

LAB University of Applied Sciences
Faculty of Business Administration, Lappeenranta
Master's Degree Programme in International Business Management

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Organizational knowledge sharing in digital era

Thesis 2020

Abstract

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The focus of this thesis is to analyse knowledge sharing practices between Finnish software-companies. This study provides valuable updated information about the current situation in such companies, their related problems, common recommendations and future suggestions. In more general, this study contributes in narrowing the knowledge gap in knowledge creation and sharing practices.

Theoretical part of this thesis introduces theory of knowledge creation and sharing. The new empirical data was collected through online interviews. By understanding current situation, related problems, common solutions and best practices, it is possible to create practical development advices. Previous empirical research has been included in this study.

Based on the main findings of this study, it can be stated that communication and collaboration skills have great influence on organizational learning process even in highly digitalized working environment. An ability to search and manage information individually provides additional benefits for knowledge creation practices.

Keywords: digitalization, digital competence, organizational learning

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1 Introduction

1.1 Background of the study

Twenty-first century is characterized by globalization and rapidly changing environment. Geographical division of labour becomes a norm. Manufacturing and administrative assistance offices are sent to the countries with recently evolving industrial capabilities, whereas knowledge-based services are moved to more developed countries. In order to succeed, a company must adopt good practices of knowledge creating and sharing. Effective and efficient knowledge management adds significant competitive advantage, for example coping with fast changes, reducing unnecessary complexity of the operations and overlays in working process, increasing profitability by managing inefficiency. Successful implementation of intellectual capital and well-organized knowledge sharing of best practices are important for today's business environment. (Ichijo, Nonaka & Nonaka 2006, pp 3-4.) As the world becomes more and more interconnected and digitalized, the importance of successful information sharing and learning online is rising. It can be reached with sufficient digital competence and good knowledge sharing practices.

The COVID-19 pandemic has emphasized the necessity of digital assets for our economies. Existing networks, connectivity, digital skills and computer technologies have allowed the continuation of working life for many people in the middle of the crisis. To support health systems, Member states of the European Union have taken instant actions to minimize the spread of the virus. Suitable applications and online platforms were developed to assist telemedicine and synchronize health resources. Digitization stepped up in several areas, including e-commerce, remote work, online coaching and learning, as well as in digital public services. Advanced computer technologies stimulated research works of the scientists. Certain actions had to be taken to assist digital infrastructure facing forced growth in demand, including prioritizing of cyber security. Current crisis has proved that basic digital skills needed for using internet services and accessing information online are important for the whole population. (DESI 2020, pp.10-12.)

1.2 Research objectives and questions

Successful knowledge creation and sharing providing competitive advantage for companies is an important subject for today's business processes in the digitalized world. Juvonen (2005) in his qualitative study of forest industry software enterprises in South-East Finland described and characterized common properties for 10 local small and middle-sized software firms. Those companies were divided into three different types: collector, specializer and anticipator. Results of this study provided practical development suggestions for these local enterprises. His study (Juvonen 2005) has shown that small and middle-sized software suppliers are facing constant problems in sharing their expertise. The group works were usually neglected due to high risks of competition and lack of tools and opportunities for knowledge distribution. Even though companies were interested in teamworking, some doubts were raised whether appropriately strong front man to lead the network process could be found. (Juvonen 2005, p.107.)

The purpose of this thesis work is to study knowledge sharing practices between software-companies. The interest of this thesis work is to discover how the competence in organizations is created and how professional skills and experiences are shared. This study aims to discover how learning happens in digitalized working environment, what kind of competences are needed for knowledge sharing in digitally oriented organization and are there any similarities or challenges between the companies.

Finnish IT-companies are seen to be the most suitable research group, as they are already working in digital world and have faced problems in networking and knowledge sharing before, as shown in the study of Juvonen (2005). It is necessary to remember, that after 2005 the technology has changed dramatically. For example, iPhone release in 2007 has been a remarkable step forward for mobile phone industry, software development and communication styles. The way people share information has changed significantly. Technical limitations should not be an issue for communication and information sharing practices between IT-companies anymore. This thesis aims to increase the understanding whether the co-operation willingness between software enterprises increased and if

knowledge sharing processes between those companies has changed over the years.

Rapid development of informational technology make the world more and more data driven. From this point of view proposed thesis topic is very up-to-date and demonstrates developing contribution into current working life. Based on the research goals, the main research question is:

How to support organizational learning in digital era?

Within the content of this thesis work, the following sub questions are:

1. Can organizational learning be improved by digital competence?
2. How do employees gain knowledge and share learning experiences?
3. How does digital learning effect people's lives and company's development?

1.3 Delimitations and scope of the study

The limitations of the theoretical part of the thesis are made in organizational knowledge and learning areas. Knowledge management is excluded from the theoretical part, as it is not considered to be directly in the interest of the study. However, it could be potential subject for the following research work. Knowledge types and basis of knowledge creation process are covered in this study. This topic is related and important for the organizational learning processes. This thesis is concentrating mostly on knowledge creating and sharing, therefore there is no information on effective teamwork nor leadership methods.

The empirical analysis of the study is limited to a certain degree as well. This thesis project is concentrated on the working environment of IT-enterprises within specific geographical location, which is Finland. Therefore, the outcomes of this thesis cannot be possibly generalized to other geographical regions nor industries. There is no limitation in terms of industry field studied companies are working for, due to the high probability all of those digital companies are working and providing their services across several businesses within the same region. De-

limitations of the research work are made by selecting the questions for the interviews related to the previous research specifics, digital competence, knowledge creation and sharing and by keeping in mind future improvement suggestions.

1.4 Theoretical framework

Theoretical framework of this thesis is built upon a number of existing sources in Finnish and English, including books, articles, statistics, recommendations and websites. Theoretical core of this study is related to organizational knowledge and learning processes, wrapped around the existing trend of digitalization and emerging need of digital skills in different industry sectors. Successful knowledge creation provision and good practices of knowledge sharing become the base of effective organizational learning. Theoretical part of this study includes SECI-model for knowledge creation, Spender's framework of organizational knowledge and Blackler's model of organizations and knowledge. Taking in consideration today's challenges and technology development, theoretical framework of this thesis applies the assumption, that digital competence became an essential part of organizational learning progress.

Theoretical framework of the study (Figure 1) is represented by the author of the thesis as a triangle with the organizational learning inside it. Knowledge creation and knowledge sharing are situated on the base of triangle to the left and to the right side representing the most fundamental parts of learning process. Digital competence is added on the top of the triangle to signify the newest modern skill needed for successful organizational learning.

