such as illness, guilt, grief, education and guidance. In such situations, people may even become somewhat dependent on the professionals and this requires certain communication and interaction skills from professionals.

Professions gain their strong specialized knowledge-base through university education and vocational training. Furthermore, professionals continue their training after the graduation to obtain new information and to further develop their skills. In addition, ethics and standards guide the work of professionals. For example, Calman (1994) states that from the times of the Hippocratic Oath, the medical profession has related closely to ethical course of action which is one of the key features of this profession. The work ethics entails also altruism that is typical for these professions (Helander, 1993). However, the daily work of professionals can cause ethical dilemmas which are challenging to handle (Calman, 1994). These dilemmas are not decreasing while entering to the modern work environment characterized by digitalization and loads of information. In overall, work in professions is becoming more and more knowledge-intensive,

**Figure 1. Knowledge work enablers and restraints theoretical framework.**



and there is a need to understand how the professions perceive the enablers and restraints typical in knowledge work in general. In order to study these empirically, a set of variables based on the previous theory discussion is presented in Figure 1.

### 3. Research methods

The research was carried out as a multiple-case study (Yin, 1994). The purpose is to analyse and compare the enablers and restraints of KW in different professions. Four different professions were chosen as cases of the study: medical profession, clergy, legal and teaching professions. The first three represent traditional professions with high status, while the latter one is more of a semi-profession. The selection of professions was driven by the objective to have different professions as case units for the analysis, but still to have professions that have certain similarities, such as customer involvement and ethical code of the profession, to enable case comparisons. The representatives of these professions are working daily with one or more people and their work is closely related to the different phases of the human life. Especially, lawyers, pastors and physicians work often privately with people but they may also carry out the tasks among a larger group of people. Teachers, in turn, work typically with several people or with groups. However, their work contains also working in solitude. Each of these professions has been given an exclusive right to perform the certain tasks and to make independent decisions in their work. In addition, they have an authoritative position over their customers and other occupational groups. (Calman, 1994; Hargreaves and Fullan, 2012; Suhonen, 2009)

The empirical data was gathered with unstructured interviews using a narrative interview method. Questions were open so that the situations were similar to a discussion. The interviewer posed further questions to deeper the interviewee's answers and to build the continuity of the interview upon them. Using the narrative interview method was that the researcher tried not to influence or led the interviewee to a significant extent. In this way it was possible to verify which of the aiding and hindering elements discussed in the theoretical part appeared in the interviews and how significant they were seen by the professionals but even more importantly the unstructured interview method helped to point out completely new aspects enabling or restricting the knowledge work of chosen professions. The knowledge workers were interviewed individually.

In the interviews, the narratives were based, on one hand, on the knowledge workers' education and work background and, on the other hand, on their present work. In addition, the interviewees were asked to describe widely the positive and the negative aspect of their work. The idea in the questions is to explain concretely what happened, for example, yesterday during the working day and not to ask directly the participants to describe their average working day. Seidman (2006) discusses that this kind of method, targeted at particular aspects, leads more likely to valuable interview data. The further specified questions are related to possible knowledge work enablers and challenges. The questions, which were used as a basis for the interviews, were as following:

1. Describe your education and career path?
2. Describe a typical working day and describe one working day from this week?

3. Describe what kind of knowledge and skills you need in your work?
4. Describe what things are going well in your work and why.?
5. Describe what is particularly challenging in your work and why?

There were four interviewees from each profession so the total number of interviewees was 16. The interviewees from the teacher's profession consist of two principals and two subject teachers. The principals do also teaching to some extent. Three of them were working in primary school and one of the interviewees was working upper comprehensive school. All of them were working in a public school. The principals' work consist more of administrative and managerial work so they have somewhat different perspective in the interviews than the subject teachers have. This, however, offers a versatile aspect on the teachers' work as well as to its enablers and challenges. The interviewed physicians consist of specialist in general medicine, company physician and two registrars in anaesthesiology and plastic surgery. One of them works in private organization and the others work in a public health centre or in a hospital. Therefore, the spectrum of the physicians is diverse. The interviewed lawyers represent public and private firms. Three of the interviewed lawyers have a lot of managerial duties in their work since they are in a leading position in the company. The pastors that were interviewed are working as parish pastors, chaplain or in a private organization. Three of the pastors have also managerial tasks and two of them are vicars in the parishes. The interviews lasted approximately 60–90 min.

