# THE INFLUENCE OF THE COVID-19 PANDEMIC ON THE KNOWLEDGE WORKERS EXPERIENCES OF THEIR SOCIAL NETWORKS AND RELATIONSHIPS WITHIN AN ORGANIZATION

Lappeenranta-Lahti University of Technology LUT

LUT School of Business and Management

Master´s thesis

2023

Anu Voho

Examiners: Associate professor Anna-Maija Nisula

Professor Kirsimarja Blomqvist

ABSTRACT

Lappeenranta–Lahti University of Technology LUT

School of Business and Management

Business Administration

Anu Voho

**The Influence of the COVID-19 pandemic on the Knowledge workers Experiences of their Social networks and Relationships within an Organization**

Master's thesis

2023
86 pages, 11 figures, 11 tables and 1 appendix
Examiners: Associate professor Anna-Maija Nisula and Professor Kirsimarja Blomqvist

Keywords: social network, network ties, trust, remote work, organization

The COVID-19 pandemic changed the working environment of organizations overnight, forcing knowledge workers to work remotely. Little was known about how this change affected social networks and relationships within the organization. Today's knowledge-intensive, complex work requires collaboration, and networks within organizations are essential for short- and long-term success. This study sought to explore how knowledge workers experienced the pandemic have influenced their social networks within an organization.

The study consists of a theoretical literature review and a qualitative study. Thematic semi-structured interviews and inductive research methods were used to explore the changes experienced by the knowledge workers. The themes of the interviews were extracted from the literature, focusing on change in the work environment, social networks and relationships, and trust as a key coordination mechanism for network formation.

The results of the study led to two propositions. Strong network ties flourish in a remote work environment in an organization and remote working reduces weak ties in an organization. The propositions provide direction for further research, but also tools to help organizations focus on long-term success by understanding that remote work and on-site work need to be managed differently. As we move into the post-pandemic era, organizations should create an environment where weak networks that unite teams and bridge structural gaps in the organization can flourish.

TIIVISTELMÄ

Lappeenrannan–Lahden teknillinen yliopisto LUT

LUT-kauppakorkeakoulu

Kauppatieteet

Anu Voho

**COVID-19-pandemian vaikutus tietotyöntekijöiden kokemuksiin heidän sosiaalisista verkostoistaan organisaatiossa**

Kauppatieteiden pro gradu -tutkielma

2023

86 sivua, 11 kuvaa, 11 taulukkoa ja 1 liite

Tarkastaja(t): Tutkijaopettaja Anna-Maija Nisula ja professori Kirsimarja Blomqvist

Avainsanat: sosiaalinen verkosto, verkostositeet, luottamus, etätyö, organisaatio

COVID-19-pandemia muutti organisaatioiden työympäristöä yhdessä yössä pakottamalla tietotyöntekijät etätyöhön. Siitä, miten tämä muutos vaikutti sosiaalisiin verkostoihin ja suhteisiin organisaation sisällä, tiedettiin vain vähän. Nykypäivän tietointensiivinen ja monimutkainen työ edellyttää yhteistyötä, ja organisaatioiden sisäiset verkostot ovat olennaisen tärkeitä organisaation lyhyen ja pitkän aikavälin menestyksen kannalta. Tässä tutkimuksessa pyrittiin selvittämään, miten tietotyöntekijät kokivat pandemian vaikuttavan heidän sosiaalisiin verkostoihinsa organisaation sisällä.

Tutkimus koostuu teoreettisesta kirjallisuuskatsauksesta ja laadullisesta tutkimuksesta. Tietotyöntekijöiden kokemien muutosten tutkimiseen käytettiin temaattisia puolistrukturoituja haastatteluja ja induktiivisia tutkimusmenetelmiä. Haastattelujen teemat poimittiin kirjallisuudesta, ja niissä keskityttiin työympäristön muutoksiin, sosiaalisiin verkostoihin ja suhteisiin sekä luottamukseen verkostojen muodostumisen keskeisenä koordinointimekanismina.

Tutkimuksen tulokset johtivat kahteen propositioon. Vahvat verkostositeet kukoistavat etäympäristössä toimivassa organisaatiossa ja etätyö vähentää organisaation heikkoja sidoksia. Ehdotukset antavat suuntaa jatkotutkimukselle, mutta myös välineitä, joiden avulla organisaatiot voivat keskittyä pitkän aikavälin menestykseen ymmärtämällä, että etätyötä ja paikan päällä tehtävää työtä on hallittava eri tavalla. Siirryttäessä pandemian jälkeiseen aikakauteen organisaatioiden tulisi luoda ympäristö, jossa heikot verkostot, jotka yhdistävät tiimejä ja kurovat umpeen organisaation rakenteellisia aukkoja, voivat kukoistaa.

**Table of Content**

Attachments

Attachment 1. Research questions and themes

# 1. Introduction

The coronavirus disease (COVID-19) pandemic changed the way we work. In Finland, extensive restrictions were imposed on workers, forcing them to work from home from March 2020 (Ministry of Social Affairs and Health, 2022). The impact was major for knowledge workers, as before the pandemic most knowledge workers worked mainly in offices. The COVID-19 crises forced knowledge workers to start to work from home overnight. This led to a rapid spread of digitally enabled communications, which changed the way people work and interact, such as how information is shared, what systems are used, and how relationships and networks are built and maintained.

The aim of the study was to examine how the shift from office-based to home-based work due to the COVID-19 pandemic influenced knowledge workers' experiences of their social networks and relationships within the organization. Little is known about whether and how this change in the work environment changes workers' relationships and networks. Networks are key to success in a complex working environment (Schein 2019). They allow information flow smoothly and give meaning to sometimes difficult and nuanced information (Granovetter, 2005). Networks have been identified as a key element of the social capital of knowledge-intensive organizations (Nahapiet and Goshal, 1998).

Knowledge-intensive companies require high levels of both social and human capital (Subramaniam and Youndt, 2005). Human capital can be described as the experiences, knowledge, and skills of organization´s employees (McElroy, 2002). Social capital, first introduced by Coleman in 1988, is flow of information (Coleman, 1988), relationships, networks and trust as well organizations shared norms, values and language (McElroy, 2002; Nahapiet and Goshal, 1998; Organization for Economic Co-operation and Development (OECD), 2001). By combining the human capital of knowledge workers with social capital of organizations, organizations can create new intangible and tangible assets that enhance organizational performance (Subramaniam and Youndt, 2005). Unless human

capital, such as knowledge, is networked, shared and transformed through relationships, it is of little use to organizations (Burt, 2000, 3; Nahapiet and Goshal, 1998).

To better understand the components of social capital, we need to look at the work of Nahapiet and Goshal (1998). They considered social capital as an actual and potential resource that an individual or group can draw from networks and divided social capital into three dimensions, structural, cognitive and relational (Figure 1). The structural dimension refers to networks, relationships and appropriate organization. The cognitive dimension refers to shared narratives, codes and language. And the relational dimension consists of trust, norms, obligations and identification. The dimensions are highly linked together and interact with each other and are required for utilization of organizations social capital (Nahapiet and Goshal, 1998.) Thus, for an organization to have rich internal networks, it must have shared values, norms and language, as well as organizational structures that support network formation and continuity. Trust is also needed to enable successful networking and communication. (Nahapiet and Goshal, 1998.)

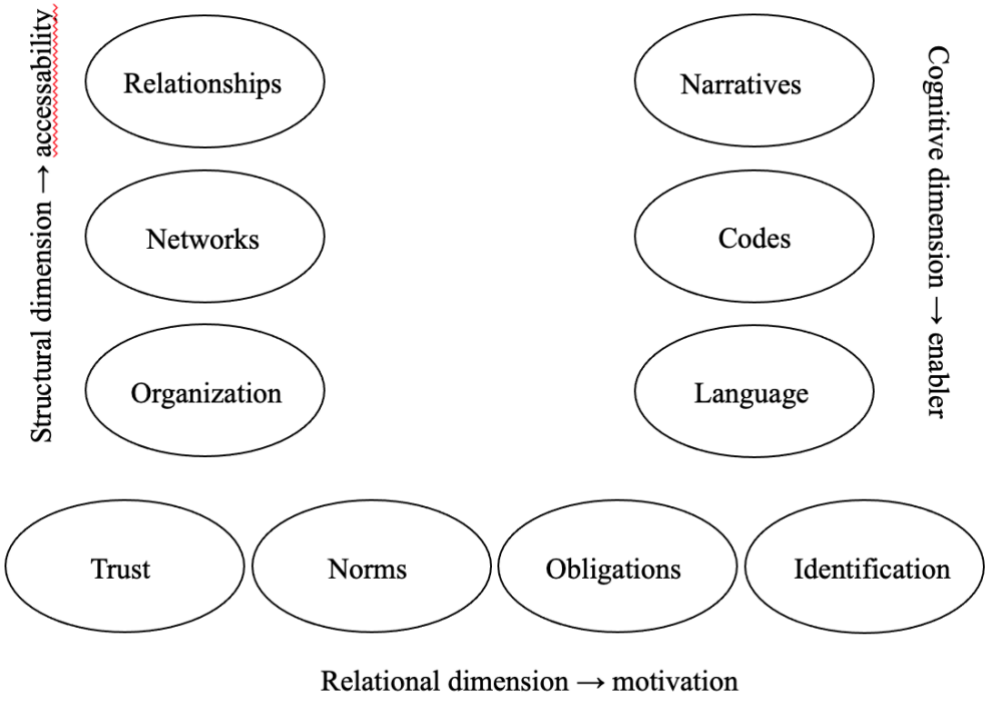


Figure 1. Social capital dimensions. Adapted from Nahapiet and Goshal, 1998, 251.

The structural dimension of social capital gives structure to an organization. Networks, network relationships, their structure and suitability determine who you reach and how. Every team and every employee have different network relationships. Patterns of linkages can be measured by density, interconnectedness, hierarchy and appropriate organization. Relationships facilitate the exchange of knowledge and increase intellectual capital. Organizations can strengthen relationships by building networks and promoting interaction between individuals. Networks of social relationships, especially those based on weak ties, i.e. irregular meetings between individuals, can provide important new insights for innovation. It is also essential to create social relationships that fill so-called structural gaps, i.e. areas where individuals are not connected by organizational structure or working practices. (Nahapiet and Goshal, 1998; Burt, 2000.)

The cognitive dimensions shared language and codes helps people to communicate in a meaningful way and to share information in a form both parties understand. Shared language enhances trust and makes communication easier within and across professions. Shared narratives facilitate knowledge sharing and combining knowledge. This enhances relationships and networks building stronger ties between partners. (Nahapiet and Goshal, 1998.)

The relational dimension consists of trust, norms, obligations and identification. Relational dimension influences access to parties and motivation of parties to engage in activity. Relational embeddedness describes the kind of personal relationships people have developed with each other through a history of interactions, focusing on respect and friendship. Trust increases willingness to co-operate and fastens formation of relationships. (Nahapiet and Goshal, 1998.)

In summary, social capital defines the requirements that employees need in order to build and maintain networks and relationships within an organization. Some organizational structures are more conducive to collaboration and networking. Social capital had been

shown to have a positive impact on both incremental and radical innovation capabilities in companies with high levels of intellectual capital (Subramaniam and Youndt, 2005). In addition companies with high levels of social capital also systematically outperform other companies in times of economic difficulty (Fiordelisi, Galloppo and Lattanzio, 2022). Social capital is an enabler which gives individuals and groups a base to build on. This study focused on selected components of social capital. The focus was on individuals and their experiences of networks and trust. This was chosen on the basis of a study by Nahapiet and Goshal (1998), which highlighted the importance of social networks as a key component of social capital. And trust was included because it has been shown to be an important coordination mechanism in social networks (Burt, 2000). Organizations was selected as a key framework due to their importance in today's societies. Much of social life takes place within formal organizations. Organizations are a means for people to achieve economic, social and other goals. They provide individuals with access to a wide range of resources. Organizations have been studied extensively and are used in sociological research processes such as network formation. (Haveman and Wetts, 2019a.)

### 1.1. Research questions

This study is looking for individuals' experiences in organizations. The study aimed to research the influence of COVID-19 on the knowledge workers social networks and relationships within an organization.

The main research question of this study was:

*How did the COVID-19 pandemic change the social networks and relationships of knowledge workers in an organization?*

Supporting research questions were:

1. *How did the COVID 19 pandemic change the landscape of networks and relationships in an organization?*

2. *How did the building and maintaining of trust in social networks and relationships change in the wake of the covid-19 pandemic in an organization?*

The focus was on the influence of the changes brought about by COVID-19 on how knowledge workers perceive their interactions with each other in the organization. Knowledge workers have ability to work independently on often complex and varied tasks that require continuous learning and where quality of output is key (Drucker, 1999). They need to work with knowledge and other intangible resources to create new intangible and tangible assets to improve organizational performance (Nahapiet and Goshal, 1998). This complex process often requires knowledge to be processed through relationships (Burt, 2000). Thus, the potential changes to intra-organizational networks brought about by COVID-19 are of great interest in today's knowledge-intensive work environment, where the effectiveness of knowledge workers is important for organizational performance (Drucker, 1999). Next the main concepts impacting or on focus of this work will be described.

## 1.2. Main concepts

*The COVID-19 pandemic* was a global pandemic caused by the SARS-CoV-2 virus. It forced many workers to switch to remote work in Finland in early 2020. The pandemic affected people around the world. Respiratory symptoms ranging from mild to severe were observed in infected people. Older people and people with other illnesses were more likely to develop severe illness. However, anyone could become seriously ill or die, regardless of age. The virus spread easily from person to person when people breathed, talked, sang, sneezed or coughed. The best ways to prevent infection were to stay away from others, wear masks, wash your hands and get vaccinated. (World Health Organization, 2022.) Due to the nature of SARS-CoV-2 virus it transmitted widely also in workplaces. Organizations and governments set recommendations and restrictions on how to prevent transmission of SARS-CoV-2 virus. World Health Organization (WHO) and International Labour Organization (ILO) also set recommendations for occupational safety and health related to COVID-19 to

prevent transmission of SARS-CoV-2 virus. Physical contact between people, inadequate ventilation and shared workspaces, common travel or dining areas increased the incidence of COVID-19 in organizations. In particular, proximity to people contributed to the incidence of the disease and the risk of infection was correspondingly lower if the work tasks allowed for remote working or if the work was of a type where there was little interaction with other people. In workplaces, the main factor in preventing COVID-19 cases has been the promotion of remote working. Governments have recommended or ordered non-essential workers to remote work. In addition, organizations have issued their own regulations on remote working. (WHO, 2022; ILO, 2021.) The government recommendation on remote working was introduced in Finland in October 2020 and abolished in March 2022 (Ministry of Social Affairs and Health, 2022). In addition, organizations have made their own more stringent remote working recommendations since March 2020, and not all organizations have yet removed their own remote working recommendations.

*Organizations* are collections of people, materials, information and financial resource. The members of an organization have common goals that they work together to achieve. Organizations can affect individuals within and outside the organization, other organizations and society as a whole (Haveman and Wetts 2019a.) The demographic, relational and cultural perspectives form the core of the currently dominant organizational theory. Social structure consists of the distribution of social actors across dimensions of both social and physical space, with different networks of social relations. Perceptions of reality and possibilities shape the former. The perspectives look at things from slightly different angles and thus support each other. (Haveman and Wetts, 2019a.) Organizations are an important part of society and, because of globalization, of our shared world. It must be remembered that organizations are made up of individuals. While organizations tend to be rational, they also exhibit aspects of non-rationality, as individuals bring non-rationality to the organization as part of rationality. Rationality gives organizations a clear direction to move forward. However, organizations need to stop and think and, prepare for the unexpected and uncertainty. Non-rationality allows organizations to prepare for the unexpected and the unknown of the world (McCabe, 2016). An organization is a community with shared policies and rules and exists for a purpose. It has a structure that enables it to function and is

connected to the environment around it, such as other actors, culture, laws and like in recent years the COVID-19 pandemic.

*Knowledge workers* are individuals who perform a variety of knowledge-intensive tasks to create innovation and solve complex problems in organizations (Drucker, 1999). Knowledge workers have high levels of human capital, which can be described as experience, knowledge and skills (McElroy, 2002). If we think of organizations, individuals build the human capital of organizations. For an organization to fully utilize knowledge workers, their human capital must be transformed into intellectual capital through the social capital of the organization (Nahapiet and Goshal, 1998; Subramaniam and Youndt, 2005). It is known that social networks are an essential part of social capital (Nahapiet and Goshal, 1998) and that they play a specific role in the processing of knowledge (Burt, 2000), which can affect the productivity of knowledge workers. The productivity of knowledge workers focuses on the quantity and quality of outputs (Drucker, 1999). Factors affecting knowledge workers' productivity include knowledge-related tasks, knowledge workers' self-management skills, their perception of job autonomy and their ability to learn and teach others on an ongoing basis. In addition, knowledge workers must be valued as important resources to be motivated. (Drucker, 1999.) Knowledge workers are individuals, and their productivity can also be affected by the varying degrees individual commitment to the organization. Commitment influences individuals' work behaviour (Allen and Meyer, 1996). Commitment can be affective (emotional attachment), continuance (perceived costs) or normative (sense of obligation) (Allen and Meyer, 1996) and can thus indirectly affect social networks and possibly organizational success.