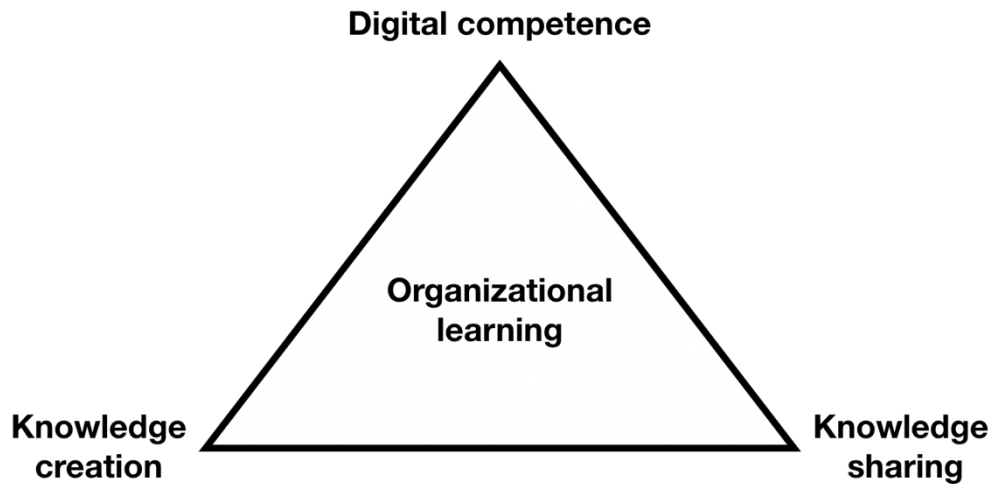


Figure 1. Theoretical framework of the current study.

Theoretical part also covers some facts and general information about digitalization processes and software industry development in Finland. This study concentrates on the knowledge sharing practices in Finland, therefore, from the prospective of the research work, it is important to get certain understanding about the current state of the country. The empirical research of this thesis is supported by the theoretical part and the results of the study are discussed alongside the theoretical framework.

1.5 Structure of the study

The introduction chapter of this thesis paper explains the background of the study and describes the reasons behind the interest of the research. Research objectives and questions are followed by theoretical framework and delimitations of the study. The theoretical part introduces the reader to living in knowledge society and explains digital competence as a necessary skill in today's world. The digitalization process in Finland is described together with the development of software industry in the country. The empirical part presents, discusses and summarizes the findings of the study. The interview questions are built up on the theoretical background of the thesis.

2 Living in knowledge society

The access to and usage of information and communication technology have been rapidly increasing since 2005 all over the world. Mobile phone subscriptions as well as fixed broadband- and active mobile-broadband subscriptions have been continuously growing. According to Information Society Report (ITU 2018), the number of the individuals using the Internet worldwide has already reached 3,9 billion people (51,2 % of the whole population) in 2018. While in 2005 less than 20% of households had the access to the Internet, in 2018 the number has been almost 60%. Mobile phone access takes leading position and it can be noticed in fixed telephone subscription decline. (ITU 2018)

According to Digital Economy and Society Index (DESI 2020), European countries are making a good progress in adopting digitalization as a part of an everyday life. For example, in 2019 the majority of European people (85%) used the Internet at least once a week, around 86% of households had access to fast broadband and the percentage of citizens with at least basic digital skills reached 58% (DESI 2020, pp.11-12). Information and communication technologies make a strong impact on the way people work, live and act on daily basis in these countries. European citizens become active digital content creators and consumers, emerging the market to welcome innovations and new participants. Digital transformation greatly influences different public sectors, such as education system, employment and social services. (EU Science Hub.)

2.1 Digitalization in Finland

Finnish society began to slowly incorporate digital technology into everyday life since 1980s. Between 1990s and early 2000s Finland stood as one of the leaders in digitalization process. Thanks to Nokia success Finns have started to use mobile phones very early on. The number of cell phone's owners were rapidly increasing at an annual rate over 100%, starting with less than 10 percent of households owning a mobile phone in 1990 and growing up to 89% in 2001. The most important innovations affecting personal lives of the consumers were personal computers together with the social media usage and the Internet. Broadband internet access has rapidly become a norm in Finnish households. The Internet

and digital services have become an essential part of everyday life for Finnish people and companies of the country. (Ilmarinen & Koskela 2015, para 3; Koiranen, Räsänen & Södegård 2016, p.26.)

Digitalization has transformed the conventional roles between consumers and businesses. Today anyone can search for numerous products or service providers within a minute and therefore the local Finnish companies have been increasingly exposed to international competition. The digital operating environment of business and public organizations is constantly developing. Even the usage of electronic services provided by governmental authorities and the public sector has grown from the least common in 2006 to more broadly used than online shops in 2014. (Koiranen, Räsänen & Södegård 2016, pp.27-29.) Year 2014 have been very significant for the development and growth of the mobile Internet in Finland, as that time the number of smartphone owners in the country has reached nearly 70% and more than half of the population started to use mobile Internet outside home or work (Ilmarinen & Koskela 2015, para 3). According to statistics (Suomen virallinen tilasto 18), in 2018 89% of Finns aged 16–89 had used the Internet and 76% of them are using the Internet on the daily basis. The same statistics shows, that 75% of the population are using the internet via mobile phone. The Internet is used for communication, media following, information search and purchasing goods and services. (Suomen virallinen tilasto 18.)

Digibarometer (2019) is a survey which evaluates and compares the degree of digitalization in each given country. The measurement is carried across different parts of the community: public sector, civic sector and companies. Digibarometer measures the digitalization on three levels: implications, capabilities and utilization. The study has been carried out since 2014 and Finland has been on the top of the list ever since. It won the first place in 2016 and ranked third in 2019 and 2018. Country's competences and skills to use and apply digitalization are stated to be the second best in the world. (Digibarometer 2019.)

2.2 Software industry in Finland

According to recent studies (Software industry survey 2017), the Finnish software industry is growing steadily across all sizes of IT-companies: small, medium and

large. The industry needs a wide range of expertise, including programming, analytics, design and project professionals. Digital skills are essential for stable economic growth of the whole country. Growth-seeking enterprises are rebuilding the software industry by experimenting with new technologies and business models. The willingness of Finnish companies to internationalize has also increased. Rapid development of technology adds challenges for the education system and working life, as it might be difficult to find enough software specialists with various skills. (Software industry survey 2017.)

Software industry in Finland is growing faster than other services due to effective marketing over the Internet, digitalization projects of the companies and online distribution channels. Successful operations attract investors and capital, which is another reason for industry's steady development. Technology growth is raising the need of experts in digitalization and artificial intelligence. Software companies are expected to react quickly to any changes in customer wishes. The ability of the IT industry to adopt new technologies and operating models has a direct impact on the development of the information society. IT-consumerism and digitalization are found to be the key drivers software business. (Ohjelmistoyrityskartoitus 2017.)

Software industry survey (2018), conducted as a qualitative interview study, examined the main trends of business development in 99 software companies of the country. According to the results (Software industry survey 2018) 35% of respondents believe that technologies they use now will change in the near future. Due to that almost a third of respondents (31%) believe that competencies and skills they need at work will also change within 3-5 years. As the need for expertise shifts, industry will continue to struggle with more competence challenges, which could slow down the operating conditions, productivity of the companies or negatively affect the desire to expand and grow businesses. (Software industry survey 2018.)