The empirical data was analysed inductively with Atlas.ti software. The analysis was based on the interpretation and reasoning in which the process began from classifying the empirical data and proceeded towards a more theoretical and conceptual perception of the research phenomenon. The purpose was to understand the concepts that were meaningful for the research phenomena and in the end of analysis process new categories and concepts could be formed. First, the interview results were grouped by the professions in order to depict the main enablers and restraints of the knowledge work of the different professions. In this way, it was also seen which elements were common or divergent in different professions. After that, the empirical results could be compared with the elements discussed in the theoretical part of the study. In addition, the empirical results could be analysed in relation to the knowledge work actions presented in the theoretical part of the study.

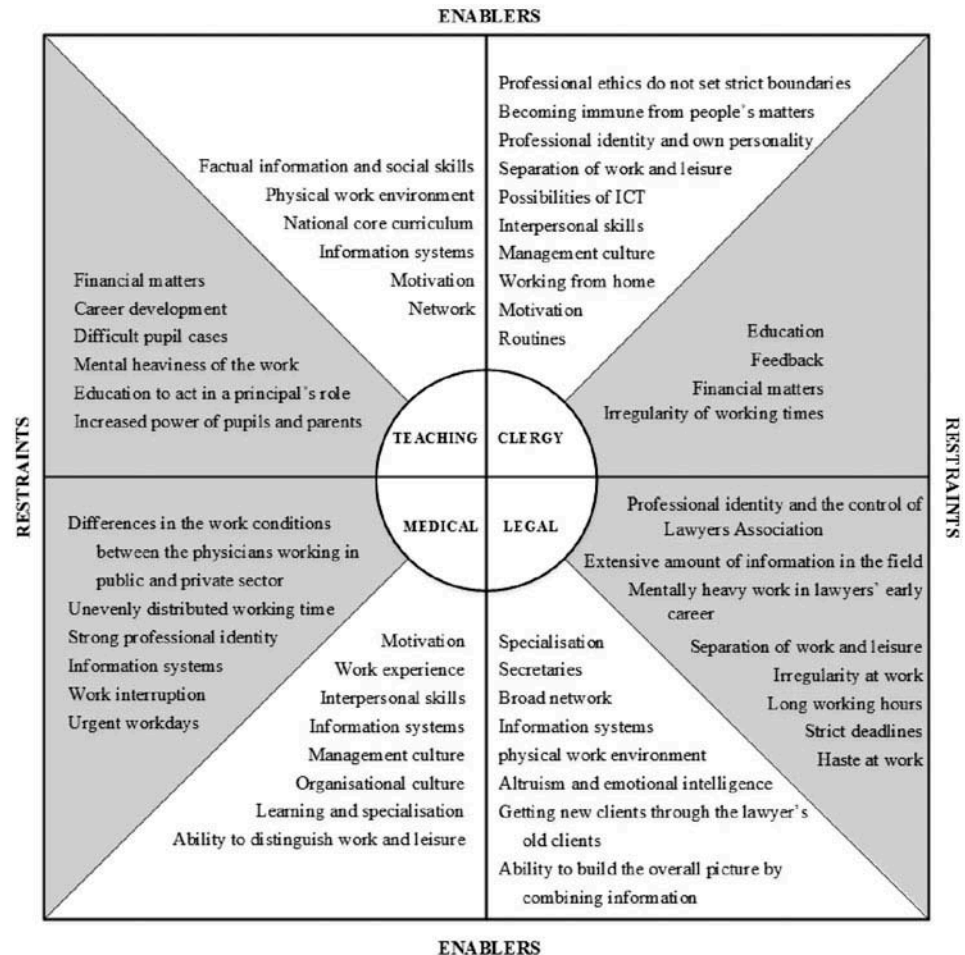
#### 4. Empirical findings

Various points were brought about in the narrative interviews that were conducted among teachers, doctors, lawyers and pastors regarding their work and the positive and negative aspects of it. As a result of the empirical analysis, a summary of the key enablers and restraints in the chosen professions is presented in Figure 2.

As Figure 2 depicts, most of the supporters in teaching profession, such as factual information and social skills, facilitate teaching and getting along with pupils. Moreover, some of the enablers, e.g. network and work environment, affect the information sharing among teachers and contribute to teachers' job satisfaction. The main restraints are particularly related to difficult pupils and their parents, which cause stress and affect negatively the well-being at work. The following extract gives an illustration of these challenges:

*Nowadays, the pupils and students are well aware of their rights, but it is rarely remembered that there are also obligations. It seems that the parents know this too. They are quick to criticize the school's and teachers' work and to provide advice to the teacher. Such a phenomenon has increased in recently. Therefore, I must say that I have been thinking how I can do my work and act on the lessons without getting conflict with the pupils' and students' parents. (Teacher 4)*

**Figure 2. Summary of the key enablers and restraints in the chosen professions.**



Even though information systems were seen as one of the knowledge work enablers among teachers, the digitalization of work in more general terms was seen also as a restraint, as the following quote illustrates:

