Master's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Economics and Management
Dept. of Industrial Economics and Technology
Management

Ryan W. Murray

Why competence in teleworking matters

A qualitative case study of two consulting engineering firms in Canada

Master's thesis in Project management
Supervisor: Ola Edvin Vie
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Abstract

Teleworking (also referred to as remote working) is currently rising in popularity, and based on the recent COVID-19 pandemic this trend appears likely to continue. The existing theoretical literature on teleworking indicates the importance of taking the context of teleworking into consideration. One context that has received little attention in the literature is consulting engineering firms. While teleworking theory does cover knowledge-intensive firms and consulting firms in general, minimal studies specifically address consulting engineering. This research project aims to fill that gap by answering the following research question:

> *How is the practice of teleworking in consulting engineering firms influenced by conditions on the job, individual, organizational, and environmental and societal levels?*

A qualitative case study is conducted that includes two consulting engineering firms located in the Greater Toronto Area region of Canada. One is a small firm that purely teleworks, whereas the other is a medium-sized firm that infrequently teleworked prior to COVID-19, but transitioned to full-time teleworking during COVID-19 which is captured in the empirical data. A total of seven employees are interviewed in depth, in positions ranging from junior engineers to presidents, in order to obtain a holistic view of the teleworking practices in these firms. This research project primarily uses an inductive approach by generating theory based on the empirical data and then comparing it to the existing theoretical literature. A theoretical framework is developed that divides teleworking into four levels that structure the overall analysis and discussion: the job level, the individual level, the organizational level, and the environmental and societal level. A few key concepts within each level are examined by comparing the findings from the empirical data with existing literature.

The research reveals two main findings. First, consulting engineering firms do not appear to experience any significantly unique challenges in regards to teleworking. Secondly, teleworking literature appears to have surprisingly neglected emphasizing the importance of teleworking as a competence. This research showcases that teleworking competence influences the outcomes of teleworking at all four levels of the theoretical framework.

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A special thank you to all of the case firms that participated, and more importantly, the individuals who took time out of their day to participate in an interview. In the interest of anonymity, I will not call out names, but you know who you are. I truly appreciate your enthusiasm in the research and hope it was an interesting experience for you as well.

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I am especially grateful to my loving and supporting family. Many of you encouraged me throughout this thesis and inspired me by your interest in the topic. I cannot wait to get back to Canada to visit all of you, especially our new additions to the family who I have yet to meet in person, Faye and Liam.

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Lastly, I would like to thank my dog Lady. Our daily walks through the woods were surprisingly useful for developing and reflecting on the ideas presented in this thesis. Many of the key parts of this thesis were originally conceived on a trail somewhere in Norway before they were later put down on paper.

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Chapter 1

Introduction

Teleworking (also referred to as remote working) has existed at least since the 1970s when it was conceptualized as a potentially feasible solution to offset the negative impacts of urban sprawls on commuting (Nilles 1975). The concept of teleworking essentially involves conducting work outside of a conventional office space with the aid of technology, on either a part-time or full-time basis (Konradt et al. 2000). This enables individuals to work from a space that is convenient for them, and to limit their exposure to potentially stressful commutes (Montreuil & Lippel 2003). With the issue of traffic congestion still lingering today (Gu et al. 2018), coupled with increasing technological innovation that supports teleworking (Spreitzer et al. 2017), it is hardly surprising that the popularity of teleworking has been on the rise in the past decade (Gajendran et al. 2015, Allen et al. 2015). Moreover, the recent COVID-19 pandemic has resulted in a sharp increase in teleworking worldwide, which seems likely to further cement its foothold in the future of work (Baert et al. 2020, Belzunegui-Eraso & Erro-Garcés 2020).

The literature on teleworking to date demonstrates that it is a complex phenomenon with far reaching consequences at the individual, organizational, and societal levels (Allen et al. 2015). Viewing teleworking as a complex system is important because it frequently involves tradeoffs (Kraut 1989), and the overall outcome and shape of teleworking is heavily based on context (Allen et al. 2015). One important contextual aspect of teleworking is the suitability of certain jobs for teleworking (Bailey & Kurland 2002, Golden & Veiga 2005). For example, the effectiveness of teleworking for construction labour is clearly different than for an accountant. Jobs involving knowledge work are generally considered to be conducive to teleworking because of the supporting technology (Leclercq-Vandelannoitte & Isaac 2016) and their high level of autonomy (Allen et al. 2015, Bailey & Kurland 2002), which collectively enables performing this type of work from anywhere.

Consulting engineering is considered a knowledge-intensive firm (Alvesson 2004) that employs knowledge workers, and it follows that it should, therefore, be conducive to teleworking in theory. However, telework literature seems to lack studies specifically on consulting engineering contexts, although a limited few include consulting firms in general in their sample (Cooper & Kurland 2002, Kelliher & Anderson 2010). Consulting firms is a broad category, and the needs of a marketing consulting firm may be quite different than the needs of an consulting engineering firm when it comes to teleworking. As previously mentioned, the context of teleworking is important and has been identified as an area for future research in teleworking (Allen et al. 2015). Therefore, the purpose of this thesis is to contribute to filling this gap in knowledge by examining teleworking in a consulting engineering setting. The primary intention is to advance the knowledge of teleworking in consulting engineering firms, however, the results also broadly contribute to the knowledge of teleworking in general. Accordingly, the following is the **research question** that this thesis aims to answer:

> *How is the practice of teleworking in consulting engineering firms influenced by conditions on the job, individual, organizational, and environmental and societal levels?*

Research approach

Considering the complex nature of teleworking practices, a qualitative case study research design was selected for this research to enable a thorough investigation of teleworking in consulting engineering contexts. I narrow the focus to teleworking in two consulting engineering firms stationed in the Greater Toronto Area of Canada, which emphasizes the focus on consulting engineers firms since it limits the potential influence of geographical and cultural influences. Moreover, the case firms include one small and one medium sized firm that vary in terms of the extent they telework, which Allen et al. (2015) assert is an important variable to consider when studying teleworking. At each case firm, a spectrum of employees are interviewed, ranging from junior engineers up to the president, which allows for a holistic perspective of teleworking practices at each firm. Furthermore, an inductive research strategy is predominantly used which facilitates developing theory relevant to the world's current teleworking context.

Importance of research

In addition to the theoretical gaps this research intends to fill, its importance is emphasized by its contribution of tailored knowledge to the consulting en-

gineering industry, which may see a permanent increase in teleworking as a result of COVID-19. Canada spends a significant amount of public funds on infrastructure which primarily drives the local consulting engineering industry. For example, in 2018, the architectural and engineering services industry in Canada was approximately 23.9 billion CAD in size (Statistics Canada 2020). Given the size of this industry, proper guidance in regards to teleworking could result in significant savings for the public. Furthermore, the worldwide consulting engineering industry could benefit from the results of this research as well, assuming that local geographical and cultural aspects are properly considered.