*Social networks are relationships* between individuals, groups, organizations, or societies (Katz, Lazer, Arrow and Contractor, 2004). They can be interpersonal or interorganizational relationships or friendships. When analyzing network ties, the analysis can be done in multiple levels like in individual-to-individual level or individual-to-group level (Katz et al., 2004). Networks in organizations can be official or unofficial and span structural holes in organizations (Burt, 2000; Coleman, 1988). This study focuses only on social networks and relationships within the organization and how individuals perceive the changes in their

networks caused by the COVID-19 pandemic. The focus in not on measuring networks. The following chapters discuss in more detail the different types of networks and the requirements for setting up and maintaining them.

*Trust* is a property inherent in human relationships (Granovetter, 1985). It is thus required for the formation and continuation of networks. Trust is an essential part of relationships. Trust is the expectation of the other party's expertise, integrity and goodwill. It complements other coordination mechanisms and without trust cooperation is limited. Trust enables communication, commitment and collaboration efficiently and effectively. It has a big role in situations when there is a risk, vulnerability, interdependency, power and information asymmetry as well as complexity. Trust decreases cost and risks in cooperation. Trust will be further discussed in the next chapter because it is an integral coordination mechanism in knowledge intensive networks. (Adler, 2001.)

This work looked at networks and relationships from an individual perspective in an organizational context. How knowledge workers experienced change in their networks and relationships before and during the COVID-19 pandemic. Emphasis was also placed on the role of trust. Trust has been shown to be an essential factor in building social structures and relationships between people. Key findings showed that social networks and relationships persisted during remote work during the COVID-19 pandemic. However, there were changes in the overall structure of networks within the organization. Strong network ties were strengthened, and weak ties weakened. The following chapters discuss in more detail the literature on the changing work environment, social networks and relationships and trust. Then research sample, methodology and results of the empirical study will be described. Finally, the results are discussed, conclusions are drawn, and managerial implications are discussed.

# 2. COVID-19 and the working environment of knowledge workers

There are multiple metaphors used to describe the impact of COVID-19 pandemic like “war” (Oswick, 2020) or “wicked problem” (Moon, 2020) on the society. COVID-19 restricted individuals’ social interactions and forced them to work remotely (WHO, 2022; ILO, 2021). The COVID-19 pandemic was seen as a process in which we were all involved, as we are collectively connected to a changing world (Langley, 2021).

Already before COVID-19 pandemic it was often debated about where work should be done. COVID-19 changed the way we work overnight. COVID-19 restricted people's contacts and forced knowledge workers who were used to working in an office to work remotely. This section discusses both office and remote work and their implications on knowledge workers.

## 2.1. Office work

Office work in many organizations before COVID-19 meant that people worked or were forced to work in an office. Employees may have had their own rooms, or they work in open plan offices. Offices provided a variety of spaces for formal and informal meetings and interaction. Employees working in an office worked every day in the same place where they met their colleagues. Some companies specifically favored working in offices. For example, Yahoo banned its employees from working from home because they felt that it weakened the organization’s ability to innovate (Pathak, Bathini and Kadathil, 2015,12). Working from an office was associated with better communication between employees (Pathak et al., 2015, 12). However, working in an office is no longer seen as so strongly necessary. Some companies started to adapt remote working strategies even before the COVID-19 pandemic, but still favoured office-based communication for collaborative work (Pathak et al., 2015, 14).

## 2.2. Remote work

COVID-19 forced employees to work from home overnight (Jaiswal and Arun 2020; Yang et al., 2020). In this study, remote work is defined as a practice where employees mainly work from home or occasionally from other remote location instead of working in an office. This means that all work-related tasks are performed remotely using technology-mediated communication and tools (Allen, Golde and Shockley, 2015; Garret and Danziger, 2007; Golden, 2006). Brem, Viardot and Nylund (2021) studied the phenomenon and showed that technology evolved during the pandemic to provide a variety of tools, such as enhanced video conferencing, to perform work tasks and communicate.

Networks and relationships are essential part of organizations. There are limited studies on how remote work changes relationships and impacts on organizational performance. It has been shown that widespread remote work is likely related to changes in information exchange (Blau, 1964; Daft and Lengel, 1986; Wayne, Shore and Liden, 1997). And the socio-emotional elements of relationships are less easily exchanged when working remotely (Daft and Lengel, 1986).

A recent study of public sector workplaces during COVID-19 pandemic by Jämsen, Sivunen and Blomqvist (2022) showed that interpersonal communication decreased during COVID-19 when people worked remotely. Employees described how communication with colleagues had changed compared to the time they were working in the office. Workers experienced a loss of natural encounters with people. Previous daily lunch, coffee and hallways chats in the office provided peer support and humor that was not available when working remotely. They also found it more difficult to contact and receive support from colleagues when working remotely. This challenged communication. However, some employees experienced it oppositively. Overall remote work was experienced beneficial to get job done. (Jämsen et al., 2022.)

## 2.3. Hybrid work

In hybrid work employees work remotely and in an office. The COVID-19 pandemic defoliated, and employees started to work again in the offices. The work won't return full time to offices but will contain both working remotely and from office. Hybrid work is anticipated to thrive after COVID-19 pandemic. Golden (2006) studied the impact of hybrid work on work satisfaction. Job satisfaction was related to amount work was done remotely. Allowing remote work increased job satisfaction but increasing the amount worked remotely led to decreasing job satisfaction. They also showed that the amount of work done remotely had an impact on relationships with manager, peers and family. Employees had frequent relationship with their manager, but they did not prioritize they relationships to co-workers. (Golden, 2006).

The hybrid work might benefit new type of office design. During the recent years the design of organization premises has moved towards activity-based design. Social interaction and networking are seen as important and are reinforced through space design, including informal encounters. Alternative spaces for individual, group and project work have also been created. Spaces are also seen as an enabler of organizational culture. Leadership challenge is to adapt to the situation, as work is increasingly done in networks when more time on collaboration and networking is needed. (Hunnes Blakstadt, 2015.)

## 2.4. Knowledge workers in a changing environment

The place and the way we work affect on how we communicate and collaborate with each other. In knowledge intensive work, it is important for companies to have high level of human capital and social capital (Subramaniam and Youndt, 2005). Knowledge workers have a wealth of human capital that they use to gather and use knowledge in their work (Drucker, 1999; McElroy, 2002). This is not enough but knowledge workers must also have access to critical resources. Knowledge and colleagues are key resources for knowledge

workers, providing critical resources for success. Social networks and relationships within company provide access to knowhow and resources (Burt, 2000).

In a changing work environment, it is important to understand how change affects the productivity of knowledge workers. To understand to potential impact of COVID-19 on knowledge workers, factors associated with knowledge workers productivity can be examined. Building on the work of Ramírez and Nembhard (2004) and Tangen (2005), Kianto, Shujahat, Hussain, Nawaz and Ali (2018) proposed that productivity could be assessed on three dimensions; 1) meeting deadlines, 2) meeting required standards and quality of work, and 3) job autonomy. These can be further divided into organizational and individual factors. One of the organizational factors is the ability to put knowledge workers´ knowledge into action to create innovations (Kianto et al., 2018). Based on the social capital and network studies, an important aspect is the influence of the environment on collaboration, as collaboration can transform knowledge into innovation (Burt, 2000; Nahapiet and Goshal, 1998). A changing environment may affect the effectiveness of knowledge workers' collaboration in social networks. However, very little is currently known on this topic. In remote work, the quality of collaboration and the number and diversity of potential collaborators can be a challenging. The next chapter will look more broadly at social networks and relationships within an organization.

# 3. Social networks and relationships

Social capital consists of social norms, information flows, obligations, expectations (Coleman, 1988) and organizational networks (OECD, 2001). It is an organizational resource derived from networks of individuals and groups (Nahapiet and Goshal, 1998). This section will focus on networks and relationships. First, the perspectives behind network research will be examined and the role of networks in an organization will be discussed. It then defines strong and weak networks, open and closed networks and the different mechanisms by which networks can be built. It also focuses on the importance of information flow in networks and what is required of individuals and organizations to build and maintain networks that lead to better performance.

## 3.1. Perspectives on network research

Network research draws on several theoretical approaches that look at the phenomenon from different perspectives. Theories of social exchange are based on early studies by Homans (1961). According to Homans individuals will participate in exchange when three circumstances exist. At first a partner needs to have something that the other partner does not have but he needs. The second is that values have to be same. And the third everybody have to get more than they give. The other early study by Thibaut and Kelley (1959) argue that the level of satisfaction in relation to rewards and expenses in exchange process determines whether exchange will happen.

Coleman (1988) drew on the learnings from economics rational action which he incorporated into social systems. He introduces theory of self-interest as a missing component in the previous social exchange models. He was the first who introduced the term social capital and defined it as including social norms, the flow of information and obligations and expectations. The interaction between two actors, each acting in their own self-interest, creates the basis for a social network. In this interaction, each actor seeks to maximize its

own individual interests. However, the maximization of interests is limited, as both are bound to each other in an interdependent relationship regulating behavior and selfishness. The relationship provides both parties with more resources through the other actor. (Coleman, 1988; Katz et al., 2004.)

Granovetter (1985) emphasized the role of networks in building trust, creating norms and setting expectations. In his later research he highlighted three reasons why social networks are important and affect economic performance. First, social networks facilitate the flow of information and give meaning to sometimes difficult and nuanced information. Second, they play an important role in reward and punishment. These mechanisms are mediated by shared norms of behavior. The mechanisms become stronger as the density of networks increases. This is because in a dense network, information flows better and it is more difficult to deviate from norms that favor acceptable behavior and punish inappropriate behavior. The third mechanism is trust in others to do the right thing. Again, this is more likely in dense and cohesive networks. (Granovetter, 2005.)

Schein (2019, 142) points out that relationships are key to success in a complex working environment "*The minute work becomes in any way complex and requires any kind of collaboration and coordination, then you must reduce the distance between the boss/leader and the subordinate/employee and treat that relationship as a more personal relationship in which you'll look for a higher level of trust, at least in regard to the work to be done.*" Investing time in relationships creates the unconditional trust needed to make people want to work towards common goals (Jones and George, 1998). Individuals and organizations with better relationships and connections perform better, and their relative position in the network brings value to individuals and groups. Networks create trust and obligations to others, which lead to support for others, and through exchange, dependence. (Burt, 2000.)

The following chapters focus on the different types of networks, the different connections within networks and the role of brokers in network formation. The importance of network diversity and the advantages and disadvantages of networks are also discussed.

### 3.2. Network mechanisms

Closure is one of the key mediation mechanisms in networks. Closure defines how people are linked to each other. In networks with closure everyone is connected, and information flows efficiently (Figure 2.). Closure makes networks trustworthiness. Social control develops in closed network and becomes its main control mechanism. Social control and norms define who can be part of the network. If you do not follow the norms, you can´t be part of the network. Closed networks provide their members with support, resources and timely information. (Coleman, 1988).

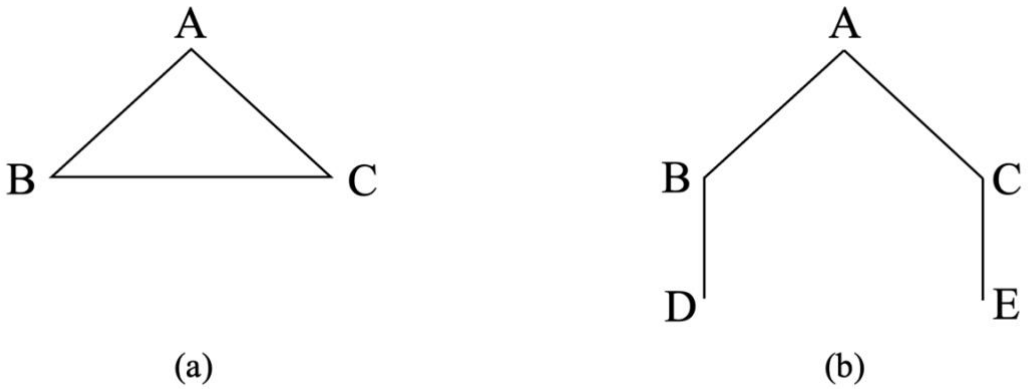


Figure 2. Network in (a) has a closure and in (b) there is no closure. Adapted from Coleman, 1988, 106.

Another network mechanism is brokerage. Brokerages connects areas where people do not have social connections within an organization. These areas are called structural holes. Structural holes lead to a situation where information is not shared between people. People know each other, but their work roles do not coincide, so they do not have a common point of contact or interest in the activities of another group or people. (Burt, 2000.) Broker is used to describe a person who is connecting different people or groups together which are not occurring otherwise. (Burt, 2000.) Brokers fill structural holes when they seek to connect individuals or groups who are not directly connected. This broking connects non-redundant people to each other and increases social capital as they 'mediate' the flow of knowledge and

information between those who are not directly connected. Networks covering structural holes bring new knowledge to people. (Burt, 2000; Kwon, Rondi, Levin, Massis and Brass, 2020).

## 3.3. Network and relationship ties

Individuals´ networks relationships can be strong, weak, or absent. Organizations have networks of both strong and weak ties (Figure 3.). *"The strength of a tie is a combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie"* (Granovetter, 1973, 1361).

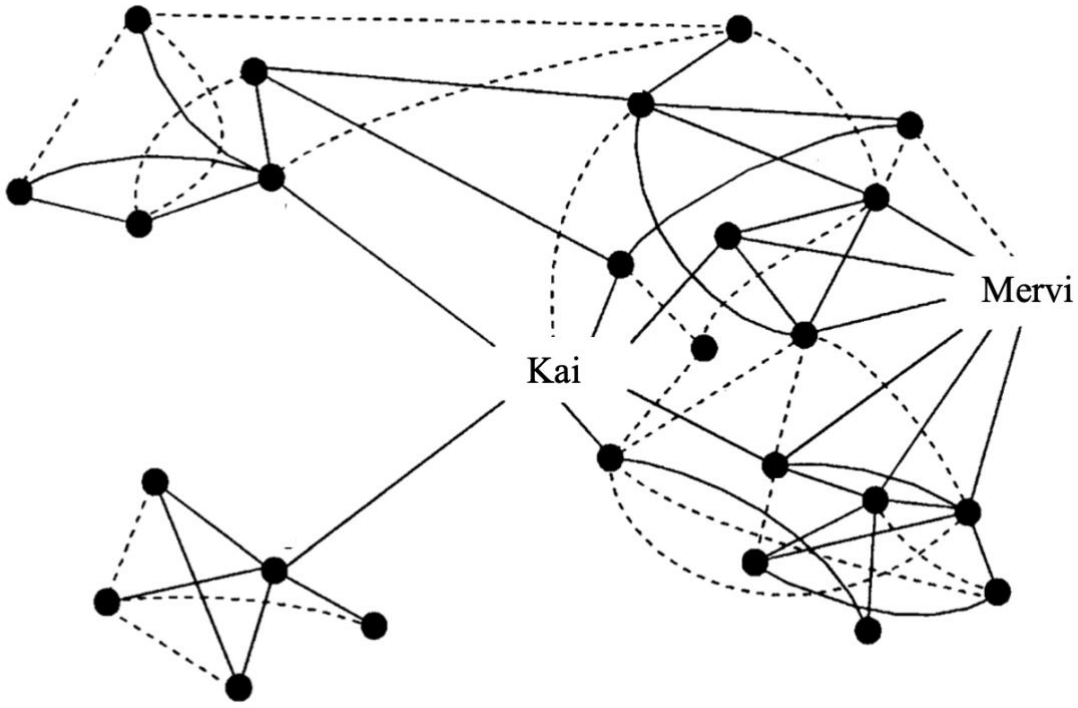


Figure 3. Illustration of network of weak ties (dotted line) and strong ties (black lines) in an organization. Adapted from Burt, 2000, 349.

Strong network ties are direct and intense, involving investment of time, loyalty, emotion and reciprocity (Granovetter, 1973). Strong networks provide personal support, increase knowledge transfer in a group, facilitate compliance with norms, build trust and improve team performance (Coleman 1988; Granovetter, 1973, 2000; Adler and Kwon, 2002; Uzzi and Spiro, 2005). However, there cannot be too many networks with strong ties due to the needed time investment (Granovetter, 1973; Burt 2000).