*Information technology has increased its role significantly in good and bad. Earlier, the things were sent via post and we had more time to respond them. Today, these same things are sent by email and they must be treated within hours. Since everything has to be done quickly and effectively, I think that the quality of work may suffer a bit. Information technology facilitates, however, the knowledge sharing. I do not have to remember to tell the things separately when I have sent them directly by email. We are going to work in the paperless office in the future. I use already less paper than before. (Teacher 1)*

*If I do the budget, I must turn my phone to silent mode and close my door. Moreover, when I do the timetables, I inform the others that I am two days off the school. In practice, I however work normally. During these two days home is the best place to focus and then I have time to do the work in privacy. Also, the teachers do not have here a proper workspace which let them work in privacy. We have here an office but not the private workstations. This has been a problem for the teachers but we have acquired the laptops and phones for them, so they work at their classrooms or wherever since we have wireless connections. (Teacher 1)*

In medical profession, the enablers help the physicians in their daily patient work and in coping with patients. For example, information systems provide patients' data, X-ray pictures and

laboratory test results quickly. Physicians feel that the ability and desire to learn is essential in their work because of themselves but also for the patients' sake. The following extract depicts how autonomy and organizational culture supports a doctor's work as a professional:

*This is a typical professional firm. Hence, we are given a lot of responsibility and autonomy and at the same time the supervisor supports our work. The employees really enjoy working here.*  
(Physician 1)

The major challenges in the medical profession are related to the heavy workload, long working hours and interruptions in the patient work, but also to physical premises and devices:

*I do not have my own workstation. We have the office for the registrars where we have computers but the workspace is too small and we have too few computers. The office would need to be bigger and better-equipped. I do not wish to get an actual office just for myself but I hope that our common office would have more space and computers for everyone. We need the computer all the time.* (Physician 3)

As for the legal professions, the key supporters are altruism and emotional intelligence, specialization, the ability to build the overall picture by combining information, the physical work environment, information systems, the secretaries, broad network and receiving new clients through the lawyer's old clients. These enablers allow lawyers to work for the customer's best and to develop their own competence. According to some of the interviewed lawyers, financial aspects were shown in lawyers' work so that they were not able to take a client case into treatment if it was not financially viable. This created contradictions between professional values and organizational values. Moreover, there are various elements, such as strict deadlines, irregularity at work and long working hours that cause stress, pressure and haste at work as depicted in the following extract:

*As a negative issue, I consider the fact that the workload is too heavy and more and more cases are coming all the time. When I have a lot work, I really need to stretch to my limit. The fair amount of work is just a wish. Sometimes the lawyer is close to burnout.* (Lawyer 4)

In pastors' work, enablers like interpersonal skills, professional identity and own personality, help the pastors to act with people. Moreover, some factors, such as the separation of work and leisure time and becoming immune to people's personal matters, support the pastors to cope with their heavy workload. Most of the hindering aspects in pastors' work are typically related to interaction with the people. However, some of these aspects were considered as enablers since it is essential that the pastors overcome the challenges of interaction with people. Some of the restraints that are related to pastors' work may also impair the atmosphere at the workplace. The following extract illustrates how interaction with people is an important part of the profession:

*Communication skills play an absolute role in this work. In general, agreeing, talking and negotiating with the people must be handled in this work. It is all the same, how well you know the Bible. If you are unable to communicate with people, you cannot work in this field. It is also important that the pastor is able to be silent in right situation.* (Pastor 2)

When it comes to the use of information systems, the pastors were pointing out that they use computers also at home to facilitate their work as they do not need to wait for the inspiration to come only at the office:

*Sometimes I can work from home. For example, I might write speeches at home with my computer. I do not necessarily have an inspiration during the daily working hours so I may then write a speech at the evening or in the weekend. The time used for the preparation work I am able to reduce from the office working time.* (Pastor 2)

## 5. Discussion

The empirical research results show that there are a lot of similarities in the enablers and restraints of KW in different professions. They have either a positive or negative impact on the performance of the KW actions, such as information acquisition, dissemination, interpretation and communication. For example, ICT and information systems aid the teachers', physicians', lawyers' and pastors' work. They facilitate particularly the information acquisition and communication. Teachers and pastors seem to use information technology in a very innovative way to support teaching and communicating with the parishioners. The information technology also allows work from home, particularly for pastors. On the other hand, as the physicians' work is greatly dependent on the information technology, the non-functioning information systems cause one of the major challenges in their work. Additionally, the lawyers feel that they are increasingly forced to work from home with mobile technology. In the lawyers' work, the boundary between work and leisure time becomes blurred since they often must work on weekends and holidays. Constant connectivity distracts distinction between work and leisure.