Thesis structure

The structure of this thesis is organized as follows:

- **Chapter 1 - Introduction:** introduces the purpose and importance of this research.
- **Chapter 2 - Theoretical background:** builds a theoretical framework of teleworking from existing literature, and proposes relevant propositions that will be evaluated based on the empirical data.
- **Chapter 3 - Method:** describes in detail the research methodology selected and accompanying rationales. In addition, the overall research process is outlined along with an evaluation of its quality.
- **Chapter 4 - Empirical data:** presents the empirical data collected during the interview process.
- **Chapter 5 - Analysis:** evaluates the theoretical propositions solely based on the empirical data collected.
- **Chapter 6 - Discussion:** discusses the implications of the analysis for theory on teleworking.
- **Chapter 7 - Conclusion:** outlines the main findings, limitations, and opportunities for further research.

Chapter 2

Theoretical background

The purpose of this chapter is to develop a theoretical framework that supports answering the research question:

> *How is the practice of teleworking in consulting engineering firms influenced by conditions on the job, individual, organizational, and environmental and societal levels?*

The chapter begins by introducing teleworking as a concept, and then continues to build the theoretical framework piece by piece, generally by ending each subsection with a proposition. At the end of the chapter, a summary of all of the propositions is provided.

2.1 Teleworking

This section begins by presenting a working definition of teleworking. Following that, a theoretical framework is introduced to organize the telework theory relevant to this thesis.

2.1.1 What is teleworking

It is necessary to develop a working definition of teleworking to clarify how it is used in this thesis, which may differ from the conception that some readers have. It is common for perspectives to vary since there are many similar and sometimes overlapping terms related to teleworking, going by names such as *telecommuting* (Gajendran et al. 2015), *remote work (Olson 1983), distributed work* (Venkatesh & Vitalari 1992), *flexible work arrangements* (De Menezes & Kelliher 2011), and *virtual teams* (Gilson et al. 2015). In a review by Allen et al. (2015), an emphasis is placed on the importance

of future research explaining the type of teleworking they are investigating, which is the main focus of this section. Instead of clarifying the distinctions between each of the aforementioned terms, which has been done before (Allen et al. 2015), a working definition is derived for the purposes of this thesis that best fits the sample. There are many definitions within literature to choose from, and an overview of some of the ways that telework is described in publications is presented in Table 2.1, which is inspired by a similar table by Allen et al. (2015) and extended with additional sources.

From these definitions, there are three main attributes of teleworking that stand out: (1) telework takes place outside of the normal company office space; (2) telework uses computer-based technology for communication; and (3) its frequency varies from partial to full-time. The sample selected for research in this thesis satisfies these attributes, including a varying range in frequency, which Allen et al. (2015) identifies as an important yet often ignored variable. In addition, most of the definitions do not specify where teleworking is performed, only that it does not occur outside the traditional office space. Some of the definitions mention that it often takes place in an employee's home, and this fits well with the characteristics of the sample of this thesis. One element that is excluded from the definition of teleworking in this thesis is the notion of satellite offices owned by the employee's firm, simply because that situation seemed different enough from telework at the beginning of this thesis that the topic was purposefully avoided during the interview process. Therefore, the following working definition of teleworking is hereby used for the remainder of this thesis:

> *Teleworking: a form of work that either partially or completely takes place outside of the normal company office space, often at an employee's home, with the aid of information and communication technologies.*

2.1.2 Theoretical framework

Baruch & Nicholson (1997) categorize factors influencing teleworking into four levels, which I find to be a useful starting point for structuring the theoretical framework in this thesis. The four levels are: the home/work interface, the job, the individual, and the organization. The home/work interface is about how teleworking impacts the relationship between home and work life, such as how kids at home impact work performance for example. The job level is concerned with the tasks involved in a job and how well technology supports doing those tasks remotely. The individual level covers how the uniqueness and diversity of individuals influence teleworking outcomes.

Table 2.1: Overview of usages of telework in academic literature

Publication	Definition
Morganson et al. (2010)	"Work performed by (a) those whose remote work is from the home or in a satellite office, (b) those whose telework is primarily in the field, and (c) those whose work is "networked" in such a way that they regularly work in a combination of home, work and field contexts."
Konradt et al. (2000)	"A form of work organization in which the work is partially or completely done outside the conventional company workplace with the aid of information and telecommunication services."
Garrett & Danziger (2007)	"Work that relies on technology-mediated communication and sophisticated information-processing capabilities instead of colocation for the production and delivery of work outputs."
Fonner & Roloff (2010)	"A work arrangement in which employees perform their regular work at a site other than the ordinary workplace, supported by technological connections."
Golden & Fromen (2011)	"Working a portion of the work week away from the traditional office and communicating by computer-based technology."
Bailey & Kurland (2002)	"Working outside the conventional workplace and communicating with it by way of telecommunications or computer-based technology"
Belzunegui-Eraso & Erro-Garcés (2020)	"The use of information and communications technologies (ICTs), such as smartphones, tablets, laptops, and/or desktop computers, for work that is performed outside the employer's premises"
Venkatesh & Speier (2000)	"Work or parts of work that occur away from a corporate location, often in an employee's home"

Lastly, the organization level deals with how supportive the organizational culture is for teleworking.

Belzunegui-Eraso & Erro-Garcés (2020) propose a fifth level to amend the model by Baruch & Nicholson (1997), which I term the environmental and societal level, and includes factors such as environmental, safety, and legal considerations. In addition, I propose to combine the individual real with the home/work interface level, since I take the perspective that the characteristics of a home and how it interfaces with work varies based on the individual. Moreover, combining these two levels gives a better fit to the categories developed through coding of the empirical data, which are presented in Chapter 4 (*Empirical data*). Thus, this results in a final total of four levels again that are based on a combination of the original model by Baruch & Nicholson (1997), the amendment by Belzunegui-Eraso & Erro-Garcés (2020), and my personal amendments. This model forms the theoretical framework for this thesis and is illustrated in Figure 2.1.