Software development manager at Atlassian Nyo (2018) anticipated several trends in software industry. For example, the need for specialists will decrease, whereas the need for general developers ready to work with any kind of new technology, will rise. Global mindset and ability to work with people remotely and

openly is another emerging trend in software industry pointed out by Nyo (2018). Constant learning and having an entrepreneurial mindset would be expected from the employees. Nyo (2018) also predicts growing need of collaboration skills for speeding up the innovation process. Juvonen (2005) in his study has also emphasized the need for collaboration between software enterprises. Rapid technology evolution emphasizes growing need for various skills and effective learning processes. An ability to share knowledge efficiently within and between the organizations might be a key for the next phase of industry progress.

3 Organizational knowledge and learning

Knowledge can be described as something people have. Scientists adopting this point of view often picture knowledge as a pyramid or hierarchy, including data as the base of the pyramid, then moving up to information, knowledge and wisdom at the top. The illustration of knowledge pyramid can be seen on the figure below (Figure 2). Data is placed on the bottom of the pyramid and has no intrinsic value and is seen as distinct physical entity, separate from the individual. Once the data is organized or shaped in some way it becomes information, which is placed as the next level of the pyramid. Information can be collected, organized and sent. It is also detached from any specific person. The next level of the pyramid is knowledge. Oppose to data and information, knowledge is explained as individual property of person, who is capable to discuss the meaning of data and information reflecting from one's own personal experiences, observations and beliefs. In this sense the knowledge is owned by individuals, as the understanding of information comes from their intellectual capacity, personal interpretation and past events. According to this explanation, knowledge is something people possess and so, like any of personal belongings, it can be passed to others. Wisdom is located on the top of the pyramid. (Newell, Robertson, Scarbrough & Swan 2009, pp.3-4.)

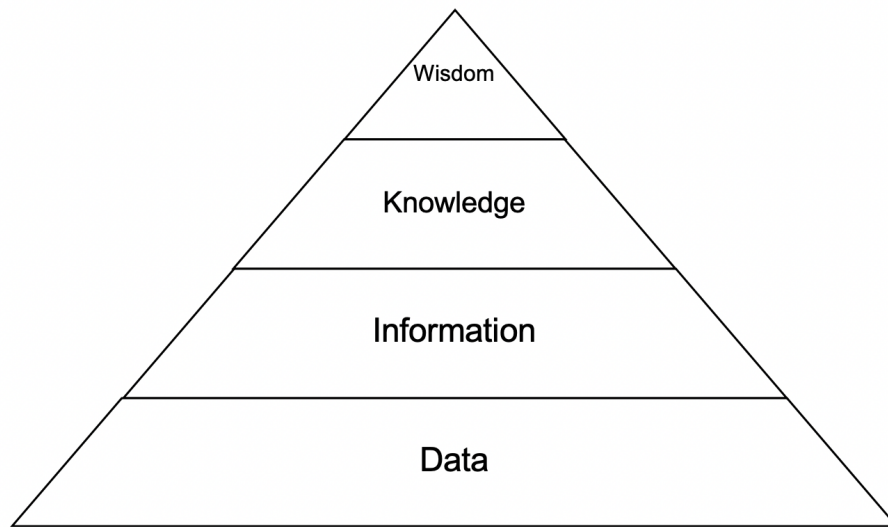


Figure 2. Knowledge hierarchy. (Newell *et al.* 2009, p.3)

Knowledge could be also be referred as an:

Understanding of or information about a subject that you get by experience or study, either known by one person or by people generally (Cambridge Dictionary 2019.)

The process of passing possessed knowledge to others through instructions, as well as experiencing new skill or gaining new knowledge through study is known as learning (Allee 2003, p.264.). There are several ways of how people distribute and pass the knowledge, individually and within a group. According to Scarbrough (2008), organizational knowledge can be explained as an absorbed set of common norms and practices, that merges people and objects to produce valuable results within certain social and organizational environment. Consequently, organizations also pass and share knowledge. Allee (2003, p.265) explains organizational learning as a process there an organization applies its joint capability to interpret its environment and respond with better adaptive actions. The next chapters will explain more about different knowledge creation models and organizational learning process.

3.1 Types of knowledge

From the point of view of an individual three types of knowledge can be defined. First type of objective knowledge is based on information or related to certain task. Second is tacit, experiential know-how knowledge, which includes skills and deeper understanding of processes. Personal knowledge is known as the third type and includes talents, natural gifts, artistic abilities, imagination or intuition. Whenever two or more co-workers develop and share their skills, values, beliefs habits, practices and norms they create collective knowledge, as a knowledge of each individual employee and information available to them combined. Cultural systems and social activities also affect collective knowledge. (Lowendahl, Revang & Fosstenlokken 2001.)

Knowledge can be divided into another different types. Certain information could be put in writing, communicated with words, described through drawings, manuals and specifications or addressed in numbers or formulas. This type of knowledge is known as explicit. It can be properly distributed in the form of data between individuals. From another hand, different kind of understanding is strongly attached to personal experiences or skills, individual perception and understandings, guesses or intuition. This type of knowledge is known as tacit. It is a challenging task to formalize, transmit and share tacit knowledge with other people in systematic and clear way, as it is deeply connected to individual's own experience, values and feelings. Tacit knowledge is very subjective. Both types of knowledge are vital for knowledge creation process. As people create something new, those types complement and interconnect with each other. (Von Krogh, Ichijo & Nonaka 2000, p.6; Nonaka & Nishiguchi 2001, p.33.)

3.2 SECI-model

Understanding the ways of knowledge creation and sharing is essential for this thesis work. Interaction between explicit and tacit knowledge and knowledge transitions is described in the SECI (socialization, externalization, combination and internalization) model. SECI-model is used as a base for the research study.

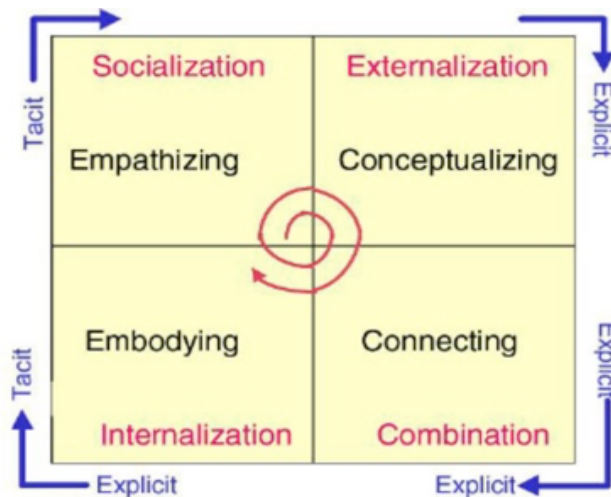


Figure 3. The SECI Process. (Nonaka & Nishiguchi 2001, p.40)

Fourfold figure 3 demonstrates the spiral of knowledge creation process starting with socialization on the upper left-hand corner and externalization on the upper right-hand corner. There is a symbiotic relation between tacit and explicit knowledge: it can be converted from tacit to tacit with socialization and from tacit to explicit through externalization. (Nonaka & Nishiguchi 2001, p.34.) An example of knowledge externalization might be creating a written instruction of someone's expertise with the purpose of knowledge sharing between co-workers. Observing colleague's or masters' working process and learning by imitation is an example of socialization.