ICT act as a major enabler of the work to most professions. According to earlier research (Bosch-Sijtsema et al., 2009; Holsapple & Jones, 2004; Reinhardt et al., 2011), a knowledge worker may acquire, disseminate, store and interpret the information, also these actions the interviewees said they did with ICT. Hence, it can be proposed that information technology help the professions to perform the knowledge work actions.

The empirical analysis indicated that profession benefit from the broad network, especially in teaching and legal profession. For teachers and lawyers, the network acts as a channel for disseminating and obtaining information. In addition to these characteristics, lawyers may get job offerings through their networks. All the discussed professions need social skills in their work. They are constantly dealing with people and therefore they need to have an ability to communicate. Interviewed professionals expressed that the interpersonal skills are the ones that develop the most through work experience. Communication consisting of information sharing and combining knowledge is one of the KW actions described (see e.g. Reinhardt et al., 2011). This action was and its significance was indicated most in the interviews.

In addition to social skills, a positive work environment is essential for all the professions. The work environment helps to enhance well-being at work. Organizational culture enhances the positive work environment and supports the autonomous work of professionals, especially in medical profession. Autonomy is one of the typical elements defining a profession in general. For all the professions, the separation of work and leisure time was important but it was highlighted in the case of physicians and the pastors. The lawyers, in turn, had difficulties in distinguishing the work and leisure time. Becoming immune to difficult things aids the teachers', physicians', lawyers' and pastors' work and helps them to handle the heavy circumstances more comprehensively. This ability is increased through work experience. However, young lawyers had difficulties with externalizing themselves from people's human matters.

Routines support especially pastors' work. For example, a pastor can prepare the speeches quicker and to deliver the services more naturally by following certain routines. Work experience helped the physicians to do improve their patient work and to avoid the stress better. Secretaries facilitate lawyers' work as they do the administrative tasks and, thus, release the professionals to perform their core work.

The large amount of information is a challenge for some professions as it may make it difficult to combine and internalise information. Especially, the legal and medical professionals expressed a need to be aware of the changes and updates of the knowledge in the field. For lawyers, the extensive amount of information is relatively challenging to handle since the theoretical knowledge must be applied to practice. Moreover, the extensive amount of information requires especially the lawyers and the physicians to specialize in a particular sector of expertise. However,

specialization can also act as a motivator for these professionals. In addition, almost all the professionals felt that they need information from other fields and the ability to combine information. For example, teachers need legal information, and lawyers must be aware of marketing and human resource management. According to earlier research (Fischer & Otswald, 2001), the large amount of information may cause difficulties in finding the right information from various sources. Even though lawyers and physicians mentioned this as a hindrance, they also considered learning and information gathering as a motivational aspect in their work.

The autonomy and privacy are essential for knowledge workers to perform their tasks. For example, planning and thinking are KW actions that require concentration and help the knowledge workers to maintain the cognitive flow and concentration (Heerwagen et al., 2004). In the empirical part of the study it was seen that the physical work environment seemed to be particularly important for physicians and teachers. A good location of an office can help a lawyer to make contacts and meet the clients. Physicians may, however, consider the physical environment as a challenge in their work, as lack of space may harm their daily patient work. According to literature (Haynes, 2008; Heerwagen et al., 2004), physical work environment can be seen both as an aid and a hindrance of KW. Our research shows that teachers value the physical work environment that supports autonomy while lawyers emphasized also the interactive workspaces. The office layout and distraction are however significant challenges in physicians' work.

The research also indicates that there are various elements that motivate professionals in their work. While the motivating elements vary across individuals, they support and enable the best work performance and help the professionals to cope with their work. In literature (Rossi, 2004), motivation is divided into intrinsic and extrinsic aspects. In the case of professional KW, the intrinsic motivational factors were highlighted. Motivation was most commonly related to the autonomy at work, independence, personal or professional growth as well as appreciation.

In some cases, other people, such as pupils and their parents, patients, clients and parishioners, seem to have a somewhat negative impact on professionals. Pupils and their parents have got increased power in relation to teachers. Patients', clients' and parishioners' problematic matters cause stress and heavy workload for physicians, lawyers and pastors. The most critical challenge of the professional knowledge work, however, seems to be the mental load of the work. Haste at work and long working hours are significant challenges especially in the work of physicians, pastors and lawyers. These elements cause stress and pressure for the professionals and increase further the mental workload. If the professions choose not to work long hours, they felt they were working against their professional values.