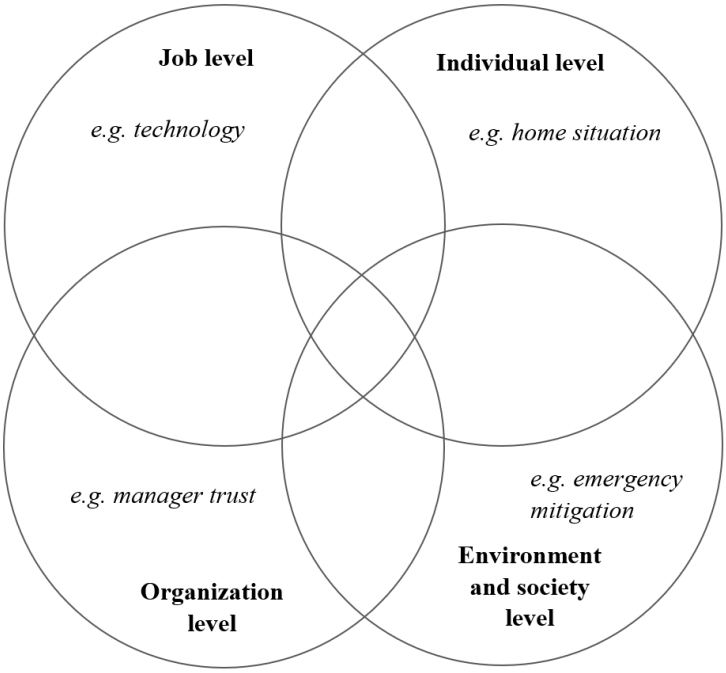
The primary usage of this theoretical framework in this thesis is to facilitate organization of the variety of topics covered. The remainder of the sections of this chapter are organized based on this model, and elaborate on the specific areas within each level that are covered by this thesis. Note that each level is not covered comprehensively since that would be beyond the scope of this thesis. Instead, focus areas are selected based on their perceived importance to teleworking and relevancy to the collected empirical data. In Chapter 5 (*Analysis*) and Chapter 6 (*Discussion*), the sections are also organized based on this model. Chapter 4 (*Empirical data*) is an exception which is not organized according to this model, however, the rationale for this is explained further in 3.2.6 (*Analyzing the data*). Eventually, in Chapter 6 (*Discussion*), a revised version of this model is presented based on the discovery of an important element common to all levels. Overall, this framework is a useful tool for conceptualizing the various aspects connected to teleworking, considering its high level of complexity.

The following sections cover theory related to each level within this theoretical framework, beginning with the job level.

2.2 Job level

As mentioned, the job level covers aspects related to the characteristics of the work being done and their implications for teleworking. This section explores the influence of communication technology on telework effectiveness, as well as the general conduciveness of engineering consulting to teleworking.

Figure 2.1: Theoretical framework (based on Baruch & Nicholson (1997))



2.2.1 Influence of communication technology on telework effectiveness

Technology is an important facilitator for teleworking (Allen et al. 2015), and indeed teleworking would not exist without it. The main type of technology that literature seems to have focused on in teleworking is communication technologies (Allen et al. 2015, Gilson et al. 2015). One way of assessing communication technology effectiveness is by comparing it to face-to-face interactions (Waber 2013). This type of measure is referred to as the technology's *media richness* (Daft & Lengel 1986), with technologies such as email having less media richness than video chat (Allen et al. 2015). The media richness of technology has been increasing over time (Messenger & Gschwind 2016), and according to theory, this should result in better performance in telework environments.

In contrast, media richness may actually become less important as millenials join the workforce because of the commonality of such communication means in their daily lives (Gilson et al. 2015). Essentially, these are two mutually reinforcing forces that positively influence the effectiveness of communication during teleworking. Firstly, the improvements in media richness make the technology easier to communicate with, and secondly, people

are becoming more adept with such technologies in general which also contributes to easier communication. Therefore, if communication technology is indeed important for teleworking, then organizations who implement it effectively should be effective at teleworking, which leads to the following proposition:

> *J1: Consulting engineering firms that implement effective communication technology for teleworking are effective in teleworking.*

Note that the proposition is identified as 'J1' because it is the first proposition that follows within the job level. This convention is adopted for the remainder of the thesis (e.g. I2 = the second proposition at the individual level).

2.2.2 The technological feasibility of consulting for teleworking

Despite significant advancements in technology, there remains some tasks that are not feasible to do entirely remotely, such as healthcare, restaurant service, and construction labour (Allen et al. 2015). The main reason these tasks are not possible to do remotely is because the nature of the work involves being physically present at a specific location. However, the subject of this thesis is on consulting engineering which several authors have inferred is highly amenable to teleworking (Baruch & Nicholson 1997, Bailey & Kurland 2002, Allen et al. 2015). A few key characteristics of these types of jobs that make them conducive to teleworking are their high level of autonomy (Baruch & Nicholson 1997) and the capacity for them to be performed through computer technology (Golden 2012). On the other hand, there are still parts of consulting that are not conducive to teleworking such as physical meetings with clients (Baruch & Nicholson 1997). Nevertheless, the vast majority of engineering work seems to meet the aforementioned characteristics, which leads to the following proposition:

> *J2: Technology in general has advanced sufficiently to enable effective teleworking in consulting engineering firms.*

2.3 Individual level

The individual level includes topics that relate to an individual's unique circumstances, and the implications of those for teleworking. This section presents theory on how teleworking influences productivity in general,

changes the level of distractions, and influences the number of hours employees work.

2.3.1 General influence of teleworking on productivity

The productivity of individuals is one of the most popular topics in this regard, with numerous articles being published over the past 30 years in both popular press and academia (Hill et al. 1998, Gajendran & Harrison 2007, Allen et al. 2015). Despite its popularity, and perhaps unsurprisingly, there continues to be an open debate without any firm conclusions about the productivity of people who telework (Allen et al. 2015). A variety of pathways have been identified, sometimes in the same article, that describe how teleworking can either support or hinder productivity (Montreuil & Lippel 2003, Harris 2003, Golden et al. 2006). The combined effect of all of these mechanisms should contribute to the overall impact on productivity, however, its direction and magnitude remains a point of contention (Allen et al. 2015).

Initial empirical research into this matter revealed that a high percentage of employees became more productive when teleworking (e.g. Hartman et al. 1992, Baruch & Nicholson 1997, Hill et al. 1998), however, these studies relied on self-report measures of productivity which are susceptible to biased employees who may be eager to demonstrate the effectiveness of teleworking (Bailey & Kurland 2002, Dutcher 2012). Moreover, several studies have demonstrated that the accuracy of self-reported productivity is low and can be inflated as compared to alternative measures (Mabe & West 1982, Harris & Schaubroeck 1988). As an alternative to self-reporting, Shin et al. (2000) suggest that supervisor-reported productivity be used as a supplemental measure, which seems to be the direction taken in telework literature based on subsequent studies (e.g. Gajendran & Harrison 2007, Gajendran et al. 2015).

Of course objective measures are ideal, however, they are complicated by the fact that productivity indicators can vary across roles and organizations (Zhang et al. 2011). Furthermore, measuring productivity can be particularly difficult with knowledge-based workers, such as those in the sample of this study, because their outputs are not conducive to simplistic quantifications (Prasad et al. 2004, Mattke et al. 2007). When considering these limitations, it is understandable why the subsequent studies introduced supervisor-reported productivity rather than objective measures. The findings of these studies are presented next due to their central position in the literature, however, their reliability is not without question as will be discussed subsequently.