Weak ties are irregular meetings and can be relationships of mutual appreciation. They are valuable e.g., for mobilizing resources, being able to ask for something and for contact opportunities. The number of weak relationships is not limited at the same way than the number of strong relationships. Employees can have almost unlimited number of weak relationships. Weak ties are important to information exchange and in a group level they build general trust within communities and between diverse groups. Weak ties can connect otherwise unconnected groups, bridging gaps in networks. (Burt, 2000; Granovetter, 1973; Yakubovich, 2005.)

### 3.4. Network connections

Networks connections are contacts between individuals in a network (Burt, 2000). There are different types of connections inside networks and between different networks in an organization. Connections differ on based where they are focusing on. The key types of social capital connections are bonding and bridging. Of these, bonding meaning internal ties within group and bridging meaning external ties between groups (Adler and Kwon, 2002). Next bonding and bridging will be further explored.

Bonding is a strong connection between network or group members. Bonding describes the frequency of working relationships. High bonding creates a feeling of "our gang", with clear boundaries, i.e. closed network and strong ties between individuals. When there is a high bonding, people trust to each other, knowledge flows and you can ask for help. These facilitate the pursuit of common goals. Downsides of high bonding occurs when it creates

horizontal silos. That might hinder knowledge flow and communication between functions if there is no bringing between the functions or investment in bridging between functions or units. (Coleman, 1988; Adler and Kwon, 2002.)

Bridging enables functions and groups to discuss with each other. When there is a mechanism of bridging people from different functions, units or groups discuss and work together. Weak ties are typical of bridging social capital. Bridging capital allows individuals and groups to access information at an early stage and increases learning (Burt, 2000). Brokerage is one way of bridging structural holes in organizational social networks, although Adler and Kwon (2002) talked only of external relationships when they discussed about bridging. Organizations with a strong bridging mechanism understand the value created by networks that cross internal organizational boundaries. (Adler and Kwon, 2002; Burt, 2000; Granovetter, 1973.)

## 3.5. Benefits and downsides of networks

*Benefits*

Who you know is important because networks can help people do their jobs better (Reagans and Zuckerman, 2001). It affects what you know and when you know it, including how much resources or help you can get when you need it. Networks are especially important in non-hierarchical organizations. Networks increase the flow of information. However, the greater the distance between people, the less information flows. There is less information flow between groups than within groups. (Burt, 2000.) Through networks and relationships, individuals and groups can gain important knowledge. Networks of social relations, especially weak ties and structural holes, provide new knowledge that is important for innovation. Weak ties are important because new knowledge can be quickly acquired from different networks. (Nahapiet and Ghoshal, 1998.)

Trust is required in strong ties. Trust increases adaptability by reducing transaction costs and transferring tacit and complex information. Trust also increases the willingness to cooperate,

speeds up the flow of information and facilitates the transmission of complex tacit information. A common language increases trust and facilitates communication within and between professions. (Nahapiet and Ghoshal, 1998.)

Wu, Antone, Srinivas, De Church and Contractor (2021) examined the impact of networks on work performance during the COVID-19 pandemic. They showed that during the COVID-19 pandemic, workers with connections between different team's members performed better. Relationships within teams were not found to influence job performance (Wu et al., 2021). Team ties to other teams increase diversity (Reagans and Zuckerman, 2001). The finding of Wu et al. (2021) may be due to the performance-enhancing effect of increased diversity. Increased diversity in network groups has been linked to their performance. If diversity decreases, cohesion and trust between group members deteriorate and performance is reduced. Diversity increases the availability of information, which increases performance. When team networks are heterogeneous, teams tend to learn better. Productivity was higher in knowledge-intensive teams with denser interaction networks than in teams with sparse networks. However, boundaries should not be too large as to prevent communication. It should also be taken into account that high network heterogeneity can increase conflict among members and thus reduce network performance on outcomes other than productivity. (Reagans, Zuckerman, 2001.)

*Downsides*

Networks also have disadvantages. Closed networks limit openness to new ideas and increase collective blindness (Nahapiet and Ghoshal, 1998). The same information circulates in a group, and group members start thinking in the same way. The danger is that groupthink becomes the norm and new knowledge is not incorporated into the discussion and decision-making process (Portes, 1998). This reduces innovation and renewal and increases normative thinking (Portes, 1998; Adler and Kwon, 2002).

In addition, individual freedom and deviant thinking may be restricted. This calls for more uniformity, a downward leveling of norms and more community sanctions. It may also create

limited solidarity, which can be seen as silos within an organization. There is also the possibility of excessive demands or free riding on group members. (Portes, 1998.) Strong ties can create excessive obligations and inhibit opportunities for radical innovation (Adler and Kwon, 2002).

As discussed, the networks bring to knowledge workers critical information (Burt, 2000) and knowledge for innovation (Nahapiet and Goshal, 1998) and to solve problems (Drucker, 1999). Several elements are required for an organization to enable formation and continuation of networks within the organization. The norms together with shared values, narratives, language, obligations and identification are critical (Granovetter, 2005; Nahapiet and Goshal, 1998; OECD, 2011). One of the critical components is trust. Trust has been shown to be one of the key elements in creation of human interactions and partnerships. The next chapter discusses trust. It focuses on the requirements of trust and its role as a coordination mechanism for relationships. It also building and evolving trust and different types of trust.

# 4. Trust

The social psychological approach sees trust as an inherent characteristic of human relationships (Granovetter, 1985). It has been shown to be one of the key factors in creating human interactions and partnerships, as trust develops in relationships over time (Blomqvist, 1997). Trust can take different forms in different relationships. It has been shown to be both a calculation of perceived gains and losses and an emotional response based on affection and identification between people (Rosseau, Sitkin, Burt and Camerer, 1998). Trust plays an important role in this work because trust is considered a key coordination mechanism in knowledge-intensive networks (Adler, 2001).

Trust is about expectations. Mayer, Davis and Schoorman (1995, 712) describe trust as "*the willingness of a party to be exposed to the actions of another party, based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party*". Trust is built through shared history and experience. In the beginning it is about the expectations that are created for employees, customers or peers, for example. Creating positive expectations and meeting expectations are key to building trust (Lewicki, McAllister and Bies, 1998; Rosseau et al., 1998). Trust is expectation of the other party's expertise and goodwill (Blomqvist, 1997). Humanity and warmth build trust between strangers (Blomqvist and Ståhle, 2011).

In a knowledge-based network economy, trust is an essential part of relationships (Adler, 2001). Trust is one of the important coordination mechanisms of economic exchange (Bradach and Eccles, 1989). It enhances cooperation and complements other coordination mechanisms. And it is an essential element of communication, commitment and cooperation (Adler, 2001.) It is of great importance in situations of risk, vulnerability, interdependence, asymmetry of power and information and complexity. Trust reduces the costs and risks of cooperation (Gambetta, 2000.) Trust is a source of competitive advantage because it is not equally available to all.

## 4.1. Building trust

Building trust starts with assessing trustworthiness. Individuals intuitively assess the trustworthiness of other people and organizations. The components of trustworthiness are competence, benevolence and integrity (Figure 4.). These seem to explain the intra-trust variation in trust in other people. (Mayer et al., 1995.) Competence consists of substantive knowledge and collaborative skills (Blomqvist and Ståhle, 2011). Collaboration skills reflect an individual's ability to work with people. It measures how easy or difficult it is to work with others. Benevolence or goodwill is built on an individual's intention, motivation, interest, respect, concern and morale (Mayer et al., 1995). It determines whether the parties are truly interested in working together and whether the relationship is important. Integrity defines behaviour and its consistency (Mayer et al., 1995). It includes identity, clear values and goals, one's ability to make choices and a realistic view of oneself. The weight of different factors in assessing integrity is context-dependent (Mayer et al., 1995).

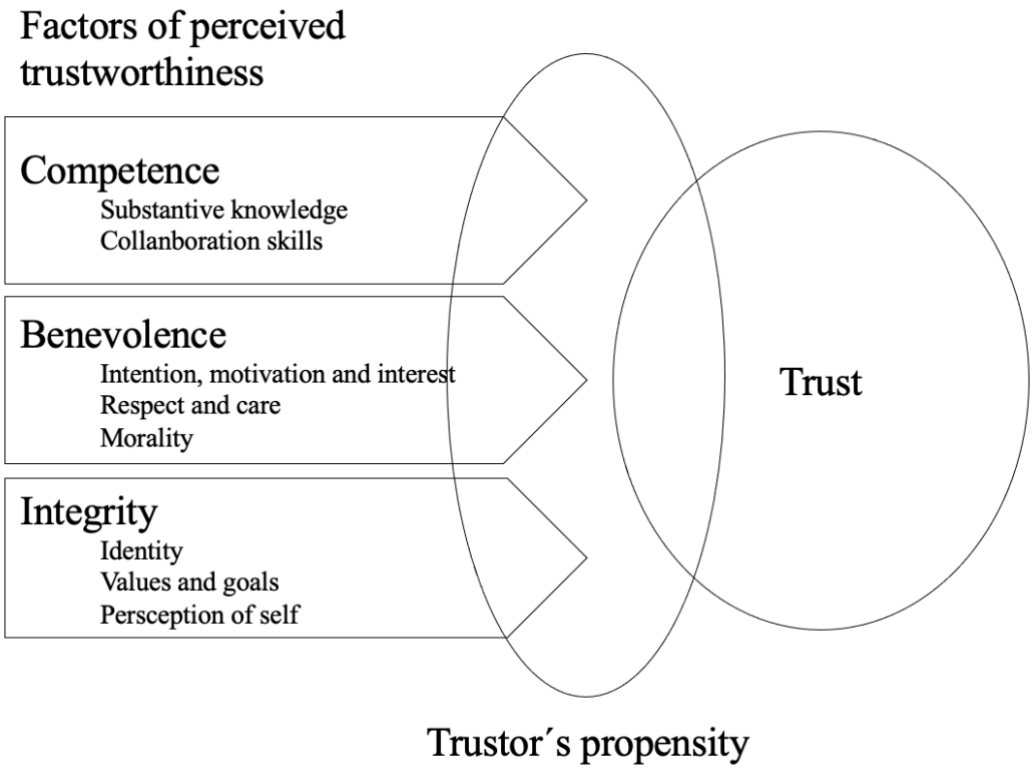


Figure 4. Factors that influence the development of trust. Adapted from Mayer et al., 1995, 715.

## 4.2. Experiencing trust

The experience of trust can be examined from a cognitive, attitudinal, emotional and value-based perspective. These different characteristics or emotional states interact and impact with each other and are different between individuals and in different situations (Figure 5.). Experiencing trust depends on individuals own values. Individuals´ values are typically quite stable and guide individuals' feelings and actions. Over time values may change due to gained new experiences, knowledge, or beliefs. Values impact on attitude-based experience of trust. Attitudes are seen here as gained knowledge and beliefs which create specific feelings and experience of trust. Cognitive-based experience of trust draws on previous experiences and knowledge. It impacts attitude-based experience of trust. It also may have a long-term effect on values. Moods and emotions also impact how individuals experience trust. Emotions-based trust is situation specific, temporal and not necessarily rational even though it has a big impact on experiencing trust. (Blomqvist and Ståhle, 2011; Jones and George, 1998.)

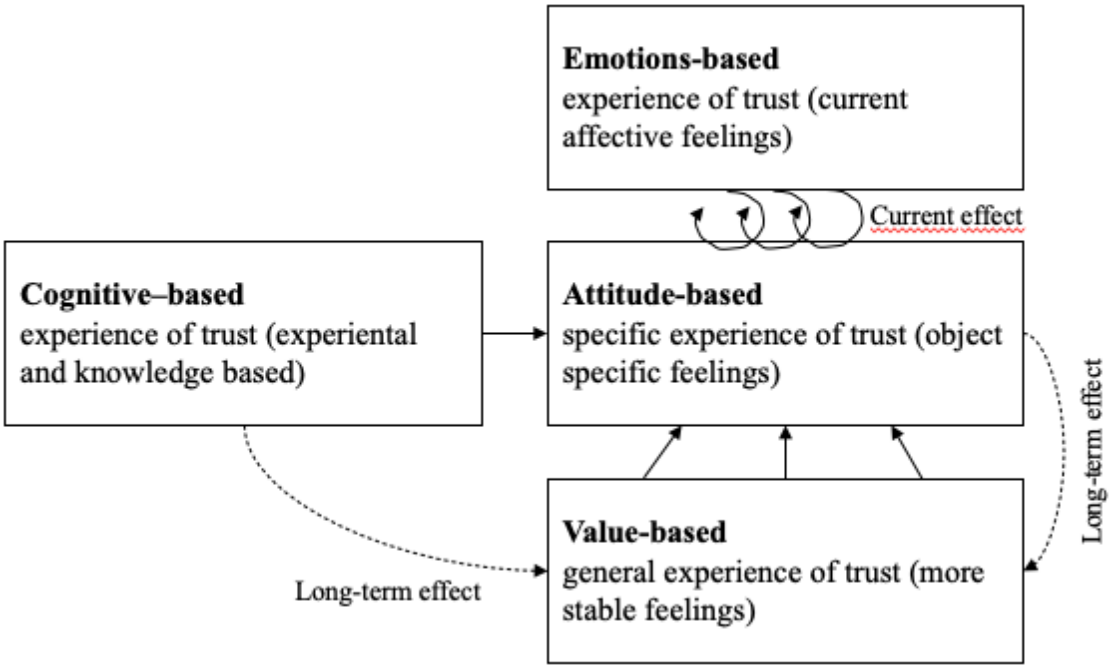


Figure 5. Experiencing trust. Adapted from Blomqvist and Ståhle, 2011, 6.

Trust evolves in relationships. Individuals tend to trust to other when creating relationships (Luhmann, 1980). However, as described in the previous chapter people mirror they own values to other partys´ values and if they feel that values are inconsistent with your own values it creates distrust between parties. In a long term to build trust further both parties have to put themself in someone else's shoes and share thought and emotions. These attitudes reinforce trust. Trust evolves in relationship and moods and emotions shape the relationship and trust. Positive emotions enhance trust and common understanding. Negative emotions creates distrust. The crucial point in the development of trust is the point at which both exchange partners trust each other's values and reliability, interactions create positive impact and the other is treated favorably. Trust before that point is conditional trust. For both parties to be willing to cooperate, both must behave appropriately, be able to see the other's point of view and interpret the situation in the same way. Conditional trust is the most common in organizations. Trust moves to unconditional trust when both trust the other party´s values, there is a positive attitude between the partners and interaction creates positive emotions. These kinds of relationships have mutual identification and relationships are meaningful to both parties. Trust has thus three forms; distrust, conditional trust and unconditional trust. Trust is dynamic process which evolves in relationships. Mechanisms that increase trust can, if implemented in the opposite direction, undermine trust. (Jones and George, 1998.)

Recent work in remote working setting showed that interpersonal trust was negatively related to adaptation to remote working (vanZoonen. Sivunen, Blomqvist, Olsson, Ropponen, Henttonen and Vartiainen, 2021). This interesting finding may be explained by the fact that normally relationships with strong trust produce positive emotions and feelings. In remote working, these interactions may have been fewer, which may have contributed to a reduction in daily positive experiences. This can lead to feelings of dissatisfaction and inefficiency. (van Zoonen et al., 2021.)

### 4.3. Trust in networks and relationships in organizations

Trust makes people and groups work together. Cooperation between people depends on the state of trust. Unconditional trust facilitates the transfer of information between colleagues

in organizations. In the case of conditional trust, attitudes in a group drive the process of exchange between the parties. Group members are less likely to cooperate in ways that require personal sacrifice. The relationship lacks certainty about the shared values that would guide future action. In addition, relationships are less likely to produce positive outcomes for the parties involved. As unconditional trust develops, the group becomes a team. Unconditional trust enables the team to work together to achieve common goals. Shared values define behavior, team members invest in the relationship, cooperation generates positive feelings and emotions, and team members look forward to the future rather than the status quo. Unconditional trust also promotes social processes that foster the development of synergistic relationships within the team (Figure 6) (Jones and George, 1998.)