Receiving feedback seems to be a problem for the pastors, as in some cases, the pastors find it difficult to get feedback. Indeed, they are often required to read the feedback from people's faces. Moreover, when they possibly get negative feedback, it is actually addressed to the Church. Financial matters complicate teachers' and pastors' work. Lack of money has a negative impact particularly on the physical work environment and it increases workload. For example, teachers must teach increasingly larger groups and the parishes need to rely on the volunteers' help since they cannot afford to open and fill the posts.

Across all cases, professional ethics rose strongly in the interviews even though it was not in the centre of the research. This is understandable when talking about professions: ethics is inseparable from the professional work. When professionals describe their work, ethics seem to give the frames for their core work. While ethics explains the existence of the professions it can also cause challenges to professional work. For example, some lawyers explained that they have to refuse from client cases if they do not meet the organization's financial objectives. Thus, there may be contradictions between the professional values and organization's managerial values. Managerial values such as productivity and effectiveness may prevent the professionals to act in accordance with their professional ethics.

In addition to the previously discussed similarities in the enablers and restraints in the KW of different professions, the interviews also raised some special features that facilitated or hindered KW in the chosen professions. These elements were unique to each profession as the supporters and the restraints vary between different professions.

The core work of the professionals consists of KW actions, such as information acquisition, dissemination, creation and communication, while the well-being at the work and coping with the heavy workload have an indirect effect on the KW actions. The restraints were associated with the professionals' core work as well as well-being at work but in a negative way. Thus, challenges were considered as the elements that hindered the professionals to carry out their core work such as taking care of patients properly. Additionally, restraints are seen as a reason for the heavy workload causing pressure for the professionals.

For example, the national core curriculum sets the framework for teaching and, thus, clarifies the work of a teacher. Furthermore, not only the difficult pupils but also the parents hinder significantly the teachers' work. Also, teachers' career development turned out to be contradictory. A permanent position is a safe option but there are very few of them available. Regarding physicians, there is a clear difference between working in the public sector and working in the private sector, which creates divergent views among the professionals depending on where the physician is working. For example, the physicians who worked in public sector did not indicate the physical work environment as a positive aspect enabling their work. They described that the public hospitals and health centres in which they worked were physically worn-out, old and there were a shortage of space. Moreover, the strong professional identity of physicians hinders the separation of work and leisure time and affects other people and their behaviour in an unwanted manner.

Lawyers typically receive new clients through their old clients. In such cases, new clients may already know the lawyer's working methods as marketing of the lawyer's services happens conveniently by word of mouth. This helps lawyers to handle client cases. Lawyers' work is largely controlled by strict deadlines, which causes stress and haste at work and eats lawyers' resources. The Lawyers Association controls the lawyers' appropriate behaviour and level of know-how and guides lawyers' professional ethics.

## 6. Conclusions

The purpose of this article was to analyse and compare the elements that either enable or restrain knowledge work in four different professions, and further, to discuss the effect of these identified elements on work performance within the studied professions. In the theoretical part of the study four main elements—physical work environment, organizational culture, motivation and information technology—were discussed as enablers and restraints of knowledge work. They have either a positive or negative effect on the performance of knowledge work actions. As a result of the study, it was seen that there are a lot of similar elements that support or hinder the knowledge work of chosen professions. The supporters were typically the elements that facilitate the professionals' core work, such as teaching or handling the legal cases. In addition, the enablers that were mentioned by the interviewees helped the professionals to cope with their work pressure, handle the stress and cope with the heavy workload. Indeed, the aides were strongly related to the well-being at work. The core work of the professionals consists of knowledge work actions, such as information acquisition, dissemination, creation and communication, while the well-being at the work and coping with the heavy workload have an indirect effect on the knowledge work actions and further, in work performance. The restraints were associated with the professionals' core work as well as well-being at work but in a negative way. Thus, challenges were considered as the elements that hindered the professionals to carry out their core work such as taking care of patients properly. Additionally, hindrances are seen as a reason for the heavy workload causing pressure for the professionals.

It seems that the KW enablers aid more the core KW of the professionals while the restraints are more commonly related to the well-being, stress and pressure at work. Factors affecting the core work and well-being at work were linked with one another to some extent. For many professionals, the factors causing stress and pressure had an indirect impact on their core work. This was seen, for example, in the teachers' work as the teachers need to consider their performance nowadays more carefully because of the increased power of pupils and their parents. At the same time, this aspect causes stress for the teachers. If the core work is made difficult, it can increase the pressure at work. On the other hand, having an appropriate framework for pursuing the profession in terms of organizational culture, motivation and support received from colleagues facilitates the core work.