Based on recent studies using supervisor-reported measurements, the link

between teleworking and productivity seems to be positive, although additional research is still required before drawing any conclusions (Allen et al. 2015). The results from a meta-analysis of 46 studies on teleworking, which utilizes both self-reported and supervisor-reported productivity measures, demonstrates a positive correlation between teleworking and supervisor-reported productivity, but interestingly no similar correlation between teleworking and self-reported productivity (Gajendran & Harrison 2007). The reason for this discrepancy is unclear, although it could be attributed to the aforementioned accuracy problems surrounding self-reporting (Allen et al. 2015). Nevertheless, this study suggests at a minimum that teleworking is at least not necessarily negatively associated with productivity and is potentially positively associated. An even more recent study of 343 employees and their respective 143 supervisors supports the latter by suggesting that teleworking is positively correlated to supervisor-reported productivity (Gajendran et al. 2015). While both of these studies seem to build a case that teleworking positively impacts productivity, it is important to keep in mind that the *direction of causality* (Bryman 2012) is unknown and these correlations could have alternative explanations; for example, perhaps highly productive employees are more likely to be afforded the opportunity to telework.

Moreover, if supervisor-reported productivity is the favoured measure for these studies, then it follows that managerial perceptions of teleworking should also be of interest, along with their potential influence on reported productivity. It is unclear whether the supervisor-reported measures used by the aforementioned studies account for this or not. It should at least be considered since there is empirical evidence suggesting skepticism exists amongst managers regarding how productive employees are when teleworking (Golden & Veiga 2005, Thatcher & Bagger 2011, Kaplan et al. 2018), although the extent of this skepticism is unknown. This managerial skepticism seems to exist despite minimal empirical evidence to support their skepticism (Allen et al. 2015), underscoring "a tension between telecommuting's popularity as a family-friendly work arrangement and managerial concerns" (Gajendran et al. 2015, p.354). Furthermore, a disadvantage of teleworking for some managers is the difficulty in gauging the performance of employees who telework (Felstead et al. 2003, Allen et al. 2015). It seems plausible that this difficulty could seed the aforementioned skepticism, but more importantly, it raises questions about the reliability of their reported productivity as a measure when they themselves have challenges in measuring teleworker productivity.

In summary, I agree with Allen et al. (2015) that it is too early to draw any generic conclusions surrounding the relationship between teleworking and productivity. Moreover, the fact that studies have shown overall neu-

tral or positive correlations (Gajendran & Harrison 2007, Gajendran et al. 2015, Allen et al. 2015) suggests that only a thin relationship exists and that additional *confounding variables* (Bryman 2012) may be at play. However, the theory does suggest there is no overall negative impact, and with that in mind the following proposition is made:

> *I1: Teleworking does not negatively impact employee productivity in consulting engineering firms.*

2.3.2 Environmental distractions and teleworking productivity

Some employees who experience increased productivity from teleworking partly attribute it to there being fewer interruptions from coworkers, which are often for non-urgent matters, and this enables them to concentrate more effectively (Golden et al. 2006, Golden & Veiga 2008, Montreuil & Lippel 2003). The impact of task interruptions on performance is generally negative, possibly due to the switching cost involved to change from one task to another (Wylie & Allport 2000, Kiesel et al. 2010). Moreover, this effect may be especially heightened amongst knowledge-workers because the nature of the work requires exerting focused mental effort (Froehle & White 2014). This suggests that distractions from a knowledge-worker's office environment negatively impacts their productivity.

On the other hand, interruptions from coworkers may actually be replaced with a new set of distractions from the home-environment which are non-work related, such as childcare and home responsibilities (Kraut 1989), multiple workers from the same home (Harris 2003), or pre-occupation with family-member needs (Golden 2012). These may be collectively less distracting as compared to an office environment (Kelliher & Anderson 2010), however, it is also plausible to envision them being more distracting for some individuals, particularly if anti-interruption measures are implemented in the office, such as wearing headphones, closing doors, or even traffic-light-like indicators (Züger et al. 2017). Furthermore, what are sometimes viewed as distractions in an office may be part of a new collaborative form of working (Wajcman & Rose 2011), unlike distractions at home which have no direct contributions to work productivity. Nevertheless, the influence of teleworking on productivity seems to depend on the differential of distractions between the office and home environment. Therefore, the following proposition is made to test which environment has more distractions:

> *I2: Teleworking reduces the work environmental distractions an employee is subject to in consulting engineering firms.*

2.3.3 Influence of teleworking on total work hours

Teleworking is often touted as a work-life balance improvement, and it is therefore peculiar that employees sometimes end up working more hours total (Allen et al. 2015). This demonstrates one pathway in which employees can become more productive from teleworking: by spending additional time working. In this manner, employees are not necessarily more efficient from teleworking, but the extra hours lead to more productivity. There are a few different ways that employees end up working more time while teleworking. Employees gain extra time from not having to commute, and while this time may be allocated to other activities such as family (Golden 2006), it is fairly common for employees to use this time for work as well (Golden 2012, Bailey & Kurland 2002, Igbaria & Guimaraes 1999). Moreover, teleworking tends to blur the boundaries between work and home life because the option to work is always there (Allen et al. 2015), and this can lead to extra working time.

Furthermore, teleworkers are sometimes subject to skepticism about their productivity from coworkers (Thatcher & Bagger 2011), and can also feel expectations for high performance in exchange for the option to telework (Golden & Veiga 2008), both of which can lead to employees putting in additional hours. In the former, employees may work extra time to maintain a certain level of productivity to dismiss doubts from their coworkers, whereas in the latter they main similarly maintain a level of productivity to secure managerial support to continue teleworking. On the other hand, these factors are not necessarily universal since employees with more experience in teleworking seem to be less prone to work additional hours (Allen et al. 2015). In this respect, an increased productivity resulting from increased number of work hours may be a temporary effect for new teleworkers that gradually disappears as they become more experienced teleworkers. Nevertheless, the following proposition is made:

> *I3: Consulting engineering firms employees work more hours total when working from home as compared to in the office.*

2.4 Organizational level

The organization level looks at how supportive organizational culture is towards teleworking and the implications of this. In this section, theory is presented on the influence of teleworking policies and the importance of supervisor trust for teleworking.