Knowledge creation model continues to the knowledge combination on the right lower corner and embodying on the left lower corner. Combination transforms explicit knowledge to another explicit knowledge. Explicit knowledge changes to tacit through internationalization. The theory suggests that knowledge is formed through social interaction between tacit and explicit knowledge. (Nonaka & Nishiguchi 2001, p.34.) Tacit knowledge in particular has a great value for new knowledge creation and innovation (Von Krogh, Ichijo & Nonaka 2000, p.55). Enabling suitable environment for such process is one of the key ingredients for being a successful organization.

In addition to SECI-model, Von Krogh, Ichijo and Nonaka (2000) present a concept of knowledge creation and care by dividing low care and high care. Low Care

environment describes the situation, when the employees prefer to keep individual knowledge to themselves, because they feel vulnerable in their positions or the business environment does not inspire knowledge creation. Knowledge sharing happens by transacting explicit knowledge. Tacit knowledge is not well accepted as a source of innovation. Efforts to present new ideas are encountered with tough judgment. High Care environment represents a completely reverse situation, where the support of knowledge creation and distribution is high. Members of an organization trust each other and express empathy. Individuals of high care organizations are willing to help one another and share personal insights. Supportive and encouraging environment prompts mutual knowledge creation, innovation, personal input to the knowledge of the group and tacit knowledge sharing. (Von Krogh, Ichijo & Nonaka 2000, pp.54-55, 57.)

3.3 Spender's framework

Spender's framework, represented on the figure below (Figure 4), also takes people-oriented viewpoint towards knowledge creation process. In this model the knowledge is divided into individual and social, explicit and implicit. It differs from Nonaka's model by making a very important additional point of social knowledge forms existing outside the individual. Spender takes in consideration not only the type of knowledge, but also whether the knowledge exists within the individual alone or inside the social group. The framework emphasizes the organizational knowledge being created as a result of interaction between all four types. (Newell *et al.* 2009, pp.9-10; Wickramasinghe 2006, p.330.)

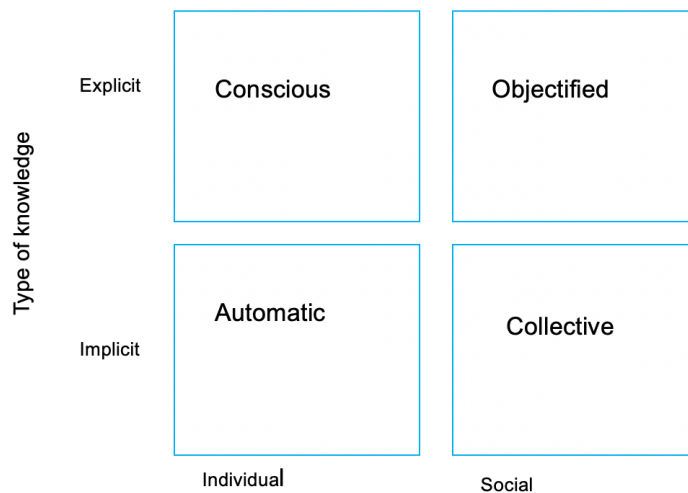


Figure 4. Spender's framework (after Newell *et al.* 2009, p.10)

Social knowledge survives longer and does not depend on the contribution of one particular person. From the strategical point of view, collective or social knowledge is highly important for organizations, because this type of knowledge is hard to copy or comprehend. Once the company develops a supporting collective culture of knowledge creation, it becomes very difficult to duplicate such kind of process, even if some people leave and try to reproduce the same practice somewhere else. (Newell *et al.* 2009, p.10.)

3.4 Blackler's model of organizations and knowledge

Blackler's framework (1995), two-by-two matrix of organizations and knowledge types illustrated on the figure below (Figure 5), was created after a review of then existing studies of organizational knowledge. Similar to Spender's, this framework implies that knowledge types occur at both individual and collective levels. Blackler points out that different types of organizations prefer to work with distinctive types of knowledge. (Newell *et al.* 2009, pp.10-11.)

Emphasis on collective endeavour	Knowledge-Routinized Organizations: <i>Knowledge embedded in technologies, rules and procedures.</i> Hierarchical division of labour and control. Low skill requirement	Communication-Intensive Organizations: <i>Encultured knowledge and collective understanding.</i> Communication and collaboration the key processes. Empowerment through integration
	Expert-Dependent Organizations: <i>Embodied competencies of key members.</i> Performance of specialist experts is crucial. Status and power from professional reputation.	Symbolic-Analyst-Dependent Organizations: <i>Embrained skills of key members.</i> Entrepreneurial problem solving. Status and power from creative achievements.
Emphasis on contributions of individuals	Focus on familiar problems	Focus on novel problems

Figure 5. Organizations and knowledge types. (after Blackler 1995, p.1030.)

In Blackler's model embrained knowledge depends purely on theoretical skills and intellectual capabilities. Embodied knowledge is based on actions and is relatively explicit. Encultured knowledge is created during the process of accomplishing and learning through the progress and improvement of organizational culture. Embedded knowledge exists in general routines. It can be studied by reflecting the relationships between instructions, tools and machineries, guidelines, processes and practices. Encoded knowledge is data expressed by science and signs, symbols and or codes, both in manual and electronically transferred form. (Blackler 1995, pp.1024-1025.) The next chapter of the thesis will concentrate more on the organizational learning and explain the process more in the light of digitalized world.

3.5 Organizational learning and knowledge

Organizations can constantly develop by learning from its achievements or failures. It involves documenting, analyzing and recording break-through events into organizational memory. By keeping innovations available for the onward use, capturing best practices, applying success stories to future purposes and ensuring mistakes do not occur again, organization improves overtime and becomes more effective. This process is known as organizational learning. (Dalkir 2011, pp. 365; 366; 368.) Allee (2003, p.265) explains organizational learning as a responsive behaviour of organization, using its collective abilities to adopt to the

existing conditions. Knowledge is also rare and unique intangible asset of the company (Cabrera & Cabrera, 2002). Business Dictionary (2019) underlines the fact, that in context of organization:

Knowledge is the sum of what is known and resides in the intelligence and the competence of people.