The conducted case study raised lot of new elements that can act as enablers or restraints of the KW in the chosen professions. These elements similarly affected the professionals' core KW as well as the well-being at work either positively or negatively. However, they were emphasized and raised because they were closely connected to the special features of the different professions. These characteristics were specific to each profession and showed that the enablers and the restraints in the different professions cannot be completely the same. Therefore, a general and comprehensive model to support the KW in different professions is relatively difficult to create as the special aspects of each profession could not be taken into account, and therefore this is a limitation.

Key implications regarding knowledge work are about performance. There seems to be three main categories of performance. The first category is individual performance supported by individual knowledge, skills and working habits. The second performance category is about organization supported by explicit operation procedures and socially constructed conventions. The third performance category is about social capital in sense of recognition of peers and key stakeholders in working domain. These categories are not exhaustive, yet as a conclusion of enablers and restraints they bring about the key issues related to knowledge work in general, and professional perspectives of knowledge work in that context. These implications have only limited direct transferability, since each professional builds own unique realm of work.

The results implicate that more attention should be paid on managerial practices in knowledge work organization. Planning sociotechnical work environment is the key, since asynchronicity and spatial dispersion of work require more working via digital platforms or using communication tools. This is in close relation to ergonomics of knowledge work, i.e. how infrastructure is set, how working is explicitly instructed, and how working conventions dictate work flow and conducting the tasks. As brought about only part of issues could be planned, since conventions are dependent on the whole realm of work as well as conventions are result of individual development through the career.

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#### References

- Abbott, A. (2014). *The system of professions: An essay on the division of expert labor*. London: University of Chicago Press.
- Alavi, M., Kayworth, T. R., & Leidner, D. E. (2006). An empirical examination of the influence of organizational culture on knowledge management practices. *Journal of Management Information Systems*, 22(3), 191–224.
- Alvesson, M. (2001). Knowledge work: Ambiguity, image and identity. *Human Relations*, 54(7), 863–886. doi:[10.1177/0018726701547004](https://doi.org/10.1177/0018726701547004)
- Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*, 7(1), 64–77. doi:[10.1108/13673270310463626](https://doi.org/10.1108/13673270310463626)
- Barber, L. K., & Santuzzi, A. M. (2015). Please respond ASAP: Workplace telepressure and employee recovery. *Journal of Occupational Health Psychology*, 20(2), 172. doi:[10.1037/a0038278](https://doi.org/10.1037/a0038278)