2.4.1 Influence of supervisors on the practice of teleworking

The practice of teleworking in an organization can vary from one that has developed naturally over time to a formal policy which may or may not be extensively implemented in the organization (Kossek et al. 2006). The formality of teleworking in an organization is important because it can have implications for its outcomes. For example, employees with an informal arrangement to telework often end up working additional hours as a means to repay their managers for the opportunity to telework (Kelliher & Anderson 2010). In general, the presence of a telework policy in an organization does not necessarily predict its practice. When an organization introduces a telework policy, it is usually to improve the human resource management aspect of the firm (Allen et al. 2015). However, the policy often delegates the responsibility for determining employee eligibility for teleworking to direct supervisors (Lautsch et al. 2009). Moreover, the success of a telework program implementation is much more dependent on supervisor support than simply introducing a policy for it (Golden & Veiga 2008, Allen et al. 2015). Therefore, the following proposition is made:

> *O1: The practice of teleworking in consulting engineering firms is influenced by supervisors.*

2.4.2 Supervisor trust in employees teleworking

Even in organizations with policies encouraging teleworking, it is common for direct supervisors to hold the decision power on whether their subordinates are allowed to partake or not (Thatcher & Bagger 2011, Kaplan et al. 2018). One important factor for supervisors making these types of decisions is the level of trust they have in their subordinates (Kaplan et al. 2018, Felstead et al. 2003, Golden & Veiga 2008), whereby support for teleworking varies positively with level of trust.

A few sources of mistrust in teleworking have been identified in literature. First, the personality of the manager matters since some managers are more cynical than others, which consequently leads to more skepticism about whether employees would actually work at home (Kaplan et al. 2018, Felstead et al. 2003). Similarly, the personality or behaviour of an employee matters. Managers are more likely to trust employees to telework who already have high performance, potentially formally or informally limiting teleworking to such individuals (Felstead et al. 2002). However, this type of prioritization of teleworking may negatively influence culture because of the perceived inequality (Thatcher & Bagger 2011), which suggests that it is perhaps not

a good strategy for managers. In addition, mistrust may simply develop because of the inability for managers to monitor their employees remotely, which prevents them from confirming if employees are working optimally (Golden & Veiga 2008, Kaplan et al. 2018). According to (Cooper & Kurland 2002), managers usually depend on behaviour-based controls to monitor employee performance which involves physically overseeing employee activities. On the other hand, an alternative strategy is to monitor employee performance based on what they produce (Konradt et al. 2003), and managers that are able to effectively implement this are more likely to experience fewer issues with trust (Gajendran & Harrison 2007).

Evidently, there are multiple potential sources of mistrust surrounding teleworking. On the other hand, it seems that the skill of a manager in telework management may reduce issues with trust. Therefore, the following proposition is made:

> *O2: In consulting engineering firms, managers with less telework management experience are more likely to have less trust in employees to telework effectively.*

2.5 Environmental and societal level

The environment and societal level is a broad category that generally includes factors other than the individual, the organization, or the work itself. In this section, theory is presented on how local commuting conditions can influence teleworking, as well as the role that teleworking can play in mitigating environmental threats.

2.5.1 Nature of the local commuting environment

The commuting characteristics for each employee at a firm are bound to differ along a variety of dimensions, which can have implications for driving teleworking. Commute time is one such dimension, and is a common factor in the rationales of employees who prefer teleworking because it reduces or eliminates the stress associated with commuting (Stephens & Szajna 1998, Kelliher & Anderson 2008, 2010, Golden 2006). However, attributing commute time as the root cause of commuting stress is not the full picture, despite its prominence within telework literature. Looking towards research on commuting, there are several examples of additional intermediary factors that can influence the stressfulness of a commute independent of time, such as traffic congestion (Hilbrecht et al. 2014), the mode of transit (e.g. walking, biking, car, public transit) (Olsson et al. 2013), predictability of

the commute (Montreuil & Lippel 2003), and "many environmental stressors like noise, crowds, pollution and thermal conditions that cause negative emotional and physical reactions" (Stutzer & Frey 2008, p.343-344). Focusing solely on commute time is likely to obscure some of these other factors which are also important to be aware of.

Nevertheless, commute time is a convenient measure that could conceivably reduce stress in some cases by minimizing exposure to the negative aspects of the commute. Moreover, commute time is a salient part of an employee's life that is more or less unproductive time (Stutzer & Frey 2008). Within the Greater Toronto Area (GTA) in Canada, the sample region for this research, a 2010 survey found an average commute time of 33 minutes with about 27% of the sample having a commute time of at least 45 minutes (Turcotte 2011). One outcome of teleworking is that employees can reallocate time saved from their commute to other potentially stress-reducing activities, such as family time (Golden 2006), physically active leisure (Hilbrecht et al. 2014), or household chores (Golden et al. 2006). This implies that the longer an employee's typical commute time is, the more they stand to gain from teleworking.

On the other hand, there is some evidence that shows eliminating a commute is not always beneficial for employees. As previously mentioned, the mode of transit can play a factor in that physically active modes (e.g. walking or biking) can lead to an either neutral or positive commuting experience (Olsson et al. 2013). The quality of the time spent commuting seems to matter (Hilbrecht et al. 2014). Furthermore, the commute has traditionally served as a useful temporal boundary for separating work life from home life (Spreitzer et al. 2003). In this respect, employees with positive commuting experiences are likely less willing to make the tradeoffs inherent with teleworking (Stephens & Szajna 1998).

In summary, theory shows that employee susceptibility towards teleworking depends both on commuting time and quality. This is what I refer to as the nature of the commute, which seems to play a strong role in influencing the practices and outcomes of teleworking. With this in mind, the following propositions is made:

ES1: The duration and perceived stressfulness of a commute influences the decision of consulting engineering firm employees to telework.

2.5.2 Teleworking as a risk mitigative measure for emergencies

The possibility of teleworking to help dampen potential economic impacts resulting from emergencies, such as storms or pandemics, has been mentioned a few times in the literature (Allen et al. 2015, Heng et al. 2012). The rationale is that if the possibility to commute into an office becomes impossible due to an emergency, then work can continue remotely instead. Heng et al. (2012) refer to the process of preparing for this as *business continuity planning*.