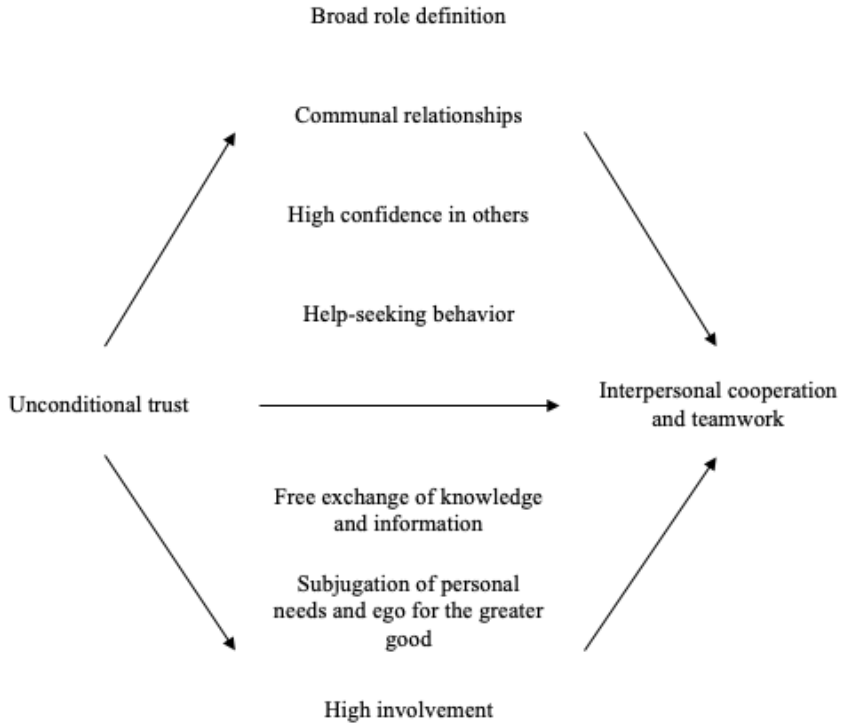


Figure 6. Unconditional trust impact cooperation and teamwork directly and through individual and organizational characteristics (Jones and George, 1998, 540).

In teams where there is unconditional trust, interacting with values, attitudes, feelings and emotions can lead to a situation where individuals see their roles in a broader perspective and contribute to the achievement of common goals, improved performance and collective advantage. Collective relationships in teams where there is unconditional trust are based on

a willingness to help. People want to help and are accountable. High levels of trust in others create synergistic team relationships and foster social commitment. Unconditional trust removes constraints on help-seeking behaviour and promotes information sharing. It also enables people to subordinate their personal needs and egos for the common good. Shared values increase commitment to teamwork. A team with unconditional trust works together towards a common goal. (Jones and George, 1998.)

## 4.4. Organizational bases for trust

Employees' trust in the organization can increase their willingness to invest time in building networks within the organization. Organizational trust and personal trust are closely related, although trust is always built and evaluated by individuals. Blomqvist and Ståhle (2011) built a model for organizational trust. Employees' trust in the organization is built on the same factors as individual trust; behavior, goodwill and competence (Table 1.) Behavior refers to self and organizational structure. The markers of goodwill are the support provided by the organization, goals and vision, leadership philosophy, culture and values. (Blomqvist and Ståhle, 2011.)

Table 1. Trust components and characteristics for organizational bases for trust

| Trust component | Behavior | Goodwill | Competence |
|---|---|---|---|
| Character | Self-reference | Organizational goals and vision | Competence |
| | Organizational structure | Managerial philosophy | |
| | | Organizational culture | |
| | | Organizational values | |

# 5. Theoretical framework of this study

The study sought to understand the changes that COVID-19 brought to organizations and individuals, and how knowledge workers' experiences of their own networks within the organization and how their perceptions of trust changed as a result of the pandemic (Figure 7). Understanding whether and how networks were changed by COVID-19 is crucial for any remedial action. Lessons learned from the perceived changes in networks resulting from remote working will help managers understand where knowledge-intensive organizations need to focus their efforts in planning for the future where networks flourish in the organizations. Networks matter because better networked individuals and organizations have been shown to perform better (Fiordelis et al., 2022; Subrananiam and Youndt, 2005). The key concepts of individual, organization, social networks and trust are strongly interrelated and interdependent. Social networks and intra-organizational relationships are the main areas of interest in this study. The research is approached from an individual perspective.

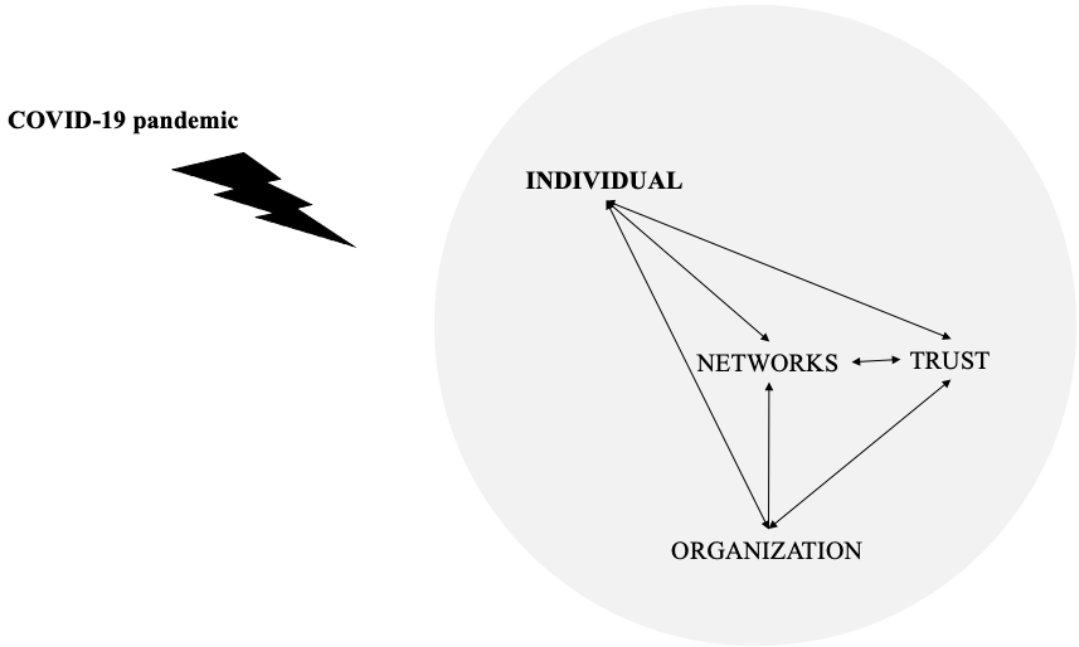


Figure 7. The theoretical framework of the study approached the changes to the networks within an organization caused by COVID-19 from an individual perspective.

Of particular interest was to understand how the COVID-19 pandemic and the shift from office to remote work influenced the types of networks and relationships, i.e. the different types of connections, whether it changed the method and frequency of communication, and whether it changed commitment and trust. The study was based on the literature on social networks in organizations, such as Burt (2000). And the importance of social interactions as part of social capital of knowledge intensive organizations (Nahapiet and Goshal, 1998).

The research was buildt on an understanding of the different networks and their different importance for the organization. Strong networks provide personal support, increase knowledge transfer within the group, facilitate norm of compliance, build trust and improve team performance (Coleman, 1988; Granovetter, 1973; Uzzi and Spiro, 2005). Weak ties, on the other hand are irregular encounters and can be relationships of mutual respect. They are valuable for example, for mobilizing resources, asking for help and providing contact opportunities. Weak ties are important for the exchange of information and, at group level, they build general trust within communities and between different groups. Weak ties can connect otherwise unconnected groups and bridge gaps in networks. (Burt, 2000; Granovetter, 1973; Yakubovich, 2005.)

Trust is handled as a key component of social capital and a necessary coordination mechanism in knowledge-based networks (Adler, 2001; Nahapiet and Goshal, 1998). Expectation is that trust enhances cooperation by enabling smooth communication and the necessary commitment (Adler, 2001).

# 6. Research methods

The following chapters present the chosen qualitative research strategy and research questions. This is followed by a description of the qualitative research methods used and the research sample. Finally, it turns to the data collection through interviews, the analysis of the data and the assessment of the validity and reliability of the study.

## 6.1. Research strategy and methods

A semi-structured qualitative research interview was used. A qualitative study was chosen to observe the changes experienced by knowledge workers in their work environment, their networks within the organization and the trust that the COVID-19 pandemic had brought about through remote working. There was little research on how the pandemic changes the network landscape of an organization, and qualitative research is a good way to understand the phenomenon. Semi-structured thematic interviews were used to gain a comprehensive understanding of how the change was perceived. A single case study can reduce the impact of factors related to organizational culture and practices and other organizational factors on the results. By focusing on knowledge-intensive work in commercial roles only, it was possible to form a smaller sample to fit the scope of the master's thesis (not yet reported). The case study and the use of a single group of workers also brings limitations to the generalizability of the findings. These limitations are discussed in the next chapter. The interviews were analyzed using Gioia method. Gioia method was selected because it has been successfully used to understand changes, which was the focus in this study. The method can generate theoretical insights useful also in other contexts. (Langley and Abdullah, 2011; Gioia at al., 2013; Gehman et al., 2018). This was a single case study.

## 6.2. Data collection

Themes and key questions were used in the interview. Individual level experiences and how individuals perceive, act, feel as well as what individuals think were assessed. Interviews had six themes that were discussed to answer the main research question and the two supporting research questions (Attachment 1). The themes were selected to support research questions and was drawn from the literature. Not all questions were used in all interviews and the order might have differed from interview to interview (Saunders, Lewis and Thornhill, 2009).

The first interview theme focused on understanding what kind of social networks and relationship knowledge workers had when they were working in the office/home. It was not known how extensive the networks or relationship were or what were the themes around which the networks were formed. This aimed to understand if the COVID-19 had an influence on certain types of relationship or networks. The second theme focused on understanding what methods were used to communicate in networks and how frequent the contacts were. This brought valuable information if the COVID-19 had influence on the methods networks and relationships were maintained and to understand if there were any changes in the frequency of communication. The third theme aimed to understand how knowledge workers built they networks and relationships. And the fourth theme aimed to understand the role of trust in building and maintaining relationships. Trust is known to be integral part of establishing new relationships and maintaining the established ones. This question aimed to focus on understanding how COVID-19 influenced methods used to build trust in relationships. The fifth theme focused on support knowledge workers were getting from their manager, peer or organization to maintain established or build new social networks and relationships. Aim was to understand what kind of influence COVID-19 had on organizational practices supporting knowledge workers networks and relationships. The sixth theme aimed to evaluate the perceived benefits the networks offered to individuals.

All themes focused on two time points. Before the COVID-19 pandemic, when knowledge workers worked in the office, and during the pandemic, when they worked mainly at home.

The interviews focused on the changes caused by COVID-19. In the interviews, all the themes were discussed before the COVID-19 pandemic and during the COVID-19 pandemic to understand the change caused by the COVID-19. In particular, participants were asked to reflect on the change that the COVID-19 pandemic had caused to their networks and relationships within the organization where they worked. The aim was to describe the change in social relations (formal and informal) caused by COVID-19.

The study was conducted two years and three months after the pandemic-induced remote working had begun in the organization. The long period of time may have affected the results, as the interviewees had to recall the situation more than two years ago, which may affect the reliability and validity of the study sample. The themes of the interviews were drawn from the literature and did not necessarily focus on new themes that may have emerged during the pandemic. However, the interview started with an open-ended question and the themes were discussed at length by the survey participants.

## 6.3. Respondents

Research sample was collected from the single knowledge intensive multinational company. The research sample consisted of seven individual technology-mediated semi-structured interviews. All interviews were conducted in Finland and in Finnish. All participant's work was knowledge intensive, and they had commercial role.

All study participants had worked from an office before the COVID-19 pandemic and had started working in the company at least half year before the COVID-19 restriction started in the company in March 2020. Meaning that the research participant had been worked in the company at least two years and nine months. When the restrictions started, all knowledge workers were forced to work from home. The shift was fast, and people moved to work from the office to the homes in a week. In the spring 2021 working from the office was allowed but the number of daily knowledge workers in the office premises were restricted. Only a

few people worked from the office. The COVID-19 restrictions and the remote work recommendation was in force during the interviews in May 2022 (Figure 8). The study participants had worked remotely for 27 months at the time of the interviews. Other demographic factors could not be described to ensure anonymity of the participants and the organization.

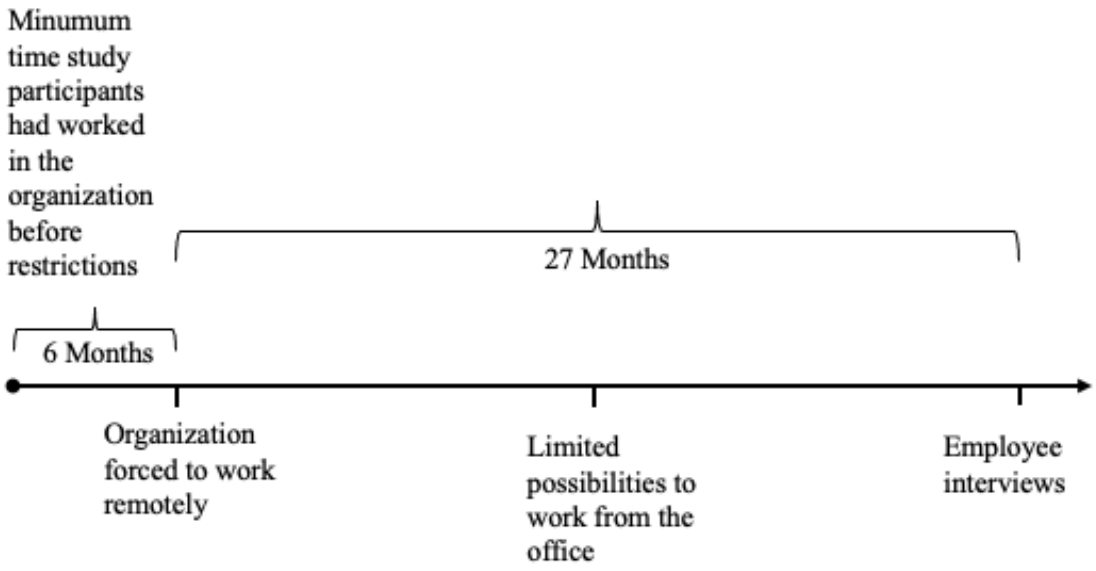


Figure 8. The timing of the interviews during the pandemic.

All interviews were scheduled by email contact. The interviews were technology mediated and were hosted on the Teams platform. Interviews were one to one. Each interview was scheduled and lasted for a one hour. All the interviews were recorded. The identification data was removed from all transcripts after the interview was held. The interviews took place in the second and third week of May 2022. A privacy notice was presented to the interviewees and a consent form was signed before the interviews.

## 6.4. Analysis of the data

The semi-structured interview data was analyzed qualitatively using Gioia method, meaning an inductive research method having systematic approach and rigor analytic method was used. Using interpretative research, the study aimed to gain a new understanding of a subject that has been little studied. (Gioia, et al., 2013). Both retrospective and real-time experiences were obtained from semi-structured interviews. The Gioia method ensures that the voice of the study participants is represented in the reporting of the research (Gioia et al., 2013). Through the research questions, the study aimed to find out, how COVID-19 changed knowledge workers social networks and relationships and if there were changes in perceiving trust in relationships.

The research sample led the analysis. Analysis started with anonymizing interview transcripts. Then research sample driven quotations were identified and organized to working data tables (example of the coding in Figure 9.). Coding started with open coding by creating first-order codes. The first order codes focused on perceived change the COVID-19 pandemic influenced. Coding was driven by research sample and represented empirical observations. The first order codes were based on quotes from interviews. Then the first-order codes were labeled into second order codes. The second-order codes were themes and influenced by theoretical observations. Next the second-order codes were grouped into aggregate dimensions. The aggregate dimensions were influenced by theory represented the findings of the study. Data tables were used to collect representative quotations of first order codes, and first and second-order codes to support coding structure. Data structure showed how empirical observations were linked to theoretical observations and finally to study results.