Since there are no two organizations going through exactly the same history of learning process and circumstances, organizational knowledge is very path depended, and therefore is hard to imitate. Knowledge is also built upon complex networks of official and unofficial interpersonal communications and relationships. Depending on those interactions learning process as such becomes context specific. (Cabrera & Cabrera, 2002.)

It is good to remember, that the process of knowledge creation is interactive and collective activity. Network establishment and collaboration appears to be an important tool for successful knowledge formation. Increasing the number of collaborations might have a positive effect on creating new information because of the extended resources used. Partner selection in such process becomes a relevant issue. However, the overall performance of knowledge creation might get lower, if the partners feel restrained in expressing their ideas with the previous partners or feel uncertain about establishing new connections with other partners. In some cases, collaboration is fruitless and therefore might cause financial losses. The benefits of possible network forming are to be taken in consideration together with potential threats. (Tur & Azagra-Caro 2018, pp.424; 432-434.)

There is a clear positive interrelationship between successful knowledge management practices and business competence levels. Effective knowledge management stimulates the coordination between tacit and explicit knowledge and is strongly linked with the innovative process of the company. Knowledge specific expertise has a direct influence on the business performance, if the company is able to establish strong knowledge management values and practices between the processes and working individuals. A skill to generate, apply, transfer and keep difficult-to-express knowledge becomes important for many organizations. The process of organizational learning together with clear strategic plan creates

valuable organizational knowledge assets. To successfully gather, share and use knowledge the company needs technical and organizational support. It is highly important to remove possible technological, administrative or cultural barriers to develop efficient knowledge sharing skills. Technology has a remarkable role in knowledge management as it provides opportunity for every individual within the company to take part in knowledge creation. It is hardly important to realize the capability of using technologies in modern knowledge management and innovation processes effectively and efficiently. (Abou-Zeid 2008, pp.40-42; Langer 2005, pp.116-120.)

Digitalized world provides numerous opportunities to gather, share and distribute knowledge. However, the variety of options does not necessarily guarantee people within organizations would successfully share their experiences and know-hows using those modern technologies. Individuals within the company are the ones who actually produce and execute the tasks concerning knowledge creation and work distribution. Besides that, there is another important unit needed for successful organizational knowledge creation process. It is represented by a group of peers, that socialize about the current work tasks, discover information gaps and work together to find ways to fill the gaps. (Allee 2003, pp.93-96.).

Sharing of information between employees is a key element for the organizational knowledge management (Cabrera & Cabrera, 2002). Recent communication technologies support exchanges of information across different time zones and geographical distances. Yet many companies struggle to inspire the employees to use those type of technologies to share their ideas. There is typical assumption that people within the organization are not eager to exchange their knowledge. There might be several reasons for this negative attitude, for example: lack of communication skills, lack of mentoring or coaching skills, lack of time provided for successful knowledge distribution. It might be hard to integrate knowledge sharing into daily working routines, duties and responsibilities. It also takes some time to learn how to efficiently use provided information, sharing technology or online system. In some other cases poor corporate culture, oriented towards individual achievements only, or practical boundaries and configurations are pre-

venting employees from working with different people and sharing the experiences. If there is not enough information about the benefits of knowledge distribution, employees will not contribute to sharing what they know with their co-workers. Sufficient support from company's management is important. Even though people's genuine interest lays in knowledge sharing and individuals normally appreciate learning from each other, there are many ways to make people feel privileged for keeping the information for themselves. (Allee 2003, pp.93-96; Cabrera & Cabrera, 2002.). The next chapter of this thesis will introduce the reader to the topic of lifelong learning and explain the essence of digital competence, as it is considered to be important for organizational knowledge sharing in today's world.

4 Lifelong learning

Today efficient knowledge management is demanded by the organizations as it is connected with high quality and competitiveness levels. The significance of the information which can be learned through the Internet and computer technologies is constantly growing. Knowledge is an immaterial element and the core component of intellectual capital within digitally oriented companies. (Nieto, Díaz, Muslera & Hernández 2017, pp.121-122.)

Rapidly expanding availability of technology and globalization trends are contributing to a number of jobs in all kinds of industries. To remain competitive, different organizations reconsider their business methods and practices on a regular basis. ICT equipment, platforms and content are constantly changing. To continue dynamic participation in working life, people need to revise and upgrade their skills systematically. To develop professionally and to remain active member of society, people need to constantly learn throughout their lives and develop new knowledge and skills. (ITU 2018, p.24.)

In 2018 a group of experts from diverse areas gathered to study the effects of artificial intelligence on future work and learning experiences. Participants of the convention have agreed, that to stand by machine intelligence, people would need a certain level of expertise to understand and utilize new scientific advancements, proactive mentality to anticipate changes and a number of foundational

beneficial skills, which would be valuable regardless any technology development. Based on their discussion, lifelong learning is one of the most critical and essential skill for the future. To succeed in different work duties and projects learning to become self-driven, explorative and disciplined will be important. An ability to find necessary answers quickly will be highly appreciated, as knowing how to effectively search for the right information demands skepticism and critical thinking. Those skills are going to be more valued than having the ever-changing information memorized. “Learning to learn” individually and within a group will become a significant skill for future employees. (Institute for the Future & Lumina foundation, 2018.)

In response to globalization and as a reaction to the continuing shift towards information-based economies, the European parliament has presented a new set of recommendations for the key skills to ensure lifelong learning. As the world is rapidly changing and bringing up new challenges, there is a significant range of competences people would need to adapt to modern lifestyle. The list of key competences includes eight proficiencies, which everyone would need for personal and professional fulfilment, successful self-realization and recognition by society, and for active involvement in local communities. As a part of this learning strategy, Member States of the Union have agreed to provide tools for developing those key competencies for all citizens. (Recommendation of the European Parliament 2006.) In line with the Recommendation of the European Parliament (2006), this basic skill set includes: communication in mother tongue and foreign languages, cultural awareness and expression, mathematical proficiency and basic skills in science, learning to learn, social and civil competences, perception of initiative and entrepreneurship and digital competence. Each skill is considered to be crucial for successful life in knowledge-driven community. (Recommendation of the European Parliament 2006.)

4.1 Digital competence

Being one of the key competences, digital competence refers to the ability to confidently use different kinds of digital tools for information searching and sharing, communication needs and finding solutions for simple problems. Digital competence is crucial for education, working life and effective contribution into society. It also plays a significant role in developing communication and language skills as well as gaining basic science skills. (School Education Gateway 2020.) As reported by European Commission (2020), recent pandemic has emphasized the importance of internet usage and has shown the significance of having digital skills to access necessary information and use services online. However, about 40% of the European population is insufficient in basic digital skills (European Commission 2020).

Recommendation of the European Parliament (2006) states that, digitally competent individual uses different technologies for communication, working and leisure activities in a confident and critical way. Digital competence includes basic skills in information and communications technology, including understanding of the main computer applications (e.g. word processing) and information storage and management opportunities. Digitally competent individual is able to present and share the information and to engage in cooperative networks online. Digital competence also involves acknowledging the opportunities and accepting the risks of the Internet and online communication. (Recommendation of the European Parliament 2006.)