Before COVID-19, there was little empirical evidence available to confirm the effectiveness of this business continuity planning. However, at least one study is now available that documents the phenomenon of teleworking during COVID-19 (Baert et al. 2020). A study of approximately 1900 employees subject to extensive teleworking during COVID-19 revealed their positive experieinces, with self reports of increased efficiency and reduced burnout. Moreover, teleworking appears to have worked so well during this period that many individuals predict that it is here to stay in some form or another (Baert et al. 2020). Therefore, the following proposition is made:

> *ES2: Teleworking is an effective strategy for consulting engineering firms to mitigate the impacts of an emergency that prevents working in an office.*

2.6 Summary

In this chapter, a working definition of teleworking was introduced followed by a theoretical framework that organizes theory into four categories: the job level, the individual level, the organizational level, and the environment and society level. The theoretical framework does not cover each level comprehensively, since this is outside the scope of one thesis. However, a few interesting concepts in each level were identified and described with relevant theory. Following each concept, a proposition was made. A summary of all of the propositions made in this chapter is provided in Table 2.3. As a recap, all of these propositions are geared towards answering the following research question:

> *How is the practice of teleworking in consulting engineering firms influenced by conditions on the job, individual, organizational, and environmental and societal levels?*

Table 2.3: Overview of propositions

Category	ID #	Proposition
Job level	J1	Consulting engineering firms that implement effective communication technology for teleworking are effective in teleworking.
Job level	J2	Technology in general has advanced sufficiently to enable effective teleworking in consulting engineering firms.
Individual level	I1	Teleworking does not negatively impact employee productivity in consulting engineering firms.
Individual level	I2	Teleworking reduces the work environmental distractions an employee is subject to in consulting engineering firms.
Individual level	I3	Consulting engineering firm employees work more hours total when working from home as compared to in the office.
Organization level	O1	The practice of teleworking in consulting engineering firms is influenced by supervisors.
Organization level	O2	In consulting engineering firms, managers with less telework management experience are more likely to have less trust in employees to telework effectively.
Environment and society level	ES1	The duration and perceived stressfulness of a commute influences the decision of consulting engineering firm employees to telework.
Environment and society level	ES2	Teleworking is an effective strategy for consulting engineering firms to mitigate the impacts of an emergency that prevents working in an office.

In the next chapter, the research methodology is presented, including a complete account of the overall research process and an evaluation of its quality.

Chapter 3

Method

This section aims to provide a clear and transparent account of the methodology undertaken in preparation of this thesis. There are three primary objectives of this chapter. First is to describe the research process as openly as possible, including any potential weaknesses, to help readers understand the research in a way as if they conducted it themselves. Second is to explain the context and rationale behind the research design and methods chosen to enable readers to properly interpret and evaluate the research results. Finally, the section concludes with my personal reflections and lessons learned from this research to provide further insight for interpreting the results, and perhaps to assist others with similar research endeavours.

This section is organized in an idealized chronological order for clarity, however, the actual process involved considerable iteration. The true nature of the process is discussed in Section 3.5 (*Personal reflections*). Overall, the research can be characterized as inductive based on the numerous iterations involved in analyzing the empirical data, developing propositions, collecting relevant theory, identifying theoretical implications, and revisions to the research question. Thus, it is prudent to keep this in mind while reading the following sections.

3.1 Research strategy and design

Research strategies and designs need to be carefully selected to form a strong connection with the specific research question and the type of knowledge being sought (Bryman 2012). For this thesis, the research strategy and design were selected based on the research question:

> *How is the practice of teleworking in consulting engineering firms influenced by conditions on the job, individual, organizational,*

and environmental and societal levels?

3.1.1 Research strategy: a qualitative approach

According to Bryman (2012), a research strategy is the general approach towards the research and may be divided into the broad categories of *qualitative* and *quantitative* research. A qualitative strategy commonly emphasizes collecting words as the main source of data which are then used to inductively generate theory (Bryman 2012). On the other hand, a quantitative strategy emphasizes collecting data that is readily quantifiable, which may also include data in the form of "words" as long as they are quantifiable, such as structured surveys that use the Likert scale Bryman (2012). In general, quantitative studies are more suited for objectivity and generalization (Bryman 2012), whereas qualitative studies are more suited for vivid detail and depth of understanding complex phenomena (Marshall & Rossman 1989). As this thesis is concerned with understanding the nature of teleworking practices in a particular context, a qualitative approach is suitable. A mixed research approach is also an option, however, it comes with a disadvantage in that the topic cannot be explored in as much depth since resources need to be partially allocated to quantitative aspects. Therefore, in order to explore teleworking in as much depth as possible, a qualitative approach was selected as the overall strategy to guide this research.

There are two main reasons why a qualitative approach is best suited to answer the research question. First, teleworking practices are complex phenomena that cannot readily be understood through quantitative measures alone. Trying to do so risks missing the type of deep-level explanations that help paint a conceptual picture of the phenomenon, including potentially important mechanisms that otherwise lose their cohesiveness when reduced to numbers. Second, the innovative and evolutionary nature of teleworking in society means that an inductive approach could yield more interesting results than a deductive study. This is because a qualitative approach is more flexible while a quantitative study is limited by needing to establish preset parameters.

As will be discussed in Section 3.5 (*Personal reflections*), this research project began with a deductive approach that resembled a quantitative study more than a qualitative one. However, the research evolved into a highly inductive study after the initial interviews were conducted because a few issues were discovered with the original research strategy, as will be discussed later.

3.1.2 Research design: a comparative design

A research design is a framework that guides how data is collected and analyzed (Bryman 2012). Within the umbrella of qualitative research, Bryman (2012) presents five different types of research designs that were considered when planning this study. Two of these designs, notably *experimental* and *longitudinal* (Bryman 2012), are simply not possible for this study due to practical and time constraints. A longitudinal study takes more time than is available during this Master's thesis. Similarly, an experimental design would require convincing companies to telework for the purposes of this research, and even then time could pose a constraint in terms of how long they would need to telework to produce credible results. Interestingly, it is worth mentioning that a natural opportunity to shift to a quasi-experimental design arose halfway through this research because of COVID-19, which is discussed further in Section 3.5, however it was too late in the research to fully seize this opportunity. Furthermore, the worldwide atmosphere surrounding the COVID-19 crisis seems to have shifted firms outside of their natural environment which could question the *ecological validity* (Bryman 2012) of relying on such findings under normal circumstances. Nevertheless, this leaves three solid and realistic choices: a *cross-sectional* design, a *case study* design, or a *comparative* design (e.g. multiple-case studies) (Bryman 2012).

All three of these designs seem appropriate for answering the research question, and the main difference is that case studies involve a more deep and intensive analysis whereas a cross-sectional design captures broader data points but lacks the aforementioned depth. For example, research questions phrased using *how* and *why* are generally suited towards case study research because of the depth of explanations enables generating (Yin 2009). Considering that all three options are valid, I decided to go with a comparative design because of how the research question is phrased as well as because it fit the opportunities I had for data collection. The specific case sampling strategy is discussed further in the next section, however an advantage for this research design is that it allows us to "understand social phenomena better [because] they are compared in relation to two or more meaningfully contrasting cases or situations" Bryman (2012, p.72). According to Bryman (2012), the distinction between cross-sectional designs and case study designs is sometimes difficult to define because studies can have elements of both. That seems to apply for this study which could be perceived as either a cross-sectional design of a sample including participants from two contrasting companies or as a comparative design of two case companies. Nevertheless, I assert that this is a comparative design because it fits the focus of the narrative better; others may disagree, but the important point

is that the semantics have little to no real consequences for the validity of the results.