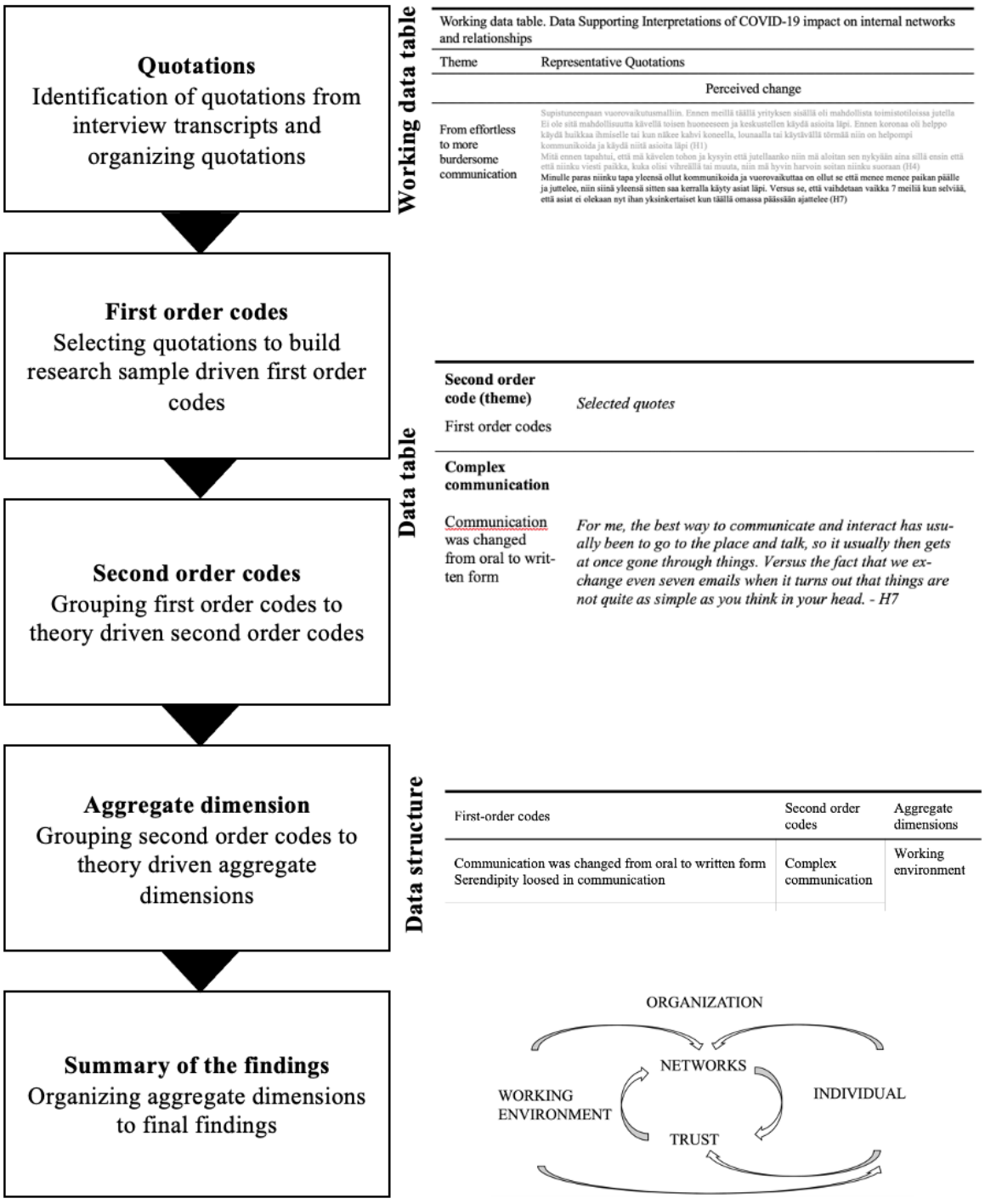


Figure 9. Schematic representation of the coding using Gioia method.

The interview transcripts were analyzed one by one to identify quotes from interviewees that related to the changes in networks and relationships caused by COVID-19. The themes that emerged from the quotations were identified. The quotes related to the different themes were

marked with different colors. After analysis of the first three interviews, the quotes that emerged from the empirical data were organized under the identified themes in working data tables. The themes were influenced by theory. After constructing the first working data tables, the remaining interview transcripts were analyzed one by one and representative quotes were collected in the working data tables. If new secondary themes emerged, a new working data table was created. After the analysis of each interview, working data table´s themes and related quotes were arranged in a more nuanced way. At the same time the visual representations drafting started using the emerged themes.

The transcripts of the interviews were then re-read and themes re-coded as necessary. The first order quotes were labeled with different colors to find out the most insightful quotes to be included in the final data tables and in a main text. Less powerful quotes were not used when reporting results. Some of the themes were also re-coded during the analysis process. This analysis revealed also quotes which were not in the right place or the theme related to them was not representative. These quotes were re-coded. Also, if some themes were only few first-order codes, a regrouping and the amount of evidence was considered whether to be included in the study. The analysis required cycling between emerging themes, codes and literature. Representative quotations and first order codes were grouped to theory driven second-order codes and reported in the final data tables. The data structure showing how aggregate dimensions was grounded in the data was built then. Aggregate dimensions were driven by theory. Finally, a visual representation of the study results was finalized. Data tables, data structure and visual representation of the results are presented in the result section. (Langley and A., 2011; Gioia et al., 2013; Gehman et al., 2018.)

## 6.5. Research reliability and validity

Reliability refers to the reproducibility of the study and its results, and validity refers to whether the study has investigated what it was intended to investigate. To ensure reliability, the research method and inductive coding were described step by step. The data tables show the quotes from informants and the first and second level codes and themes developed by the researcher. Finally, the data structure allows the reader to follow and repeat the process of how the concept was formed. The analysis of the research sample was conducted by one researcher. This may lead to the reliability of the analysis being questioned because the other researchers did not validate and verify the interpretations. However, the interview transcripts and coding were read several times and done iteratively and checked several times to ensure that the data and codes fit. This is typical when using the Gioia method (Gioia et al. 2013).

To control validity, the interview themes were taken from the literature. There was no ready-made list of interview questions, so an interview framework was created specifically for this study. The interviews were semi-structured, allowing informants to discuss issues at length, which allowed for the uncovering of new emerging issues and the construction of new concepts. The topic was also easy for participants to understand, and responses were long and included their own reflections. The interviews were open in nature and participants were interested in the topic. The interviews followed semi-structured interview themes and the planned flow. The research questions or themes were not changed when conducting the research.

Only research interviews were used as data for the study. It was not possible within the scope of this study to make field observations or to make extensive use of, for example, media documents to support the research.

# 7. Results

This section presents the results of the semi-structured interviews. Three themes emerged from the interviews during the analysis process. Firstly, the findings on perceived change COVID-19 brought in the work environment are presented, followed by the perceived influence on networks and trust in the organization. Finally, all the results are combined and summarized to provide an understanding of the perceived dynamics between environment, networks and trust.

## 7.1. Change in working environment

The change brought about by the COVID-19 pandemic was significant for knowledge workers. The perceived changes in the working environment focused on five themes: communication and communication channels, the type of information shared, communication partners and the working day schedule. The themes and the summary of the results are presented next.

### Communication

In the organization communication and working with others have been essential to get work done.

> "*My work is very much built on the fact that I get to do something with other people, that I'm not alone. I wouldn't get anything done in this world, because I think that all good ideas and thoughts are born out of this kind of cooperation, built in one way or another on the ideas of different people, or a combination of them."– H3*

The change the COVID-19 pandemic caused was major for employees. The natural connections in the office, such as communal lunch hours when people get together, meetings and workshops in the meeting rooms, coffee machine and hallway chats, and other

occasional low-threshold encounters with people from different teams, disappeared overnight. The organization had facilitated such connections by creating a culture of working together, fostering knowledge sharing and enabling people to get to know each other by organizing team and organizational-wide two-way meetings to discuss and get to know each other. Interviewees described the culture, situation before the COVID-19 pandemic and the change it caused, when employees were forced to work from home, which led to the loss of serendipity in communication.

The different communication model led to a shift from oral to written communication. Written communication was perceived to be more time-consuming and cumbersome than oral communication.

> *"Before the pandemic you'd often go into someone's room and be like hey I've got this. I feel like I've gone much more towards written communication." - H4*

For employees the communication had moved to more complex. The emerging theme and the second order code complex communication highlighted perceived change of communication. Selected interview quotes and researcher driven first order codes and second order themes are seen in Table 2.

Table 2. Data table on perceived changes in communication.

| **Second order code (theme)**<br>First order codes | *Selected quotes* |
|---|---|
| **Complex communication** | |
| Communication changed from oral to written form | *For me, the best way to communicate and interact has usually been to go to the place and talk, so it usually then gets at once gone through things. Versus the fact that we exchange even seven emails when it turns out that things are not quite as simple as you think in your head. - H7* |
| Serendipity loosed in communication | *Before, we used to be able to talk to colleagues across departmental boundaries in our office, but that was dramatically reduced. Also, the coffee-machine conversation decreased significantly, and it was very quickly noticed that the information about what was happening in the organization no longer reached us, in the same way as before the pandemic. - H6*<br><br>*Before the pandemic, there were also a lot of corporate events where the agenda was not work-related and there are none now. There has been a significant drop in the number of such forums, and it has not been possible to replicate it in the same way during the pandemic, even if you tried." – H2* |

Communication channels

The shift from office to remote work changed the channels of communication. Digitalization was already a normal part of everyday work in the office, but its importance grew enormously in remote working. Almost all communication was moved to collaboration platforms such as Teams.

> *"The Teams platform came like a tidal wave with the pandemic."* - *H3*

These platforms provided good collaboration opportunities for small teams working on the same topic. In larger forums, such as company-wide meetings, it allowed only one-way communication. In these forums, the previously important communication between individuals that had taken place when meetings were held in physical spaces was abandoned.

> *"They were practically the only networks where you could hear a little bit about what was going on elsewhere and they were usually of course in a style where there was no dialogue of any kind."* - *H6*

The wide range of different channels also led to difficulties in finding relevant information and required learning about the new preferred communication channels of different colleagues. On the other hand, it was easier and faster for people to set up new teams with members from different locations. This allowed a wider use of the different skills of knowledge workers.

> *"If there are some new projects or teams that you can jump into, it's made it easier."* - *H1*

In summary the major change was a move from face-to-face and email communication and to multiple virtual communication channels. And like mentioned in the previous chapter remote working increased the share of written communication (Table 3).

Table 3. Data table on perceived changes in communication channels.

| **Second order code (theme)**<br>First order codes | *Selected quotes* |
|---|---|
| **Multiple communication channels**<br>Communication channels switched from face-to-face and email to several different channels | *Before the pandemic there were a lot of face to face meetings and then a lot of emails. During the pandemic, other forms of communication have become more important. There are several different channels to communicate and then you have different people who experience different channels in different ways and one person prioritises something and another person prioritises something else. - H1* |

Information flow

The sharing, acquisition, use and exploitation of knowledge changed due to the COVID-19 pandemic and remote working conditions. Knowledge sharing and exploitation used to be extensive, covering a wide range of work-related and personal topics. Meeting in the same physical space allowed for easy sparring, co-innovation and personal exchange of information. Moving to remote work narrowed the communication and knowledge exchange.

*"At the moment, communication is strictly work-related." - H1*

The work-related issues were no longer widely discussed, but focused on individual problems, and sparring and peer learning were significantly reduced. Interviewees described the change as follows:

*"Any extra or ad hoc sparring was then very much kept to a minimum." - H6*

Communication focused on work related topics and individual problems. The main focus was on getting the required work done. Table 4 summarizes changes in work related information flow.

Table 4. Data table on perceived changes in information flow.

| **Second order code (theme)**<br><br>First order codes | *Selected quotes* |
|---|---|
| **Work related information flow** | |
| Communication mainly around work related topics | *Conversations revolve more around strictly work-related issues than before. - H2* |
| Individual problems discussed | *In the past, the work issue could be talked about in much broader terms. Now it's much more about solving individual problems than talking about business in general – H2* |
| Focusing on getting job done | *Developing and innovating new things and perhaps thinking about and coming up with ideas for unusual or new things, that have been neglected. - H3* |

Communication counterparts

Although communication had become narrower, the new way of working did not reduce the need for communication. It was narrowed because interviewees experienced that communication had become a chore. This led to limiting a number of collaboration partners.

> *"The need to communicate has remained pretty much the same, but there is less of it, because I don't have the resources to do it as much as before, when I could just walk into the next room and ask questions." - H2*

Working remotely during the COVID-19 pandemic meant working mainly from home, with only virtual channels and the telephone for communication. Although the number and usability of virtual channels was already advanced, extensive communication throughout the organization was perceived as cumbersome. Communication shifted to the closest colleagues with whom one had to collaborate to get the job done. The number of collaborators was limited, and there was clearly limited collaboration between units. This led to a lack of wider knowledge of what was happening in the organization. Summary of the key finding are seen in Table 5).

Table 5. Data table on perceived changes in communication counterparts.

| **Second order code (theme)**<br><br>First order codes | *Selected quotes* |
|---|---|
| **Work related communication counterpart** | |
| Limiting number of collaborations | *During the pandemic it was clearly a work-oriented and in a certain way maybe a business critical need, that what you would need the community for and maybe also thinking quite carefully about who are the most necessary people in it. - H3* |
| Focusing on the closest colleagues | *If it were the old days, I would interview a lot more people here who have been working longer and ask them how you would work in a situation like this and whether you have thought about working like this. - H7*<br><br>*Perhaps there may even have been an increase in the number of messages with the closest colleagues during this pandemic. – H1* |
| Limited collaboration between units | *Now you realize that you really don't know anything about what other teams and units are doing. - H3* |

Workday schedule

The shift to remote working led to more scheduled days. Workday schedules were perceived as tight, as calendars were full of appointments, as meetings were perceived as the only way to get things done. Knowledge workers worked in knowledge intensive roles that required teamwork and a psychologically safe environment. Interviewees discussed two factors related to how remote working had changed the work environment. First, interviewees did not want to impose an additional workload on their colleagues. This led to less use of help and collective knowledge to solve work-related problems. Interviewees did not want to disturb colleagues even when they needed help. This led to situations where more decisions were made without a second opinion. Secondly, the new virtual forum was not considered psychologically safe to discuss issues openly. The quality of interaction was lower in electronic channels. The selected quotes and the first and second level codes are presented in Table 6.

Table 6. Data table on perceived changes in workday schedule.

| **Second order code (theme)**<br>First order codes | *Selected quotes* |
|---|---|
| **Tight workday schedule** | |
| Do not want to disturb colleagues even when needing help | *Do I really need a colleague to spar with now? Somehow, I feel the threshold to go and disturb a colleague. - H1*<br><br>*When you should be sparring, you feel like you don't want to take up other people's time on their calendars. -H6* |
| Interaction quality lower in electronic channels | *Through Teams, that especially when you have more people on the screen. So, the threshold to say your own thing, or comment on something someone else has said is higher ... That it is in a certain way, perhaps a little poorer the interaction in these electronic channels. - H3* |
| Decisions made without second opinion | *The lack of sparring is perhaps the bigger factor from my point of view and what I noticed it affected quite a lot of decision-making...perhaps more decisions were made as if independently* |

*without the sparring of a colleague, which is not necessarily a good thing in itself ... - H6*

Summary of the changes in the working environment

The changes COVID-19 pandemic put on knowledge workers everyday working environment focused on complex communication, multiple communication channels, work related information flow, work related communication counterparts and tight workday schedule. Moving from the office work to remote work changed the way of communication and interviewees highlighted these five topics which changed and had influence on their networks and social connections within the organization. Next the influence of COVID-19 pandemic on knowledge workers networks will be presented.

## 7.2. Change in networks

The previous chapter presented the perceived changes in the working environment of knowledge workers caused by the COVID-19 pandemic. As many things in the work environment change, it might also affect how and with whom social networks and relationships are formed and maintained. Networks require two-way interaction between individuals. As mentioned in the previous section, the shift to remote working as a result of the pandemic changed the way knowledge workers communicate. The next section will explore how knowledge workers perceived the changes to have influenced their social networks and relationships within the organization.

### 7.2.1. Network ties

The shift from working in an office to working at home narrowed the individual's networks and relationships. During the COVID-19 pandemic, the focus was more on the networks needed to get the job done. Instead of wider networks, time was spent mainly on networks related to one's own work. This meant to cooperation with the core team. Networks that were not strictly related to work were weakened. There were limited contacts outside of the core

team. Informal weak networks and personal relationships, which had been formed automatically before the pandemic based on daily office routines, disappeared. Relationships with close colleagues also disappeared in the absence of common work-related issues. The changes were described as follows:

> *"I also notice that there are also people with whom I've had a lot of contact in the past and whom I consider trustworthy people, so with them too, it's just decreased. Perhaps it is precisely because there are no joint work projects." - H4*

> *"In a way, filtered out networks or forums that were not quite so close to the core business." - H3*

> *"This kind of classic, like who you eat with and who you hear gossip from and this kind of tacit information about what's going on inside the company, such a network has disappeared during COVID-19." - H5*

The changes experienced by knowledge workers were related to the dominance of strong networks and the reduction or even disappearance of weak networks. These formed the second-order codes of strong networks and weak networks, shown in table 7.