Digital competence is formed of knowledge and skills from different areas of life. For example, digitally competent individual understands the essentials of digital devices and is able to use those devices properly in personal and professional life. Digitally competent person is able to use technology in order to share the information and collaborate with other people. An open mind towards information and communication technology development, awareness of new digital opportunities, willingness to use technologies in everyday life and understanding the appropriate way of behaviour in digital environment are qualities of digitally competent person. (Janssen, Stoyanov, Ferrari, Punie, Pannekeet & Sloep 2013, p.477.)

4.2 Five areas of digital competence

European Union (2018) in its Digital Competence framework delivers an important message of digital skills relevancy in many aspects of our lives. First published in 2013, DIGCOMP described 5 proficiency areas, which shape and help to understand the digital competence better. Those areas are information and data literacy, communication and collaboration, digital content creation, safety, and problem solving. As seen from the key concepts, using the newest device or application is not enough to become digitally competent. The concept involves using and understanding technologies in critical and creative way, storing information digitally and developing content online, creating digital identity and following certain online behaviour, for example shopping or working using technologies. (European Union 2018.)

As artificial intelligence will become more and more involved into people's daily life all over the world, there would be a rising need for directing and using technologies efficiently. An ability to keep up with current digital standards and systems used at workplace is known as digital fluency. It is good to remember that digital fluency does not mean knowing how to code. It is more about understanding the way machines think and entangling human ways of communication into machine language. (Institute for the Future & Lumina foundation, 2018.)

4.3 Digital competence in working life

The competences brought by digitalization are essential for businesses. Companies can make more efficient use of capital by following trade analytics and using forecasts on market demands or by improving inventories with data. Digitalization lowers business costs through self-service, automatization, reduced printing and paper handling expenses. (Ilmarinen & Koskela 2015, para 2.3.). According to Nieto, Diaz, Muslera and Hernández (2017), high levels of digital competence bounded with effective management of digital knowledge assets might create significant benefits for the company, including:

- Improved customer service and customer communication
- Opportunity to collect client related information
- Growing income

- Expanding to wider market areas
- Growing number of customers
- Improved relationships with suppliers
- Quick delivery times
- Cost savings
- Error reduction and accuracy improvement
- Upgraded business operations and processes
- Advanced use of technology. (Nieto, Diaz, Muslera, & Hernández 2017, pp.121-122.)

The transition towards the Internet of things and increased integration of artificial intelligence into everyday life raise the need for critical thinking and content creation expertise. As the complexity of information and communication technology systems and the amount of collected data grow exponentially, interchangeable digital skills and lifelong learning become very important. The need for adapting and training digital skills has been usually related to technical industry work. However, digital skills are no longer narrowed to such jobs only. It is projected, that by 2020 more than 90% of jobs in the European Union will demand digital skills. In developing countries digital skills are highly requested and being digitally competent significantly improve the opportunities to get decent job. Digital skills are also connected to potentially higher earnings. (ITU 2018, p.22;24.)

The world “digital” refers to something, which does not exist materially. In digital environment the information is transmitted via bytes and not through books. New technology has significantly changed social behaviours. The Internet has been converted into a great communication tool and a living society on its own. Quickly distributed and easily available digital knowledge had a great impact on different organizations. Fast technological development, new economy trends and globalization have increased the worth of intangible assets within companies. Knowledge management has become a part of competitive strategy. Software companies with their little and easily manageable physical assets, but huge amount of actual sales, demonstrate clear evidence of commercial value of intellectual capital. (Nieto, Beltrán, Cervantes, & Hernández 2015, pp,301-302; 304-305.) The next chapter of the thesis will provide some general information about

different types of software companies in South-Eastern Finland. The information is based on the previous findings and is seen as suitable addition for the theoretical part of this study.

5 Different types of software companies

In 2005 Juvonen has studied local small and middle-sized software enterprises inside South-Eastern Finland and described interrelations between them. As a result of the research, Juvonen (2005) has divided and characterized those companies into three main types named as “specializer”, “anticipator” and “collector”. The illustration of three main players can be seen on the figure below (Figure 6). (Juvonen 2005, pp.105-106.)

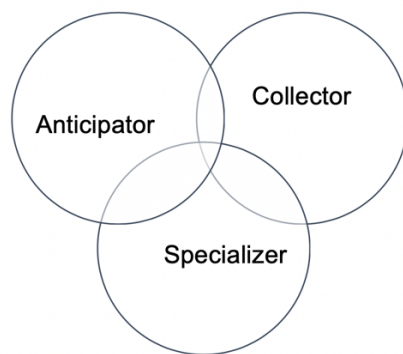


Figure 6. Main players. (after Juvonen 2005, p.93)

According to Juvonen (2005), each type has clear distinctive features. For example, anticipators try to foresee upcoming trends in business and are actively looking for solutions that would benefit their customers in future. For collector business type it is typical to run all kinds of different projects. Those companies are basing their business strategy on reactive respond to customer demand and are prepared to pick up any job the customer is paying for. Therefore, the customer base of a collector company is very mixed, and the nature of customer relations is often based on a one-time delivery. Specialist type focuses on certain technology only and offers high expertise in it. Other companies usually do have the

access to the same kind of technology or skill. For that reason, specialist companies practice proactive approach in their business operations. (Juvonen 2005, p.92.)

Based on the research, Juvonen (2005, p.111) has created a fourfold table to present possible future development trends and business strategies for the software industry companies in the region. Within the graph local businesses are placed in dimensions that describe the relationship between industry knowledge and software expertise. Another dimension is technology and resources, owned by the company. (Juvonen 2005, p.110.)

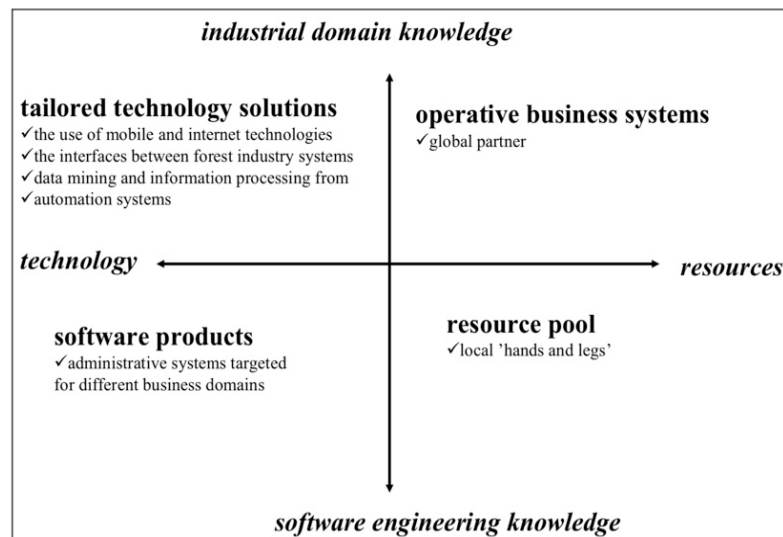


Figure 7. Results of local small and medium-sized software companies division in dimensions of knowledge, technology and resource. (Juvonen 2005, p.112)