- Barley, S. R., Meyerson, D. E., & Grodal, S. (2011). Email as a source and symbol of stress. *Organization Science*, 22(4), 887–906. doi:10.1287/orsc.1100.0573
- Ben-Arieh, D., & Pollatscheck, M. A. (2002). Analysis of information flow in hierarchical organizations. *International Journal of Production Research*, 40(15), 3561–3573. doi:10.1080/00207540210137611
- Björklund, T. A. (2010). Enhancing creative knowledge-work: Challenges and points of leverage. *International Journal of Managing Projects in Business*, 3(3), 517–525. doi:10.1108/17538371011056110
- Blackler, F. (1995). Knowledge, knowledge work and organizations: An overview and interpretation. *Organization Studies*, 16(6), 1021–1046. doi:10.1177/017084069501600605
- Bolisani, E., & Scarso, E. (2016). Factors affecting the use of wiki to manage knowledge in a small company. *Journal of Knowledge Management*, 20(3), 423–443. doi:10.1108/JKM-05-2015-0205
- Bosch-Sijtsema, P., & Postma, T. (2010). Governance factors enabling knowledge transfer in interorganizational development projects. *Technology Analysis and Strategic Management*, 22(5), 593–608.
- Bosch-Sijtsema, P. M., Ruohomäki, V., & Vartiainen, M. (2009). Knowledge work productivity in distributed teams. *Journal of Knowledge Management*, 13(6), 533–546. doi:10.1108/13673270910997178
- Brante, T. (2013). The professional landscape: The historical development of professions in Sweden. *Professions and Professionalism*, 3(2), 1–18. doi:10.7577/pp.558
- Bredl, K., Groß, A., Hünig, J., & Fleischer, J. (2015). The avatar as a knowledge worker? How immersive 3D virtual environments may foster knowledge acquisition. *Leading Issues in Knowledge Management*, 2(2), 222.
- Brown, R., Duck, J., & Jimmieson, N. (2014). E-mail in the workplace: The role of stress appraisals and normative response pressure in the relationship between e-mail stressors and employee strain. *International Journal of Stress Management*, 21(4), 325–347. doi:10.1037/a0037464
- Calman, K. (1994). The profession of medicine. *BMJ*: *British Medical Journal*, 309(6962), 1140–1143. doi:10.1136/bmj.309.6962.1140
- Cruess, S. R., Johnston, S., & Cruess, R. L. (2002). Professionalism for medicine: Opportunities and obligations. *Medical Journal of Australia*, 177(4), 208–211.
- Davis, G. B. (2002). Anytime/anyplace computing and the future of knowledge work. *Communications of the ACM*, 45(12), 67–73. doi:10.1145/585597.585617
- De Long, D. (1997). Building the knowledge-based organization: How culture drives knowledge behaviors. *Ernst & Young Center for Business Innovation, Working Paper*, Boston. Retrieved from [http://www.providersedge.com/docs/km\\_articles/Building\\_the\\_Knowledge-Based\\_Organization.pdf](http://www.providersedge.com/docs/km_articles/Building_the_Knowledge-Based_Organization.pdf).
- Despres, C., & Hiltrop, J.-M. (1995). Human resource management in the knowledge age: Current practice and perspectives on the future. *Employee Relations*, 17(1), 9–23. doi:10.1108/01425459510146652
- Diefendorff, J. M., Brown, D. J., Kamin, A. M., & Lord, R. G. (2002). Examining the roles of job involvement and work centrality in predicting organizational citizenship behaviors and job performance. *Journal of Organizational Behavior*, 23(1), 93–108. doi:10.1002/(ISSN)1099-1379
- Drucker, P. F. (1999). Knowledge-worker productivity: The biggest challenge. *California Management Review*, 41(2), 79–94. doi:10.2307/41165987
- Efimova, L. (2004). *Discovering the iceberg of knowledge work: A weblog case. Proceedings of the fifth european conference on Organisational Knowledge, Learning and Capabilities (OKLC 2004)*, April 2.
- Erämaja, T. (2006). Viimeinen matka: Toimintatutkimus kirjallisen hautauskentän professiostruktuurista. Retrieved from <https://www.doria.fi/handle/10024/3032>
- Evangeliou, C., & Karacapilidis, N. (2005). On the interaction between humans and knowledge management systems: A framework of knowledge sharing catalysts. *Knowledge Management Research & Practice*, 3(4), 253–261. doi:10.1057/palgrave.kmrp.8500076
- Fischer, G., & Otswald, J. (2001). Knowledge management: Problems, promises, realities, and challenges. *Intelligent Systems, IEEE*, 16(1), 60–72. doi:10.1109/5254.912386
- Franssila, H., Okkonen, J., & Savolainen, R. (2015). Developing measures for information ergonomics in knowledge work. *Ergonomics*, 58, 1–14. doi:10.1080/00140139.2014.956151
- Hasgall, A., & Shoham, S. (2007). Digital social network technology and the complex organizational systems. *VINE*, 37(2), 180–191. doi:10.1108/03055720710759955
- Haynes, B. P. (2008). An evaluation of the impact of the office environment on productivity. *Facilities*, 26(5/6), 178–195. doi:10.1108/02632770810864970
- Heerwagen, J. H., Kampschroer, K., Powell, K. M., & Loftness, V. (2004). Collaborative knowledge work environments. *Building Research & Information*, 32(6), 510–528. doi:10.1080/09613210412331313025
- Helander, V. (1993). *Professiot ja julkisvalta*. Helsinki: Painatuskeskus.
- Ho, C.-T. (2009). The relationship between knowledge management enablers and performance. *Industrial Management & Data Systems*, 109(1), 98–117. doi:10.1108/02635570910926618
- Holsapple, C. W., & Jones, K. (2004). Exploring primary activities of the knowledge chain. *Knowledge and Process Management*, 11(3), 155–174. doi:10.1002/(ISSN)1099-1441
- Howsam, R. B., Corrigan, D. C., Denemark, G. W., & Nash, R. J. (1976). Educating a profession. Retrieved from <http://eric.ed.gov/ERICWebPortal/recordDetail?accno=ED117053>.
- Jackson, P., & Klobas, J. (2013). Deciding to use an enterprise wiki: The role of social institutions and scripts. *Knowledge Management Research & Practice*, 11(4), 323–333. doi:10.1057/kmrp.2012.20
- Jeon, S., Kim, Y.-G., & Koh, J. (2011). An integrative model for knowledge sharing in communities-of-practice. *Journal of Knowledge Management*, 15(2), 251–269. doi:10.1108/1367327111119682
- Mark, G. (2015). Multitasking in the digital age. In J. M. Carroll (Ed.), *Multitasking in synthesis lectures on human-centered informatics* (Vol. 8, No. 3, pp.1–113). Morgan Claypool, Williston, VT. Retrieved from <https://www.morganclaypool.com/>
- Mark, G., Iqbal, S. T., Czerwinski, M., & Johns, P., (2014). *Bored Mondays and Focused Afternoons: The rhythm of attention and online activity in the workplace. Proceedings of the CHI 2014, April 26 - May 1 2014, Toronto, Canada*, (pp. 3025–3034), New York, NY: ACM.
- Mark, G., Voids, S., & Cardello, A. (2012). *A pace not dictated by electrons: An empirical study of work without email. Proceedings from SIGCHI '12: Conference on human factors in computing systems* (pp. 555–564). Austin, TX: ACM.
- Mauroner, O. (2016). Social media for the purpose of knowledge creation and creativity management—a study of knowledge workers in Germany.