Table 7. Data table showing selected quotes and second-order codes for perceived changes in network ties.

| **Second order codes (themes)**<br><br>First order codes | *Selected quotes* |
|---|---|
| **Strong networks** | |
| Collaborating with your core team | *Practically dealing with your own team - H6*<br>*Teams are very much work-related - H4* |
| Limited contacts outside you core team | *The core group with whom you work most so, it is not necessarily so big difference, but then the larger frame of reference around it so it is reduced or it may not exist at all - H5* |
| **Weak networks** | |
| Weak networks disappeared | *Wider or looser networks between your own team and the old community so they somehow felt that they were left a bit like in the background. - H3* |
| Automatic everyday face-to-face contacts disappeared | *Keep in touch with these close colleagues along the way, that it's always been my style. And then if we jump to this time, it almost broke down overnight. There were no longer those common lunch moments and this kind of interaction as if face to face encounter in the form of various training sessions or meetings. I noticed that at first, I tried to call every now and then and exchange a little news ... but I noticed that it was no longer natural to be in such close contact as before. - H7* |

### 7.2.2. Network connections

During COVID-19 pandemic social networks and relationships focused on getting job done. The connections with your own team members and with people you had created deeper friendships dominated. It was experienced that looser connections with people and networks from other departments were narrowed or even lost. Bonding was important coordination mechanism during pandemic. It was experienced that there was a strong bonding with people you had created friendships with or you worked closely to get job done. Bonding created strong boundaries and closed networks. The finding of bonding as a key mechanism is linked to previously reported domination of strong networks. Bonding led to frequent communication within those networks or relationships. Knowledge workers described how they experience their connections to people and networks within the organization:

> *"During the pandemic, the focus has clearly been on the whole business community and, my team of course it's always been there. But then the intermediate forms so they have evaporated, when there are no natural encounters in the physical environment, so you do not in the virtual environment occasionally meet with anyone." - H3*

> *"The social network narrowed... it seems that it is constantly shrinking those social networks." -H6*

During the pandemic, when working remotely, the organisation did not provide a very strong bridging mechanism for creating and maintaining networks between teams, which led to a reduction in the organisation's weak networks. Bridging used to be a strong coordination mechanism for the organisation. The organisation used to provide a variety of opportunities to meet people across the organisation, which brought people together and allowed weak networks to form. It was felt that this was lost during the pandemic.

Before the pandemic the organisation played an important role in supporting networking by providing a structure for collaboration, trying to maintain a culture and encouraging knowledge workers to work together. Organization norms guided behaviour and fostered

collaboration. Knowledge workers described the change caused by the COVID-19 pandemic as follows:

> *"Before the pandemic there were also a lot of company-organized joint events where the agenda was not work-related and there are none now. There has been a significant drop in the number of such forums, and it has not been possible to replicate it in the same way during the pandemic, even if we had tried." -H2*

> *"I've experienced that everyone has a big and important role in forming and especially maintaining networks ...and I don't see that pandemic would necessarily have changed that much." -H3*

Table 8. shows selected first order quotes derived from the research sample and the second order codes influenced by theory. Bonding was the key coordination mechanism during COVID-19 pandemic.

Table 8. Data table showing selected quotes and second-order codes for perceived changes in network connections

| **Second order codes (themes)**<br>First order codes | *Selected quotes* |
|---|---|
| **Bonding** | |
| Frequent collaboration with friends and close colleagues | *Friendships, they are clearly highlighted. Those people stood out and the contact, with them, continued really closely. -H3*<br><br>*I myself have at least started to call someone just to see what's going on and how are you. But I also feel that it has perhaps narrowed down who you can exchange news with, because it's easy to call the person you've talked to more." -H4* |
| Focus on work related networks<br><br>Own team important | *This job easily absorbs you so that you only notice the networks that are important at that moment. -H7*<br><br>*It's drifted into being with your own team. -H4* |
| **Bridging** | |
| Opportunities to meet people decreased | *Maintaining relationships. In the past, it was very automatic. It just came at lunch. It just came in the corridors. It came in these informal events that the organisation organised. -H2* |
| Interaction between people decreased | *Maybe just the kind of encouragement to keep the work community and culture alive, so that we don't lose each other, even though we're not at the home office. People's honest and genuine interaction so it has been a little missed here and hopefully we will get it. -H1* |

## 7.3. Trust

The COVID-19 pandemic and the shift from office to remote working did not fundamentally change the way knowledge workers who previously worked together in the office experienced trust when asking knowledge workers experiences two years and three months after they started to work from home. During this time knowledge workers had used to use remote channels, and these were seen as a natural way of communication. Using only remote channels such as Teams were perceived familiar. Knowledge workers experienced that when contact with colleagues increased, the experience of trust increased and vice versa. All available channels were used for communication.

Remote channels brought with them some new requirements. In remote working, communication was mainly focused on work-related issues, and it was felt that building trust could not only focus on work-related issues, but also needed to include softer issues. In the remote channels, this required an additional focus on communication to emphasize trust building. Knowledge workers described their experiences as follows:

> *"The way to maintain trust, so before the pandemic it could be done face to face and now during the pandemic it has been done remotely, but somehow when they are people who you already know and with whom you have already dealt face to face, so it has not seemed so difficult to maintain it remotely." -H1*

> *"I feel that trust comes from being in contact and being in touch. And it somehow grows as you get to talk. ...Those with whom you have perhaps even increased contact here, so you feel that trust has grown... Those with whom contact has clearly decreased, there's no reason not to trust them, but trust has faded a bit, perhaps on a mental level." -H1*

Building trust with new colleagues started with the expectation that new colleagues would be competent and live up to the company culture. It was experienced that it was also possible to deepen trust with new colleagues, but it took more time. Challenges mentioned were that communication in remote channels was not as open and people did not had as much courage

as when meeting on-site. It was also felt that it was more difficult to express oneself and interpret colleagues through remote channels. The experiences were described as follows:

*"The culture here is such that people do what they say they will do." -H5*

*"It's difficult when you can't interpret all the gestures in the same way." -H4.*

Table 9. summarizes the main finding related to trust during the COVID-19 pandemic and working mainly remotely. Trust was perceived to be maintained with colleagues who worked together in the office before the pandemic. New colleagues who had started during the COVID-19 pandemic were experienced trustworthy, but in the new remote situation, the trust took longer to build. The remote communication channels had reduced courage.

Table 9. Data table showing selected quotes and second-order codes for perceived changes in trust

| **Second order codes (themes)**<br><br>First order codes | *Selected quotes* |
|---|---|
| **Maintain trust** | |
| Trust has increased with close colleagues | *I feel that trust comes from being in contact and being in touch. And it somehow grows as you get to talk. ...Those with whom you have perhaps even increased contact here, so you feel that trust has grown... Those with whom contact has clearly decreased, there's no reason not to trust them, but trust has faded a bit, perhaps on a mental level. -H1* |
| Virtual channels provide good opportunities to maintain trust | *You can also build trust through this kind of virtual channel, perhaps because it's not such a strange way for people to communicate anymore. But maybe it needs to be built a little faster and you have to focus more on communication, so that it doesn't get too cold and matter of fact. -H6* |
| **Build trust** | |
| Culture and norms create trustworthiness | *With new colleagues, there is a basic trust that the other colleague is experienced. -H7* |
| Courage to be vulnerable has decreased | *Maybe a certain kind of courage even went down a bit. -H6* |
| Building trust with new people takes more time | *And when those first communications have been done by email and then maybe talking on the phone and even Teams with a picture might help build that trust better than just email or a normal phone call…It may take time to build trust and get to know each other, when it happens completely remotely. -H1* |

## 7.4. Summary of the results

Four aggregate dimensions working environment, network ties, network connections and trust summarizes the results. The aggregate dimensions were built on top of the quotes and the first and second order codes. Table 10. summarizes the three-level data structure.

Table 10. Data structure on the changes that COVID-19 was perceived to influence.

| First-order codes | Second order codes | Aggregate dimensions |
|---|---|---|
| Communication was changed from oral to written form<br>Serendipity loosed in communication | Complex communication | Working environment |
| Communication channels switched from face-to-face and email to several different channels | Multiple communication channels | |
| Communication mainly around work related topics<br>Individual problems discussed<br>Focusing on getting job done | Work related information flow | |
| Limiting number of collaborations<br>Focusing on the closest colleagues<br>Limited collaboration between units | Work related communication counterparts | |
| Do not want to disturb colleagues even when needing help<br>Interaction quality lower in electronic channels<br>Decisions made without second opinion | Tight workday scedule | |
| Collaborating with your core team<br>Limited contacts outside you core team | Strong networks | Network ties |
| Weak networks disappeared<br>Automatic everyday face-to-face contacts disappeared | Weak networks | |
| Frequent collaboration with friends and close colleagues<br>Focus on work related networks<br>Own team important | Bonding | Network connections |
| Opportunities to meet people decreased<br>Interaction between people decreased | Bridging | |
| Trust has increased with close colleagues<br>Virtual channels provide good opportunities to maintain trust | Maintain trust | Trust |
| Culture and norms create trustworthiness<br>Courage to be vulnerable has decreased<br>Building trust with new people takes more time | Build trust | |

The COVID-19 pandemic changed the work environment from the office to remote working. This led to more complex communication and an increase in the number of communication channels in the organization. Within the organization, information sharing was focused on work-related issues and was mainly shared with colleagues working together, due to tightly scheduled working hours. These changes in the work environment had direct influence on individuals and networks within the organization. During the pandemic, the organization was characterized by strong and closed networks with high bonding. Weak ties spanning organizational structural holes decreased. The change in the work environment influenced trust through individuals. Maintaining trust with old colleagues was not perceived to have changed. Instead, building trust with new colleagues was perceived to take more time and the new environment was not perceived to provide the courage to be vulnerable. Figure 10 highlights the dynamics between dimensions.

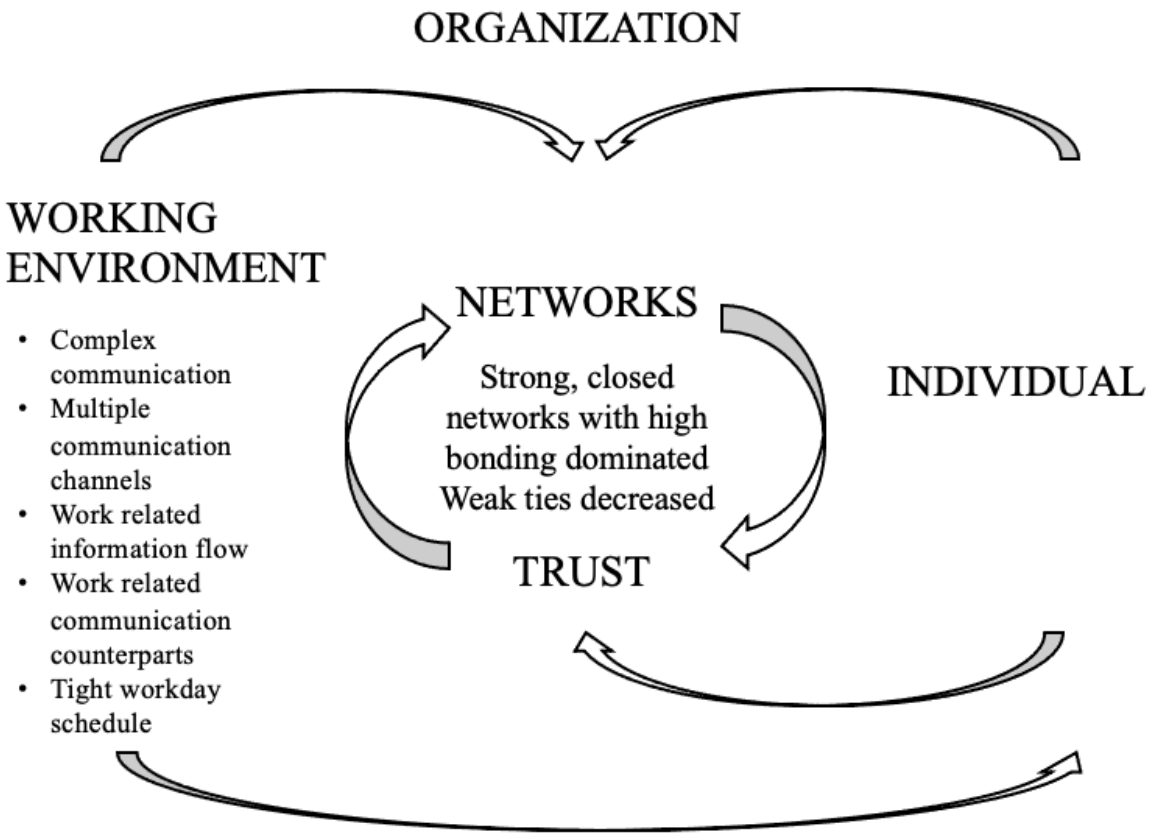


Figure 10. In the case organization COVID-19 pandemic dynamically influenced networks within the organization.

# 8. Discussion

The COVID-19 changed work environment from the office to remote location overnight. There is limited data about how this rapid change changed social networks and relationships within an organization. Topic is highly relevant to knowledge intensive organizations as networks and social relationships are crucial in exploitation of knowledge, solve complex problems, innovate and get input for decision making in current highly volatile environment.

The pandemic and the subsequent shift to remote working dramatically and rapidly changed the working environment for knowledge workers. The case organization´s private sector workers often mentioned that previously natural occasions to meet colleagues, such as common lunches, coffee breaks and discussions in hallways and meeting rooms, disappeared. Jämsen et al. (2022) made similar findings from the public sector. They described how communication with colleagues had changed compared to when they worked in the office, and workers experienced that natural encounter with people had disappeared (Jämsen et al., 2022). Knowledge workers in the case organization also described how remote channels hindered the sharing of thoughts and required extra focus to discuss non-work-related issues. They also felt that they lacked the courage to express themselves with new colleagues or in larger virtual group meetings and were more comfortable discussing with close colleagues or workplace friends. As early as 1986, Daft and Lengel showed that the socio-emotional elements of relationships are more difficult to exchange in remote working (Daft and Lengel, 1986). Although remote communication channels have evolved since then (Brem et al., 2021) similar challenges remains today.

The loss of natural and serendipity contacts with colleagues led to the experience of more complex communication. The experience may also have been related to tightly scheduled working days, which made colleagues reluctant to place extra burden on their colleagues. But also, because communication had changed from verbal to written form. Oral communication on complex issues was perceived as useful, less demanding and less misunderstood than written communication. It has also been shown previously that it was

more difficult to contact and receive support from colleagues when working remotely during a pandemic and when working remotely (Jämsen et al., 2022). Jämsen et al. (2022) and this study were conducted in Finland. This study was conducted in the private and Jämsen et al. (2002) study in the public sector. However, these findings cannot necessarily be generalized to other countries.

The pandemic and the shift to remote working also increased the number of communication channels in the organization. However, the increase in the number of communication channels did not lead to wider communication. During the pandemic and remote working communication was limited to work-related issues. Jämsen et al. (2022) also showed that communication between people decreased during COVID-19 when people worked remotely. Knowledge workers in the case organization described how multiple channels created an additional burden. Early studies by Homans (1961) on individuals' willingness to participate in exchanges showed that everyone have to get more than they give. In organizations, knowledge sharing focused on work-related issues and was mainly shared with colleagues working together. Although digital communication channels have evolved, there are still challenges that hamper communication in organizations.

These changes in the work environment directly affected the organization and the individuals and their networks within the organization. Building and maintaining networks that were not directly related to day-to-day work was perceived as a burden. People felt that it required more time and energy to maintain networks in remote environment compared to working from office. In the past, the organization provided a shared workplace in the office, which offered multiple places to interact with people. The culture of the case organization also supported communication and provided many opportunities to communicate and interact with other colleagues. Intra-organizational networks are important because they form the basis of the social capital of organizations (OECD, 2001). Companies with high social capital have been shown to perform better than other companies, including in times of economic difficulty (Fiordelisi et al., 2022). Social capital has been shown to increase innovation capacity and organizations intellectual capital (Subrananiam and Youndt, 2005). Organizational culture, shared language, narratives, norms, obligations and trust between

knowledge workers form the basis for network formation and organizations social capital (Coleman, 1988; Nahapiet and Goshal, 1998; OECD, 2001). Changes in these factors can alter the social networks and relationships within an organization. This study did not examine the level of social capital in the organization, but the changes that the COVID-19 pandemic and remote work caused to social networks and relationships within the organization.

During the pandemic and remote working, the case organization was characterized by strong and closed networks with high bonding. It was often mentioned that there was a strong focus on getting the job done. The "own team" and the people who you worked closely with became very important. Closure as a network mechanism, strong as a network tie and bonding as a network connection were key mechanisms and have been also well described in the network literature (Granovetter 1973, Coleman, 1988, Adler and Kwon, 2002). During the pandemic, the focus was on completing the work. This favored closure as a network mechanism. Closure as a mechanism means knowing who is working in the team and not allowing just anyone to join the group or network. Everyone also knows each other, and the network is closed. Closed networks bring support, resources, and timely information to their members (Coleman, 1988). If the goal is the get the job done, closed networks provide opportunity to do it efficiently.