Figure 7 demonstrates the table, which is interpreted as follows. In the upper left corner Juvonen (2005, p.112) has placed those local small and medium-sized companies that have the ability to specialize in one specific technology and to tailor their software products to fit their customers' needs. Upper right corner of the table represents the future of factory operational systems and is reserved for the companies operating on the international scale. According to Juvonen (2005, p.112), some software companies operating in forest sector will be looking for

new business opportunities in other industry sectors, therefore the left lower corner represents firms, providing information systems solutions in general administration level. Another path for future development could be the role of local subcontractor, participating the implementation and maintenance of information systems. Those companies belong to the right lower corner. (Juvonen 2005, p.112.) Juvonen (2005, pp.112-113) predicted in his research results that anticipators and specializers will continue operations according to their existing business model. Subcontracting is going to be the future of the collector companies.

In his thesis work Juvonen (2005, p.107) emphasized that local small and medium-sized software enterprises have a need and a desire to cooperate. All the respondents were interested in networking. Successful strategic partnerships and networking are beneficial for businesses. For example, innovation is increasingly taking place within network of organizations (de Man 2008, p.1). Effective knowledge sharing practices between partners positively affect innovation success and are necessary for such process. (de Man 2008, p.8).

6 Research methods

The focus of this thesis is to analyze knowledge creation and sharing practices within organizations operating in digitalized working environment. This chapter explains the research methods applied in this thesis work and provides an insight on why certain data collection approaches are chosen. This thesis work aims to find similarities in data and create new assumptions. The theory behind knowledge-enabling process is used to describe the results of this study. The outcomes of the research are analysed, compared, categorized and formed. Successful knowledge creation and sharing providing competitive advantage for companies is an important subject for today's business processes in the digitalized world.

6.1 Data collection

Qualitative research methods are widely used in studying human and social sciences, such as education, business, health care, psychology, communication,

justice and other associated fields. The empirical data of such study is not measurable by nature, consisting of written or visual materials, field notes, documentation, recordings and so on. The objectives of qualitative research depend on the purpose of the project in question. The results of the study usually present key findings from data synthesis. (Saldana 2011, pp.3-4.)

For ages people used conversation as predominant tool to gain knowledge about others, to learn and share their experiences and feelings about the world and to develop as individuals. The conversational process of knowing named “interview” has become a significant tool to understand essential features of our spoken world. Huge number of qualitative studies rely on interviews with participants. They can range from a well-planned conversation, moving forward with the help of set of prepared questions, to fully unstructured discussion guided by the list of general topics. Interviews can be organized in advance or happen spontaneously. Conversations can include one person, couple of individuals or a group of people. (Brinkmann 2013, pp.1-4; Saldana 2011, pp.32-33.)

Conducting thesis study applying face-to-face interviews is a very frequently used way of data collection. This kind of approach helps to reach better understanding and deeper meaning of the research phenomena. Personal interviews promise the researcher greater accuracy, as there is higher change to receive truthful answers. (Hague & Jackson 1995, pp.112- 115.)

Qualitative research methods aim to discover new information and provide deeper understanding of existing phenomena. In case of these thesis experts of the field were asked to discuss the knowledge sharing practices within IT-business and share their opinions with the author of the thesis. This study intended to look in detail at how the selected experts perceived the organizational knowledge sharing practices in modern digitalized world. Due to current situation and new practices of organizing meetings online, all of the interviews happened remotely. The online interview was structured in a way that there have been a set of similar questions asked from all the experts. That way the researcher ensured the discussion would provide the answers to the proposed research questions. The theoretical base of knowledge sharing practices and digitalization have become the base for this set. Nonetheless, the respondents were encouraged to

share their opinions freely, to add new information and explain their points of view.

6.2 Data analysis

Qualitative analysis is often inductive by its origin, there as quantitative methods usually rely on deductive reasoning. However, the researcher might notice new patterns or insights on the topic in the quantitatively acquired data and start developing new theories based on the findings. This situation turns initially deductive research into inductive study. (O'Dwyer & Bernauer 2014, pp.45-46.) Reflecting knowledge and opinions of the participants provides thesis work with in-depth understanding of the research questions and offers an insight to the social reality of the situation. Making meaning of the data is the final goal of this qualitative part. Theoretical understanding of social phenomena provides clues for further research. (Ivankova 2015, pp.232-235.)

Data analysis of the interview is about systematizing the essential content. Two main phases of the analysis include identifying central points of the discussion and putting them into categories. Apart from the speech, written text is usually more structured and compressed; it does not include repetition nor wondering around the subject. Making the information manageable and filtering out all the unnecessary things becomes an important phase of every qualitative study. The exploratory nature of spoken speech needs to be reduced to a clear written text. Organizing the repetitive ideas to identify common themes and fitting them into theoretical framework to develop better understanding of the research subject is the final stage of data interpretation. (Gillham 2000, pp.59-60: Auerbach & Silverstein 2003, p.45, 68.)

During this study, the results of the online conversations were monitored, information units have been compared and common themes were put together into conclusions. As the interviews contained a set of structured and planned ahead questions, the recognition of common themes started with the same order, as the questions were combined, and continued to systemization of similar comments and observations. Recognizing present situation of knowledge sharing and learn-

ing process between and inside IT-companies makes it possible to create applicable development advices for businesses and ideas for further research. The next part of the thesis will introduce the empirical findings of this research work, provide guidelines for possible future study and summarize the results.

7 Empirical findings

7.1 Main points if the discussion

Being in the line of current situation and supporting the idea of digital knowledge sharing, the research has been carried out by online interviews with four experts working in IT-field for 8 years and more. The author of the thesis believes, that the respondents have sufficient knowledge and working experience to be able to reflect on the research topic. After the interviews the most important pieces of information were gathered and put together into empirical findings listed below.

In order to reach new skills in digital safety and problem solving, to manage the information or create new digital content modern employees are openly willing to cooperate with other companies or colleagues. The idea of cooperation with other companies is also supported from organizational point of view, though keeping in mind possible company strategies or restrictions. Certain pieces of silent knowledge are not shared due to company policies. However general informative silent knowledge is encouraged to be distributed. In case the internal proficiencies or resources are deficient, companies might obtain them from the outside.

The interviewed experts believed the information sharing online and the effects of online learning are very beneficial. Nowadays digital learning tools are used a lot and employees are helping each other to gain new knowledge that way. Due to current situation, learning arrangements might be expensive or even impossible. For that reason, e-learning and online educating platforms become very popular and, in some cases, this is the only way to maintain and develop professional competences. However, certain group learning activities, like workshops or training sessions, has been found to be more challenging due to the difficulty of getting people fully involved in the process while participating virtually. Some people tend

to withdraw from additional talking during online meetings and leave their ideas unsaid.