3.2 Research method

The *research method* (Bryman 2012) builds on the design and strategy previously selected by outlining specific processes and techniques for collecting data. Thoroughly understanding teleworking practices requires looking through the lens of individuals who form them, and one suitable method for this is *semi-structured interviews* (Bryman 2012), also referred to as in-depth interviewing (Marshall & Rossman 1989), which was the primary method employed in this study. A competing research method was *ethnography* (Bryman 2012, Marshall & Rossman 1989), which would have involved immersing myself at both case firms by teleworking and observing others. The issue with an ethnographic approach is that I did not think either firm would agree to such a setup, and furthermore both case firms are located in Canada whereas I am studying in Norway, making time zone differences a potential complication.

3.2.1 Sampling of case firms

Case firms were primarily selected through a *convenience sampling approach* (Bryman 2012) based on my access to firms in Canada from previous work experience. However, I posit that the characteristics of each firm carry the same benefits as a *purposive sampling approach* (Bryman 2012), specifically *maximum variation sampling* (Bryman 2012), because of their similarity and contrast along key dimensions. These dimensions are the prominence of teleworking, organization size, industry context, and geographical context. An overview of how each case firm varies along these dimensions is presented in Table 3.1. Readers are referred to the empirical section of this thesis (Section 4.1) for a more in-depth description of each case firm along with a finer-detailed comparison table.

Table 3.1: Simplified comparative overview of Seinfeld Inc. and Benes Inc.

Firm characteristic	**Seinfeld Inc.**	**Benes Inc.**
Telework practice	Primarily telework	Primarily office work
Organization size	Micro (0 - 9 employees)	Medium (50-499 employees)
Industry context	Consulting engineering firm	Consulting engineering firm
Geographical context	Greater Toronto Area (GTA), Canada	Greater Toronto Area (GTA), Canada

3.2.2 Sampling of interviewees

Interviewees were primarily selected with a purposive sampling approach to enable a diverse view of the teleworking practices at each firm. All interviewees at Seinfeld Inc. were pre-selected, however, a *snowball approach* (Bryman 2012) was taken at Benes Inc. because of its size. Regardless of whether interviewees were pre-selected or not, the same guiding criteria applied to their selection which was to obtain a diverse pool of interviewees in terms of position and experience or preception of teleworking. For position, it was important to include the president of each firm to get a credible sense of the overarching teleworking practices at the firm, and any opportunities or constraints associated with them. Moreover, direct supervisors and engineers were equally important to gain a first-hand view of the telework practices. At Benes Inc., the perception of teleworking became a useful selection criterion because telework practices varied throughout the firm based on the decisions of ground level managers. For example, two interviewees were identified through snowballing: one engineer who frequently teleworked and a manager who was more or less against teleworking. At Seinfeld Inc., this was not an important criterion because the entire firm worked teleworked full-time and all employees were similarly positive about it.

All of the interviewees included in this study I had previously worked with, some more extensively than others. I did attempt to involve interviewees whom I had no prior relationship with, however, these attempts failed because they were unfortunately not willing to participate due to time constraints. The old adage of "time is money" rings especially true in consulting firms where hours are billed quarterly, and I was thankful to have the participants that I did. In this respect, the sampling approach was not perfectly purposive and did involve some convenience sampling out of necessity. The implications of my personal relationship with the interviewees for the interview process is discussed further in Section 3.2.5 (*Conducting*

the interviewees). Table 3.2 below provides an overview of the interviewees involved in this study.

Table 3.2: Sampling of interviewees at Seinfeld Inc. and Benes Inc.

Firm	**Nickname**	**Length of employment**	**Position**			**Interview length ***
			President	**Supervisor or Manager**	**Engineer or Technical**	
Seinfeld Inc.	Jerry	2 years	X	X	X	70 mins
	Kramer	1 year			X	60 mins
	Newman	6 months			X	50 mins
Benes Inc.	Elaine	6 years	X			65 mins
	Susan	5 years		X	X	51 mins
	George	3 years			X	65 mins
	Leo	6 years		X	X	61 mins

*Note: the duration is for the question period only, and excludes introductory and concluding formalities.

3.2.3 Interview guide development

According to Bryman (2012), an interview guide is a useful tool that can be structured, semi-structured, or unstructured. The structured format involves a rigid set of questions that is asked the exact same way to all participants. The semi-structured format is similar in that it includes a set of questions to maintain some level of focus, but also provides the flexibility to diverge as needed in order to capture the full perspective of participants. This format is applicable for this thesis because it aims to understand telework practices which are a developing practice that could benefit from flexibility. Lastly, the unstructured format is also applicable since the research did not initially have any specific theoretical topics that *needed* to be explored per se. However, given my limited experience with interviewing, a semi-structured format seemed easier to stay on track and ensure a sufficient amount of data was collected for analysis. Therefore, a semi-structured interview guide was implemented in this research project. As will be discussed shortly, three separate versions of interview guides evolved during the research, however, development of the initial research guide is discussed first.

The initial semi-structured interview guide in this thesis predominantly included open-ended questions, except at the beginning which included a few icebreaker questions to get the participants speaking. Initially, interview questions were formed based on preliminary literature research on telework-

ing and consulting engineering, as well as based on areas of personal interest. The questions were carefully phrased neutrally to avoid any resemblance of leading questions, and also to ensured they were open-ended to give participants the freedom to provide different responses. For each question, a few follow-up questions were also prepared in case a participant did not cover them in their initial response. Furthermore, two separate interview guides were created: one guide for supervisor/managerial roles and another guide for engineering/technical roles. It was important to do this so that questions were relevant for the participant's role. For example, asking a technician about challenges with supervising while teleworking is not applicable since that is not an essential part of their job responsibilities.

As recommended by Bryman (2012), the initial interview guide was pretested by holding a pilot interview. My partner served as the participant in the pilot test who, despite not having a consulting engineering background, shared the same cultural background of the official sample (Canadian). Moreover, the questions were not technical in nature which meant they could be easily understood by people outside of the sample group. Although using an official participant for piloting would have admittedly been ideal, this appeared to be a reasonable alternative given the scarce pool of willing participants. Fortunately, the pilot test revealed a couple of ambiguous and somewhat overlapping questions that were corrected prior to the official interview process. In addition, it allowed an opportunity to practice key interviewing skills outlined by Bryman (2012), such as being a curious listener. The pilot test undoubtedly played an important role in validating the interview questions to ensure that interviewees could understand the questions, remain engaged throughout the interview, and respond without bias from the questions themselves.