The networks were also strong. Strong network ties are direct and intense, involving time investment, loyalty, emotion and reciprocity (Coleman, 1988). Strong networks provide personal support, increase group knowledge transfer, facilitate compliance with norms, build trust and, improve team performance (Coleman, 1988; Granovetter, 1973, 2000; Adler and Kwon, 2002; Uzzi and Spiro, 2005). Strong networks flourished in the case organization during the pandemic. This may be due to communication channels. Digital tools were used for real-time communication and collaboration. And it was experienced easier to talk to people you know well. Discussions were more open and productive in small groups who know each other. This could lead to dominance of strong networks. High bonding, which means that network members meet frequently supports strong and closed networks. Bonding and closed networks goes together. High bonding creates a feeling of "our gang", people

trust to each other, knowledge flows and you can ask for help, making it easier to pursue common goals and get work done (Coleman, 1988; Adler and Kwon, 2002).

At the same time, weak networks spanning boundaries were reduced. Relationships and networks outside the core team was few or the communication frequency was lower than before the pandemic. Knowledge workers felt that they did not receive information from other units or functions in the same way as before pandemic. Similar findings were observed by Jämsen et al. (2022), they showed that interpersonal communication decreased during COVID-19 when people worked remotely. Workers felt that natural encounters with people disappeared because previous daily lunch, coffee and hallway conversations could not be used in a virtual environment (Jämsen et al., 2022). Weak ties were reduced in the case organization. This was likely due to the loss of natural and "easy" contacts with the wider work community. Weak ties are irregular encounters connecting otherwise unconnected groups and are valuable for mobilizing resources and asking for help (Burt, 2000). The knowledge workers in the case organization mentioned that they did the dare to bother colleagues because they felt that asking for help would place extra burden to them. Communication had also shifted from verbal to written form, which was experienced as a greater burden. It is possible that all three of these factors had reduced weak ties within the case organization. There is currently very little research on the pandemic and its impact on intra-organizational networks, so the causes need to be validated in the future.

The pandemic and remote work increased the boundaries between workers and groups. One reason may be that bridging mechanisms, such as weak ties, were weakened during the pandemic. It has been shown that bridging allows different functions, units or groups discuss and work together and to gain information at an early state (Burt, 2000). Weakened bridging may have led to structural holes that did not exist before the pandemic. This is supported by the finding that knowledge workers experienced that the flow of information had decreased and that they no longer knew what is happening around the organization. Weak ties are also important in remote work. Wu et al. (2021) showed that employees with ties between teams performed better than employees without ties between teams.

The experiences of trust to social networks and relationships were also studied. Maintaining trust with old colleagues was not perceived to have changed in the case organization. This is supported by early finding that trust has been shown to be one of the key elements in creation of human interactions and partnerships (Granovetter, 1985; Nahapiet and Goshal, 1998). Trust also evolved depending how frequent contacts were. Blomqvist (1997) has made similar findings by defining that trust evolves and develops over time in relationships. Domination of strong ties support the finding that COVID-19 pandemic and remote work did not have big effect on ongoing networks and relationships between people. It has been previously shown that strong ties require trust (Nahapiet and Ghoshal, 1998).

There was a bigger effect on building relationships with new knowledge workers who started working in the organization during the pandemic and remote work. It was experienced that it is possible to build trust, but it took longer time. The building trust started evaluating new colleagues' trustworthiness like Mayer et al. (1995) have described. It might have taken longer time because interactions in virtual channels tend to be shorter than when meeting at the office. Also, it was experienced that people gestures was harder to observe in virtual setting when e.g. respect and care are not so easily transformed.

Knowledge workers felt that their courage in communication and relationships was reduced. This may be one reason why building trust between people who had not worked or known each other before the pandemic was perceived as slower. Risk has been shown to be one of the critical conditions for trust building (Rosseau et al., 1998). Mayer et al. (1995) have also shown that trust requires a willingness to be vulnerable.

# 9. Conclusions

Social networks and relationships within an organization are vital for knowledge intensive companies. Tasks are often complex and requires collaboration within the organization. Networks and relationship increase knowledge flow and innovation. This study sought to explore how knowledge workers experienced changes in their social networks and relationships within the organization in an exceptional period of COVID-19 pandemic. The case organization had worked mainly from the office before the pandemic, which forced knowledge workers to work remotely. The transition from office work to remote work took place overnight, and remote work continued for more than two years. This provided a unique opportunity to explore how knowledge workers experiencing their networks and relationships have changed from the pre-pandemic period of working in the office to the pandemic period of working remotely.

Two questions supporting the main research question were used to understand environmental changes and individual behaviors leading to possible changes in social networks and relationships. The first supporting research question was, *How did the COVID-19 pandemic change the landscape of networks and relationships in the organization?* The study interviews were conducted 27 months after the knowledge workers were forced to work remotely. All study participants had worked in the organization before the pandemic and continued to work remotely during pandemic. The results showed that the working environment had changed in the case organization. The environmental changes were related to communication, where the shift from office to remote work removed previously natural networking opportunities, such as lunch breaks and meetings in boardrooms. A similar finding was made in a study on interpersonal communication in public organizations (Jämsen et al., 2022). At the same time, the channels of communication changed. Digitalization had already integrated communication channels into everyday work. Due to remote work, their number grew rapidly, and they became the only way to communicate. This led to a highly scheduled calendar, as all communication had to be agreed in advance. Workers had full calendars and they experienced that colleagues were busy and did not want

to contact them on non-work related issues. Communication was mostly with the immediate team, with whom they worked to get the job done. Employees operate in a social and physical space where networks of social relations are formed using schematic perceptions of realities and possibilities (Haveman and Wetts, 2019a). Changes in any of these can affect each other. The physical environment thus affects social relationships and perception of circumstances. If the physical environment changes, it may change networks. The COVID-19 pandemic changed the work environment from the office to remote work. In the case organization, this led to more complex communication and an increase in the number of communication channels in the organization. Working hours were experienced to be tightly scheduled and information sharing focused on work-related issues and was mainly shared with colleagues working together. The table 11 presents research questions and the experienced changes.

The second supporting question focused on understanding changes in trust. The question was: *How did the building and maintaining of trust in social networks and relationships change in the wake of the covid-19 pandemic in the organization?* In the case organization the change in organizations work environment affected trust through individuals. It has been shown that individual´s affective (emotional attachment), continuance (perceived cost) and normative (feeling of obligations) organizational commitments affect individuals behaviors at work (Allen and Meyer, 1996). Trust is an essential part of relationships, and it is needed for the continuation of relationships (Adler, 2001).

In this study maintaining trust with colleagues with whom you worked frequently in the office did not change when moving to remote work. The finding is supported by several studies on trust (Adler, 2001). Trust has been shown to enable communication, commitment and efficient and effective collaboration and without trust cooperation between people is limited (Adler, 2001). When employees continued to work together and met frequently to reach common goals, a change from an office to remote work did not affect perceived trust between people. It was possible to build trust with new colleagues also in remote work, it was only perceived to take more time. This is supported by Luhmann (1980) and Jones and George (1998) studies. Luhmann (1980) showed that individuals tend to trust to other when creating relationships. Jones and George (1998) observed that to build trust in a long term,

both parties have to put themselves in the others shoes and share thoughts and emotions. It may not be easy to share emotions in digital communication, which may affect the building of trust in remote work.

Table 11. The research questions and experienced changes.

| **Research questions** | **Experienced changes** | | | | |
|---|---|---|---|---|---|
| **The supporting research questions:** How did the COVID 19 pandemic change the landscape of networks and relationships in an organization? | Complex communi cation | Multiple commu-nication channels | Tight workday schedule | Informat-ion flow is mainly work related | Commu-nication counter-parts are mainly work related |
| How did the building and maintaining of trust in social networks and relationships change in the wake of the covid-19 pandemic an organization? | No major change in perceived maintaining of trust | | Building trust takes longer time and is in short of courage | | |
| **The main research question:** How did the COVID-19 pandemic change the social networks and relationships of knowledge workers in a knowledge-intensive organization? | Strong, closed networks with high bonding dominates Weak ties decreased | | | | |

The main research question of the study was: *How did the COVID-19 pandemic change the social networks and relationships of knowledge workers in the knowledge-intensive organization?* The changes in the work environment discussed earlier directly affected individuals and their networks in the organization. Trust, an essential element in the formation and continuity of networks, was not perceived to have changed in ongoing networks and relationships as the communication channel changed. Trust developed in ongoing relationships even when working remotely. During the COVID-19 pandemic, the organization was characterized by strong and closed networks with high bonding. There were many factors in the environment that favored this type of networks. Intra-organizational networks are built within organizational boundaries. The organization creates the social capital of the organization, i.e. the people you reach and how you reach them, the shared language and codes that help people communicate, and the motivation for people to participate (Nahapiet and Goshal, 1998). An organizational environment with high motivation to get work done, combined with the limited communication opportunities, complex work tasks and practices requiring interaction imposed by COVID-19, fosters the formation of strong and closed networks with high bonding. At the same time, weaker, irregular and often informal ties were reduced. The reduction of weak networks has been shown to reduce the span of structural holes in organizations (Burt, 2000). Golden (2006) showed that remote working changes social relationships. Meetings with supervisors increased and relationships with colleagues were not prioritized (Golden, 2006). Indications that weak networks may have diminished during the pandemic where also found in Jämsen's study, which found that communication between workers declined during the pandemic (Jämsen et al., 2022). Weak ties are important because new knowledge can be quickly acquired from different networks (Nahapiet and Ghoshal, 1998). They are valuable also for mobilizing resources, asking for help and they increase new contact opportunities (Burt 2000; Granovetter, 1973; Yakubovich, 2005). Wu et al. (2021) showed that ties between teams increased job performance during the COVID-19 pandemic. Thus, ties between teams' matter. Ties between teams are often weak ties (Burt, 2000). The increase of strong ties in the organization may have created excessive obligations for team members and required significant time investments that affect the time investments of weak ties. Maintaining weak ties was also perceived to require more effort during the pandemic than before the pandemic due to changes in communication channels. In summary, strong ties increased during the pandemic when working remotely and weak ties decreased.

Based on the results of the study, two propositions were made.

> Proposition 1: Strong network ties thrive in a remote work environment within an organization.
>
> Proposition 2: Remote work reduces weak ties within an organization.

The propositions provide direction for further research, but also tools to help organizations focus on long-term success by understanding that remote work and on-site work need to be managed differently. Activities need to be organized in a way that can prevent perceived changes in networks. In the following section, we will look at the factors that can help us exploit the potential of remote and office working in our day-to-day operations.

## 9.1. Managerial implications

Remote work became the norm for knowledge workers due to the COVID-19 pandemic, which forced knowledge workers to work from home or another location. Restrictions on remote working at home or other remote location have been lifted in most countries worldwide, and employees have started to return to the offices. It is expected that post-pandemic work will be hybrid, with people mixing working in the office and remote work. This section discusses the management aspects of both remote work and hybrid work. For both, the main focus should be on ensuring that weak ties are formed within the organization and balancing the time spent on managing strong ties between team members (Figure 11.).

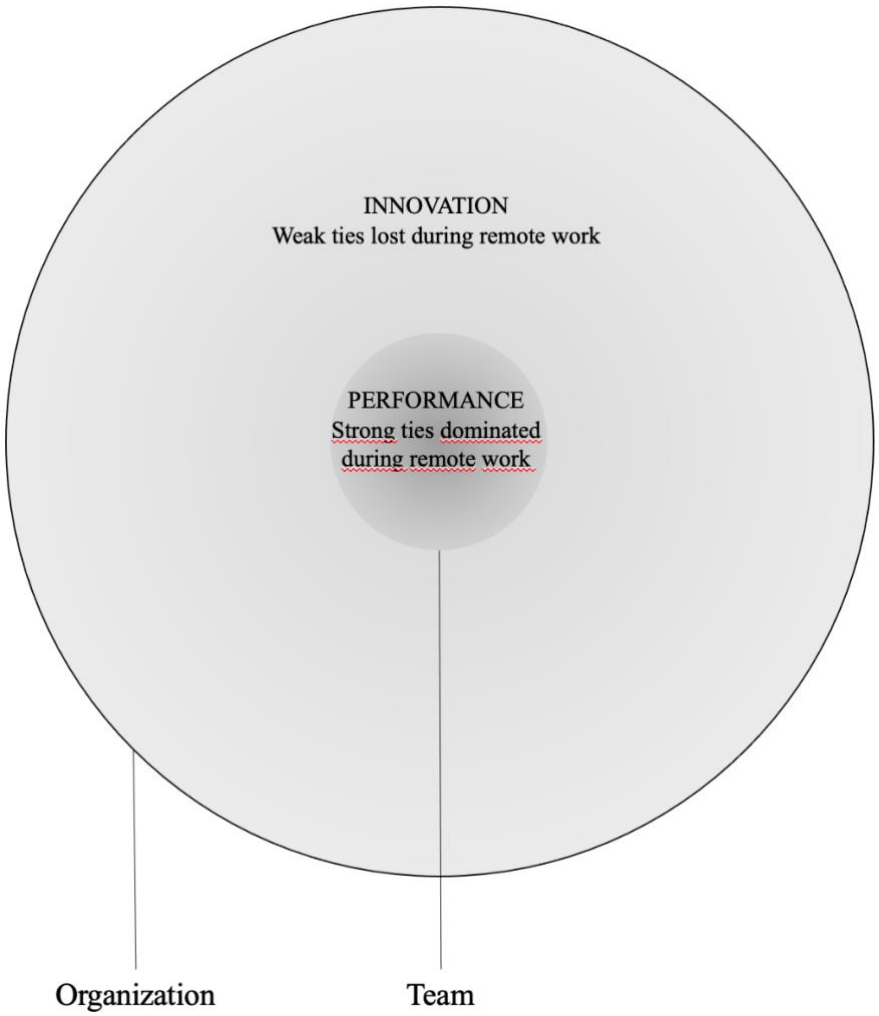


Figure 11. Remote work fostered strong ties within the team members and decreased weak ties in wider organization.

Organizations that only work remotely need to focus on balancing strong and weak networks. In remote working, measures should be implemented to ensure that weak networks in particular are formed within the organization. It would be useful to consider setting up temporary multi-stakeholder teams throughout the organization. This would allow the formation of weak networks across structural holes. Managers should also encourage formation of weak ties between teams to enable information flow across the organization as the tasks of knowledge workers are often complex and require collaboration with a wider organization. There should also be focus on building meeting practices that do not require extensive time investment in their own teams but leave knowledge workers time get their job done and seek for help from outside the core team. It is important to prevent large-scale

time investments in strong networks and to provide time resource to build and maintain weak networks. This is crucial because strong ties were showed to be dominant in remote work. Strong ties provide personal support, increase knowledge transfer in a group, facilitate compliance with norms, build trust and improve team performance (Coleman 1988; Granovetter, 1973, 2000; Adler and Kwon, 2002; Uzzi and Spiro, 2005). On the downside, high levels of bonding, typical for strong ties, creates horizontal silos and hinder knowledge flow and communication between functions (Coleman, 1988; Adler and Kwon, 2002). Organizations need both strong and weak ties. Weak ties spanning structural holes provide important new information for innovation. Remote work has been anticipated to decrease innovation (Pathak et al., 2015). For long-term success, it is essential that the organization takes steps to support the formation and persistence of both types of network ties when working remotely.

Hybrid working is expected to dominate in the future. There is an ongoing debate about how we should work in the future and how to combine the office and remote working. To build diverse networks, hybrid working should take advantage of the best aspects of both office and remote working. Office work allows for verbal communication with colleagues and provides serendipity encounters between workers, providing resources to solve complex tasks and innovate. Hybrid work should ensure that people meet in the office or other locations. In hybrid working, it is crucial for diverse networks to have enough people in the office or other locations at the same time. Maintaining a corporate culture that promotes collaboration and networking are key to the hybrid working model. Organizations should take advantage of the things that knowledge workers needed and that helped build networks before the pandemic and remote working. For example, people should be motivated to meet during breakfast, lunch or other breaks in the office to foster collaboration and build trust, networks and friendships. Each organization should find a meeting rhythm in physical locations that suits them. Physical meetings should include time for serendipity encounters with people from different teams. Office design should maximize contacts in the physical location. These measures allow weak ties to be formed and structural gaps to be bridged. Networks of social relationships, especially weak ties and structural gaps, provide important new knowledge for innovation (Nahapiet and Goshal, 1998). As with remote working, it is useful for an organization to promote the formation and continuity of diverse networks in

hybrid work. In organizations with both strong and weak ties, both bonding and bridging mechanisms are used. This ensures the formation of strong, closed networks with many ties that are necessary for the efficient performance of work tasks. In addition, the formation of weak ties that facilitate the flow of information and innovation, and bridge structural gaps in the organization by linking teams, will be strengthened.