Even though people working in IT business are digitally competent and constantly use digital tools for discussing something and sharing new information, face to face communication is still seen as very important. While working virtually, the spontaneity associated with sharing information and new ideas, mind mapping and collective flow do not occur as much. In distance working, information sharing must be done separately, for example in extra email, message or call session. While working closely and personally, information is also shared nearby coffee machine, in the corridor conversations or with a coworker sitting nearby. Low threshold personal communication provides safe environment for creating new ideas and encourages to share them as it happens simultaneously. Acquired and created that way information is not necessarily distributed via digital tools afterwards. Personal communication also helps to discuss possible mistakes openly in order to learn from each other. For that reason, personal face-to face communication benefits even in the digitally oriented IT business.

7.2 The most important skills needed to support organizational learning in digital era

An ability to search, create and filter the information is found to be very important feature in online working environment. Especially in the current situation, while many people are forced to work from home, the skill to find and manage needed knowledge and piece of advice is highly appreciated. From this point of view organizational learning processes can be improved by higher level of digital competence of the employees, as it expands the ability to seek and understand new knowledge in critical and creative way.

From the employee point of view the most important skill is communication and collaboration. Some companies might have own standards of working and easiest way to find out about them is by communication directly with the employers. Especially when it comes to joint projects, communication and collaboration skills are significant. There are cases, when the original information received about the project might change, for that reason effective communication is very important

in the sence of information sharing and collaboration developing. Having diverse set of skills and working in cross-functional teams becomes a norm in modern world. Solid cooperation skills are valuable for future progress.

8 Conclusions

The main goal of the theoretical part of these faces was to study organizational knowledge and learning processes in recent working environments. It provided general information about digitalization, knowledge creation and sharing models, and digital competence as an essential part of modern society. Theoretical framework of the study (Figure 1) was pictured by the author of the study as a triangle with the organizational learning inside it and digital competence on the top. Digital competence was placed on the top of the triangle to indicate the skill needed for successful organizational learning.

During the research work the proposed organizational learning model has been changed. As a result of empirical study, new rectangular frame (Figure 8) has been suggested by the author of the thesis to be more suitable for modern organizational learning in digital environment. Knowledge creation and sharing are still placed on the base of the figure as they represent the fundamental parts of any organizational learning. Digital competence, being originally on the top of triangle, has been changed into new skill set: an ability to search, filter and manage information and communication and collaboration skills.

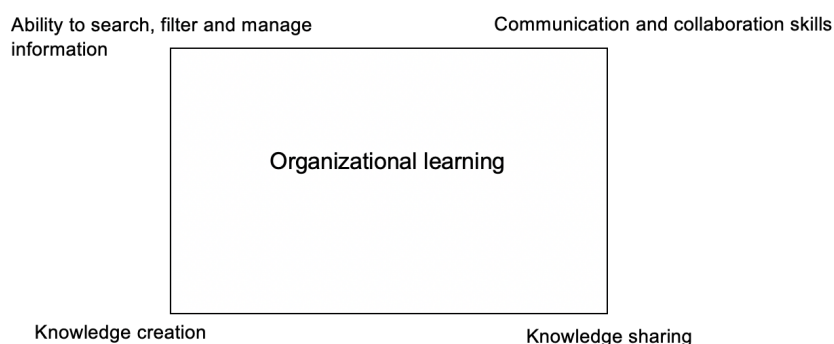


Figure 8. Organizational learning model proposed by the author after empirical study.

Based on the empirical findings it could be stated, that organizational learning in digital era could be supported by providing the facilities to search, filter and manage information individually and within groups. Efficient use of electronic information storage, formal data collection and management tools inside the company, as well as consistent knowledge capturing and updating practices contribute to the development of that ability. Digital competence supports this by providing the confidence in using digital tools and help in finding solutions for simple problems via electronic storage of information. Understanding the essentials of digital devices and using them properly in professional life improves organizational learning generally.

To successfully share learning experiences in digital environment it is important to invest into personal communication and collaboration skills. As distributing new learning experiences might become difficult from home office the importance of cooperation skills rises accordingly. Lack of face-to-face communication should be replaced by some other means.

The purpose of the empirical research work was to discover ways to support organizational learning in digital era. The research aimed to study and understand the influences of digital competence and online knowledge creating and sharing experiences on organizational learning processes. This thesis work has shown, that even though the use of online learning and virtual knowledge sharing platforms is growing rapidly in the modern society under current pandemic situation, an ability to successfully search, filter and manage needed information becomes vital and needs enhancement. As there is no opportunity to ask the colleague sitting next to you in the office, the communication and collaboration skills are gaining new importance and new meaning in home office environment. As the research work moved forward it was interesting to notice that even though the employees of IT-companies are digitally competent and virtually oriented, they still needed and appreciated soft skills, such as communication and collaboration abilities.

9 Recommendations for future research

As in ability to search, filter and manage needed information becomes very important skill in digitally oriented world, effective and wide use of electronic information storage is necessary. It is good to pay attention on the data collection and management tools within the company: that way the employees would be able to get needed information at any time quickly and easily. Effective knowledge sharing and knowledge capturing provides constant access to up-to-date information, which facilitates distance working from home office. Working from home adds up certain challenges, for that reason lessons learned and best practices should be available to all employees. It is advised to consider sharing up-to-date knowledge about competitors, industry trends and organizational directions between managers and employees, as it might provide benefits in information search and management.

Communication and collaboration skills are relevant for today's organizational knowledge creation and sharing. Distance working demands proactive approach towards personal interaction as face-to-face informational flow is taken out of the picture. Effective cooperation skills support distribution of the right knowledge to the right people at the right time. Based on the results of the empirical study, communicating the information forward efficiently becomes an important issue while working virtually. The development tools for communication and collaboration skills in digital environment might be interesting choice for the future studies.

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Appendices

Appendix 1. Interview questions

1. What kind of tools do you use for information sharing in your company?
How do you share, store and distribute information?
2. Do you see any challenges in current information sharing system?
3. Do you feel that employees use (used) face-to face communication for sharing new information, which is not necessarily distributed via digital tools?
4. What about silent knowledge or know-hows? How is this knowledge shared?
5. From your own perspective, which is the most important skill needed for sharing information in digitalized world?
6. Are you willing to cooperate with other companies or colleagues in order to reach new skills in digital safety, problem solving, ability to manage the information or digital content creation?
7. What is your experience from such cooperation?
8. What do you think about the information sharing online and online learning?
9. Is your organization willing to cooperate with other companies in order to reach new skills in digital safety, problem solving, ability to manage the information or digital content creation? Are there any conditions?
10. Do you feel that information sharing is more difficult when working from home office due to current situation?