- International Journal of Learning and Intellectual Capital*, 13(2–3), 167–183. doi:10.1504/IJLIC.2016.075694
- Mykkänen, J., & Koskinen, I. (Eds.). (1998). *Asiantuntemuksen politiikka professorit ja julkisvalta Suomessa*. Helsinki: Yliopistopaino.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York: Oxford university press.
- Offsey, S. (1997). Knowledge management: Linking people to knowledge for bottom line results. *Journal of Knowledge Management*, 1(2), 113–122. doi:10.1108/EUM0000000004586
- Okkonen, J. (2009). *Measuring knowledge work performance, practical implications*. Riga: Lambert Academic Publishing.
- Okkonen, J., & Vuori, V. (2017). *Perspectives on tools and applications supporting co-creation in knowledge work. Proceedings of international forum on knowledge asset dynamics 2017* (pp. 369–376). London.
- Paulin, D., & Suneson, K. (2012). Knowledge transfer, knowledge sharing and knowledge barriers—Three blurry terms in KM. *Electronic Journal of Knowledge Management*, 10(1), 81–91.
- Pawlowski, S. D., & Robey, D. (2004). Bridging user organizations: Knowledge brokering and the work of information technology professionals. *MIS Quarterly*, 28(4), 645–672. doi:10.2307/25148658
- Peterson, T. O., & Beard, J. W. (2004). Workspace technology's impact on individual privacy and team interaction. *Team Performance Management*, 10(7/8), 163–172. doi:10.1108/13527590410569887
- Pirkkalainen, H., Salo, M., Makkonen, M., & Tarafdar, M. (2017). *Coping with technostress: When emotional responses fail. ICIS 2017: Proceedings the 38th international conference on information systems* (pp. 1–17). Association for Information Systems (AIS).
- Pyöriä, P. (2006). *Understanding work in the age of information. Finland in focus*. Tampere: Acta Universitatis Tampensis; 518. Tampere University Press.
- Reinhardt, W., Schmidt, B., Sloep, P., & Drachsler, H. (2011). Knowledge worker roles and actions—Results of Two empirical studies. *Knowledge and Process Management*, 18(3), 150–174. doi:10.1002/kpm.v18.3
- Riege, A. (2005). Three-dozen knowledge-sharing barriers managers must consider. *Journal of Knowledge Management*, 9(3), 18–35. doi:10.1108/13673270510602746
- Rossi, M. A. (2004). Decoding the “Free/open Source (F/OSS) Software Puzzle”, a survey of theoretical and empirical contributions. Retrieved from <http://flossshub.org/system/files/rossi.pdf>
- Ruggles, R. (1998). The state of the notion. *California Management Review*, 40(3), 80–89. doi:10.2307/41165944
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–56. doi:10.1006/ceps.1999.1020
- Seidman, I. (2006). *Interviewing as qualitative research: A guide for researchers in education and the social sciences*. New York and London: Teachers College, Columbia University.
- Sharabi, M., & Harpaz, I. (2010). Improving employees' work centrality improves organizational performance: Work events and work centrality relationships. *Human Resource Development International*, 13(4), 379–392. doi:10.1080/13678868.2010.501960
- Sveiby, K. E., & Simons, R. (2002). Collaborative climate and effectiveness of knowledge work—An empirical study. *Journal of Knowledge Management*, 6(5), 420–433. doi:10.1108/13673270210450388
- Syed, J. R. (1998). An adaptive framework for knowledge work. *Journal of Knowledge Management*, 2(2), 59–69. doi:10.1108/13673279810249440
- Vuori, V., & Okkonen, J. (2012). Knowledge sharing motivational factors of using an intra-organizational social media platform. *Journal of Knowledge Management*, 16(4), 592–603. doi:10.1108/13673271211246167
- Wajcman, J., & Rose, E. (2011). Constant connectivity: Rethinking interruptions at work. *Organization Studies*, 32(7), 941–961. doi:10.1177/0170840611410829
- Yin, R. K. (1994). *Case study research*. Thousand Oaks: Design and Methods, Sage Publications.



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