Individuals and organizations that are better connected perform better. Relative position in the network brings value to individuals and groups. Networks create trust, obligations towards others, which leads to support for others, and dependency through exchange (Burt 2000). Networks are integral component of organization´s social capital. Social capital defines the requirements that knowledge workers need to be able to build and maintain networks and relationships in an organization. Some organizational structures foster more collaboration and network formation. It also defines the norms, shared narratives and shared language that are critical for the formation of trust needed to maintain and create networks. (Nahapiet and Goshal, 1998.) There should be a strong focus on building and maintaining a corporate culture, as common norms, rules and language foster networking. Organizational culture is unique for each organization. If it is strong, it has profound impact on e.g. how people work and interact together, how knowledge is shared, what systems, language and symbols are used, what is organization vision and how it treats employees and customers and how it reacts to change (Schein, 1989).

Remote working contributed to the formation and continuation of strong and closed networks with a high bonding. As we move into the post-pandemic era, organizations should create an environment in which also weak networks that connect teams and bridge structural holes in the organization can flourish.

## 9.2. Limitations

The study was conducted in a unique situation during COVID-19 pandemic. The pandemic was global and affected people around the world. SARS-CoV-2 virus spread easily from

person to person when people breathed, talked, sang, sneezed, or coughed. The best ways to prevent infection were to stay away from others, wear masks, wash your hands and get vaccinated. (WHO, 2022.) It is likely that the study cannot be repeated in a similar environment. The physical contacts and remote working restrictions related to the pandemic have been removed. There are organizations that work only remotely, but in the future, no major restrictions are expected to prevent extensive physical contact. This may affect the generalizability of the study results.

Participants in the study had worked in the same organization for at least six months before the COVID-19 pandemic started. The results of the study cannot be necessarily applied to people who started working during the COVID-19 pandemic because they had no previous exposure to the cultural elements and norms that were present before the pandemic. All participants worked in business operations and the results of the study cannot necessarily be generalized to the whole organization or to other organizations with different organizational structures, organizational cultures and elements of social capital.

Many factors influence the kind of network structure an organization develops. This study only looked at how people perceived their networks to have changed during the pandemic. The expectation was that there had been no major changes in perceived organizational culture, as all the participants in the study had worked in the organization before the pandemic and had been exposed to elements of the organization such as shared norms, narratives and language. However, this cannot be completely ruled out as the pandemic lasted for more than two years and we saw that the pandemic changed the network structure. The study does not answer the question whether the perceived change in network structure was directly or indirectly related to remote working.

This study is also based on individual experiences from a single case organization and the perceived changes cannot necessarily be generalized. However, Gioia's method aims to generate a concept and generalize theory, and the principles found in this study could be

generalized (Gioia et al. 2013). To validate the study results, they should be tested in another setting or organization.

### 9.3. Future research

Networks are integral part of knowledge intensive work. When the work is changing due to digitalization, from offices to remote and hybrid work research is needed to understand their impact on network structure within organizations.

Even though it is not possible to start a new study on the influence of COVID-19 pandemic on networks any more as the most restricted time of pandemic is very likely passed. We can study organizations who has chosen to operate only in remote setting. It should be tested if the findings can be repeated in organizations working remotely and not during pandemic. We need to understand the demands of the different network structures in remote and hybrid work, which are becoming permanent forms of work.

We should also understand whether measures are needed to promote the formation of weak ties in organizations that have been chosen to operate on a hybrid model. This study could focus on a quantitative research design to gain a better understanding of the network structure. In the future, there will be several ways of organizing hybrid work, so case studies are needed on how different ways of implementing hybrid work influence the formation of strong and weak ties.

# References

Adler, P. S. 2001. Market, Hierarchy, and Trust: The Knowledge Economy and the Future of Capitalism. *Organization Science,* 12(2), pp. 215–234.

Adler, P. S. and Kwon, S. W. 2002. Social capital: Prospects for a new concept. *Academy of Management Review*, 27(1), pp. 17–40.

Allen, T. D., Golden, T. D. and Shockley, K. M. 2015. How effective is telecommuting? Assessing the status of our scientific findings. *Psychol. Sci. Public Interest,* 16(2), pp. 40–68.

Allen, N. J., Meyer, J. P. 1996. Affective, Continuance, and Normative Commitment to the Organization: An Examination of Construct Validity. *Journal of Vocational Behavior,* 49, pp. 252–276.

Blau, P. M. 1964. Exchange and power in social life. New York: John Wiley & Sons.

Blomqvist, K. 1997. The many faces of trust. *Scan J Mgmt,* 13(2), pp. 271-286.

Blomqvist, K., Ståhle, A. 2011. Building Organisational Trust. 2011. Available from: https://www.researchgate.net/publication/242769066_Building_Organizational_Trust. Accessed Apr 3, 2022.

Bradach, J. L. and Eccles, R. G. 1989. Price, authority and trust: from ideal types to plural forms. *Annual Review of Sociology,* 15, pp. 97-118.

Brem, A., Viardot, E. and Nylund, P. A. 2021. Implications of the coronavirus (COVID-19) outbreak for innovation: which technologies will improve our lives? *Technol. Forecast. Soc. Change,* 163, 120451. https://doi.org/10.1016/j. techfore.2020.120451.

Burt, R. S. 2000. "The network structure of social capital", *Research in Organisational Behaviour*, 22, pp. 1-83.

Coleman, J. S. 1988. Social capital in the creation of human-capital. *American Journal of Sociology*, 94, pp. S95-S120.

Daft, R. L. and Lengel, R. H. 1986. Organizational information requirements, media richness and structural design. *Management Science,* 32, pp. 554–571.

Drucker, P. F. 1999. Knowledge-Workers Productivity. The Biggest Challenge. *California Management Review*, 41(2), pp. 79–94.

Fiordelisi, F., Gallappo, G., Lattanzio, G. 2022. Where does corporate social capital matter the most? Evidence From the COVID-19 crisis. https://doi.org/10.1016/j.frl.2021.102538.

Gambetta, D. 2000. Can we trust trust? In D. Gambetta (Ed.), Trust: Making and Breaking Coopertive Relations, Electronic edition, Department of Sociology, University of Oxford. 13, pp. 213-237.

Garrett, R. K., Danziger, J. N. 2007. Which telework? Defining and testing a taxonomy of technology-mediated work at a distance. *Social Science Computer Review, 25*(1), pp. 27–47.

Gehman, J., Glaser, V. L., Eisenhardt, K. M., Gioia, D., Langley, A. and Corley, K. G. 2018. Finding theory-method fit: A comparison of three qualitative approaches to theory building. *Journal of Management Inquiry,* 27(3), pp. 284–300.

Gioia, D. A., Corley, K. G. and Hamilton, A. L. 2013. Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods,* 16(1), pp. 15–31.

Golden, T. D. 2006. The role of relationships in understanding telecommuter satisfaction. *J. Org. Beh.: Int. J. Ind. Occup. Org. Psychol. Behav*., 27(3), pp. 319–340.

Granovetter, M. 2005. The Impact of Social Structure on Economic Outcomes. *The Journal of economic perspectives,* 19(1), pp. 33-50.

Granovetter, M. 1985. Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology,* 91(3), pp. 481-510.

Granovetter, M. 1973. The Strength of Weak Ties. *American Journal of Sociology,* 78(6), pp. 1360-1380.

Haveman, H. A. and Wetts, R. 2019a. Organizational theory: From classical sociology to the 1970s. *Sociology Compass,* 13:e12627. https://doi.org/10.1111/soc4.12627

Haveman, H.A. and Wetts, R. 2019b. Contemporary organizational theory: The demographic, relational, and cultural perspectives. *Sociology Compass*, 2019;13:e12664. https://doi.org/10.1111/soc4.12664

Henttonen, K. and Blomqvist, K. 2005. Managing distance in a global virtual team: the evolution of trust through technology-mediated relational communication. *Strat. Change*, 14, pp. 107–119.

Hunnes Blakstad, S. 2015. in Ropo, A., Salovaara, P., Sauer, E., and De Paoli, D. (Eds.), Leadership in spaces and places, pp. 49-68, Cheltenham: Edward Elgar Publishing.

Homans, G. C. 1961. Social behavior: Its elementary forms. Hacourt, Brace & World Inc.

Jaiswal, A. and Arun, C. J. 2020. Unlocking the COVID-19 lockdown: work from home and its impact on employees. https://doi.org/10.21203/rs.3.rs-34556/v1

Jones, G. R. and George, J. M. 1998. The experience and evolution of trust: Implications for cooperation and teamwork. *Academy of Management Review*, 23(3), 531-546.

Jämsen, R., Sivunen, A. and Blomqvist, K. 2022. Employees' perceptions of relational communication in full-time remote work in the public sector. *Computers in Human Behavior*, 132, https://doi.org/10.1016/j.chb.2022.107240

Katz, N., Lazer, D., Arrow, H. and Contractor, N. 2004. Network theory and small groups. *Small Group Research*, 35(3), pp. 307–332.

Kianto, A., Shujahat, M., Hussain, S., Nawaz, F. and Ali. M. 2019. The Impact of Knowledge Management in Knowledge Workers Productivity. *Baltic Journal of Management,* 14(2), pp. 178–197.

Kwon, S-W., Rondi, E., Levin, D. Z., Massis, A. and Brass D. J. 2020. Network Brokerage: An Integrative Review and Future Research Agenda. *Journal of Management,* 46(6), pp. 1092–1120.

Langley, A. 2021. What Is "This" a Case of? Generative Theorizing for Disruptive Times. *Journal of Management Inquiry*, 30(3), pp. 251–258.

Langley, A. and Abdallah, C. 2011. Templates and turns in qualitative studies of strategy and management. *Research Methodology in Strategy and Management,* 6, pp. 201–235.

Lewicki, R. J., McAllister, D. J and Bies, R. J. 1998. Trust and Distrust: New Relationships and realities. *Academy oi Management Review,* 23(3), pp. 438-458.

Luhmann, N. 1980. *Trust and power.* New York: Wiley. (tarkasta vuosiluku)

Mayer, R. C., Davis, J. H. and Schoorman, D.F. 1995. An Integrative Model of Organizational Trust. *Academy of Management Review* 20(3), pp. 709–734.

McCabe, D. 2016. 'Curiouser and curiouser!': Organizations as Wonderland – a metaphorical alternative to the rational model. *Human Relations,* 69(4), pp. 945–973.

McElroy, M. W. 2002. Social innovation capital. *Journal of intellectual capital,* 3(1), pp. 30-39.

Moon, M. J. 2020. Fighting COVID-19 with agility, transparency, and participation: Wicked Policy problems and new governance challenges. *Public Administration Review*, 80(4), pp. 651–656.

Nahapiet, J. and Ghoshal, S. 1998. Social Capital, Intellectual Capital, and the Organizational Advantage. *Academy of Management Review*, 23(2), pp. 242-266.

OECD (2001), The Well-Being of Nations: The Role of Human and Social Capital, OECD, Paris.

Oswick, C., Grant, D. and Oswick, R. 2020. Categories, crossroads, control, connectedness, continuity, and change: A metaphori- cal exploration of COVID-19. *Journal of Applied Behavioral Science*, 56(3), pp. 284–288.

Pathak, A. A., Bathini, D. R. and Kandathil, G. M. 2015. The ban on working from home makes sense for Yahoo. *Human Resource Management International Digest*. 23(3), pp. 12-14.

Portes, A. 1998. Social Capital: Its Origins and Applications in Modern Sociology. *Annual Review of Sociology*, 24, pp. 1–24.

Ramírez, Y.W. and Nembhard, D.A. 2004. "Measuring knowledge worker productivity: a taxonomy", *Journal of Intellectual Capital*, 5(4), pp. 602–628.

Rousseau, D. M., Sitkin, S. B., Burt, R. S. and Camerer, C. 1998. Not so different after all: A cross-discipline view of trust. *Academy of Management Review,* 23(3), 393–404.

Reagans, R., Zuckerman, E. W. 2001. Networks, diversity, and productivity: The social capital of corporate R&D teams. *Organization Science*, 12, 502–517.

Saunders, M., Lewis, P. and Thornhill, A. 2009. *Research methods for business students.* 5 edn. Harlow: Prentice Hall.

Schein, E. H. 1989. Book review: Corporate Culture and Organizational Effectiveness. *Human Resource Management.* 28(4), pp. 557–561.

Schein, E. H. and Ameln, F. 2019. Relationships as a key to change Ed Schein on the legacy and future of Change Management. *Gr Interakt Org*, 50, pp. 141-144.

Subramaniam, M. and Youndt, M. A. 2005. The Influence of Intellectual Capital on the Types of Innovative Capabilities. *Academy of Management journal,* 48(3), pp. 450-463.

SOSIAALI- ja TERVEYSMINISTERIÖ, 2022. [Referenced 24.6.2022]. Webpages https://stm.fi/etatyot-koronavirustilanteessa
https://vm.fi/documents/10623/1121917/VN_11297_2020-VM-17+Valtakunnallisen+et%C3%A4ty%C3%B6suosituksen+voimassaolon+perusteiden+tarkastelu+16.6.2021.PDF/c246bd17-7d71-75eb-c4f0-bb8d947bb5fe/VN_11297_2020-VM-17+Valtakunnallisen+et%C3%A4ty%C3%B6suosituksen+voimassaolon+perusteiden+tarkastelu+16.6.2021.pdf?t=1623858483667

Tangen, S. 2005. “Demystifying productivity and performance”, *International Journal of Productivity and Performance Management,* 54(1), pp. 34–46.

Thibaut, J. W. and Kelley, H. H. 1959. The social psychology of groups, Wiley & Sons Inc., New York.

Uzzi, B. and Spiro, J. 2005. Collaboration and creativity: The small world problem. *American Journal of Sociology,* 111(2), pp. 447–504.

Wayne, S. J., Shore, L. M. and Liden, R. C. 1997. Perceived organizational support and leader-member exchange: a social exchange perspective. *Academy of Management Journal,* 40, pp. 82–111.

WORLD HEALTH ORGANIZATION, 2022. [Referenced 24.6.2022]. Webpages https://www.who.int/health-topics/coronavirus#tab=tab_1

WORLD HEALTH ORGANIZATION and INTERNATIONAL LABOUR ORGANIZATION, 2021. Preventing and mitigating COVID-19 at work. [Referenced 24.6.2022]. https://www.who.int/publications/i/item/WHO-2019-nCoV-workplace-actions-policy-brief-2021-1.

Wu Y. J., Antone, B., Srinivas, A., DeChurch, L. and Contractor, N. 2021. Teamwork in the Time of COVID-19: Creating, Dissolving, and Reactivating Network Ties in Response to a Crisis. *Journal of Applied Psychology*, 106(10), pp. 1483–1492.

Yang, L., Jaffe, S., Holtz, D., Suri, S., Sinha, S., Weston, J., Joyce, C., Shah, N., Sherman, K., Lee, C-H., Hecht, B. and Teevan, J. 2020. How Work From Home Affects Collaboration: A Large- Scale Study of Information Workers in a Natural Experiment During COVID-19. https://www.microsoft.com/en-us/research/?msr-field-of-study=natural-experiment

Van Zoonen, W., Sivunen, A., Blomqvist, K., Olsson, T., Ropponen, A., Henttonen, K. and Vartiainen, M. 2021. Factors Influencing Adjustment to Remote Work: Employees' Initial Responses to the COVID-19 Pandemic. *Int. J. Environ. Res. Public Health*, 18, 6966. https://doi.org/10.3390/ijerph 18136966

ATTACHMENT 1

Research question themes

The theme-interview will start on general question to start discussion. All questions will focus on two time points. Before COVID-19 pandemic when working at the office and during pandemic working mainly from home. All themes will be discussed from the pre COVID-19 perspective and during COVID-19 perspective to understand the change caused by COVID-19.

Think of the time before the COVID-19 pandemic. Describe the change in social relationships (formal and informal) caused by COVID-19?

1. Type of networks and relationships (collaboration)
    a. Describe what kind of social networks and/or relationships did you had/have in the company?
        i. With whom (within your group, with functions/units) do you had/have contacts and why?
        ii. How many networks /relationships did/do you have?
        iii. How many contacts you have in your networks?
        iv. What were/are the themes around which your networks were/are built? (hierarcy, structural holes)

2. Communication method and frequency (communication)
    a. What methods you used/are using to communicate with networks and in your relationships
    b. How frequent was/is your communication?

3. Investment on networks and relationships (commitment)

a. How did/do you build and maintained your networks and relationships?

b. How much time did/do you invest in building/maintaining your networks and relationships?

4. Trust in networks and relationships (trust)

    a. How did/do you build/maintained trust in your networks and relationships?

    b. In what areas you trust?

    c. In what ways you trust?

5. Support and environment (support)

    a. What kind of support did/do you got from your manager, peer or organization to maintain established social networks and relationships?

    b. What kind of support did/do you got from your manager, peer or organization to build new social networks and relationships?

6. The role of networks and relationships (benefits)

    a. How had/have you benefitted from your networks and relationships?