Over the course of the research project, three separate versions of interview guides were developed which are included in Appendix C. The interview guides in Appendix C identify the participants that each guide was used for. The interview guide development process discussed up until this point was for the first version, which was used for half of the participants (Jerry, Kramer, Newman, and Elaine). Halfway through the interviews, this research guide was updated because the direction of the research shifted. Initially, the research question focused on the implications of teleworking for consulting engineering strategy, and this resulted in half of the questions being focused on strategy. The new research direction focused more generally on teleworking instead of its implications for strategy, and I decided that modifying the guide to better fit the new research question would optimize the relevancy of the remaining data that was to be collected. A second version was created which was used for the interview with Susan. Perhaps I should have

pilot tested the second version since the interview did not have a good flow. Nevertheless, it still rendered interesting data for inclusion in this thesis and enabled refinement of a third interview guide. The third version was created for the remaining two interviews (George and Leo) and resulted in an interview with a good flow and relevant data collection.

Retrospectively, only one interview guide should have ideally been used for consistency. However, given the evolving nature of the research, I consider the refinements to have benefited the data collected. For example, almost half of the data from the initial interviews needed to be discarded because it was no longer relevant to the research question, and continuing with this research guide would have resulted in collected further irrelevant data. The implications of this for the research quality is discussed further in Section 3.3. If this research design were to be replicated, it is recommended that the third version of the interview guide in Appendix C be used for all interviews since it resulted in the smoothest interviews that captured highly relevant data.

3.2.4 Ethical considerations and research permit

Due to the fact that this thesis uses social research methods which involve gathering personal data about individuals, measures needed to be taken to ensure the research was conducted ethically. Ethics in social research revolve around four central tenents: consent, deception, privacy, and harmfulness (Diener & Crandall 1978). In terms of consent and deception, both of these aspects were addressed in my research by being completely honest with participants throughout the entire process. For example, at the beginning of the research stage, all prospective participants were given a letter that explained the research purpose and what their involvement would entail for them, including privacy aspects. This form is attached in Appendix A. Furthermore, at the beginning of each interview, participants were reminded about the purpose of the research, how their data was collected and used, and their rights to retract their data at any time. At the end of the research project, all participants were informed of the destruction of their data. By being upfront with the participants, and following through, I believe that the consent and deception ethical aspects have been dutifully fulfilled.

Privacy and harmfulness are related in the case of this thesis, since the main potential to harm individuals would be in mishandling their data. Therefore, I developed and carefully followed a data handling protocol to ensure the privacy of individuals would be upheld. This involved recording interviews (with participant permission), transcribing them as soon as possible afterwards, replacing personal identifiers with code names, and then

permanently deleting the recordings and transcripts at the end of the research project. Throughout the project, sensitive electronic data was safely stored on a USB drive which was locked in a box to prevent others from accessing. By strictly following these protocols, I believe that the privacy of individuals was safeguarded in a way that prevents any harm from coming to them, fulfilling the last two ethical tenants.

Aside from my own ethical standards in conducting this research, I was also required to obtain a permit from the Norwegian Centre for Research Data (NSD) in order to legally conduct this research. I submitted an application to NSD in January 2020 and received a permit a few days afterwards that allowed me to begin interviews the same month and continue the project until June 2020. The application process was completed online through NSD's website, and involved describing the research project, what type of data would be collected, and explaining the measures I previously described for protecting personal data. Due to COVID-19, this research project ended up being extended by two weeks which required renewing the permit from NSD to include the additional time. The permit acquired from NSD is attached in Appendix B.

3.2.5 Conducting the interviewees

All of the interviews were conducted between February 2020 and May 2020, beginning with Seinfeld Inc. first and then ending with Benes Inc. As mentioned, I always started by introducing interviewees to the research, explaining their privacy rights and that the meeting would be recorded, as well as familiarizing them with the style of the interview since none of the interviewees had participated in such a study before. Excluding introductory formalities, the length of each interview ranged between 50 to 70 minutes, with an average of 59 minutes. For the most part, I made it through the entire interview guide with the exception of Elaine where I had to strategically skip a few questions because she generally provided much more detailed answers than the others. Moreover, I also generally had time to dig into the perspectives of each individual and diverge from the interview guide by following up on relevant and intriguing topics the interviewees raised. According to Bryman (2012), it is not unusual to stray from the prepared interview guide like in a quantitative study, rather it is a strength of semi-structured interviewing that enables the flexibility to truly explore the perspectives of the participants.

The interviewees were not provided much information beforehand, beyond the general research information for soliciting their participation in the first place. All interviewees were instructed that they would be asked questions on

topics such as teleworking and performance, however, no specific questions were revealed. This ensured that responses of the participants would be based on their initial instincts and raw perspective rather than a prepared response that could be either consciously or subconsciously manipulated. Moreover, I am not convinced that participants would have had the time to prepare for the questions even if I had circulated them in advance. Retrospectively, none of the interviewees seemed to have been hindered in their responses by not being able to prepare for them, and furthermore, all participants were given a chance at the end of the interviewee to express their closing thoughts in general.

All of the interviews were conducted using video chat over Microsoft Teams because I lived in Norway whereas the participants lived in Canada. Interviewees usually anticipated an audio interview, however, all of them were willing to use video and that seemed to have enhanced the process. Bryman (2012) mentions a few issues related to telephone interviewing, namely the absence of body language from the interaction, however, none of these issues were apparent in my interviews and it felt almost as if we were sitting in person at times. Seeing the body languaged helped the interview flow better and to keep the participants engaged. For example, it was easy to tell through facial expressions if an individual was not talking because they were taking a moment to think, or if they were visibly confused by a question I could quickly interject to clarify. My previous relationships with each interviewee may have played a role in making the conversations more fluid despite being in a remote setting, which may not be the case for someone attempting to replicate this study. Moreover, knowing the participants made coordinating meetings easier, but I also felt that interviewees were quite comfortable and honest during the interviews. On the other hand, despite my professionalism and assurance of their privacy, they may have also withheld certain information due to my connection to the industry as compared to an interviewer without such a connection. However, I did not feel this was generally the case because I received some surprisingly candid responses on rather sensitive topics.

Additionally, all of the participants were capable of accessing Microsoft Teams and we did not experience any technical issues. Although it is impossible to say for sure, my instinct is that the results of this study would not have changed should the interviews have been conducted in person instead.

Each interview was digitally recorded which enabled more efficient data gathering since I did not have to take extensive notes during the interview, although I did take some for the purposes of follow-up questions. As previously mentioned, all of the interviewees were notified of this and none of them seemed at all uncomfortable with the idea. Following each interview, I

transcribed the recordings and anonymized the data with pseudonym names for people and companies. I transcribed the entire recording as is, including parts where I was unsure of their relevance. I did not quite understand the value of transcription embarking on this research, however, I now realize it saves an extraordinary amount of time when analyzing the data compared to trying to constantly refer back to a recording.

3.2.6 Analyzing the data

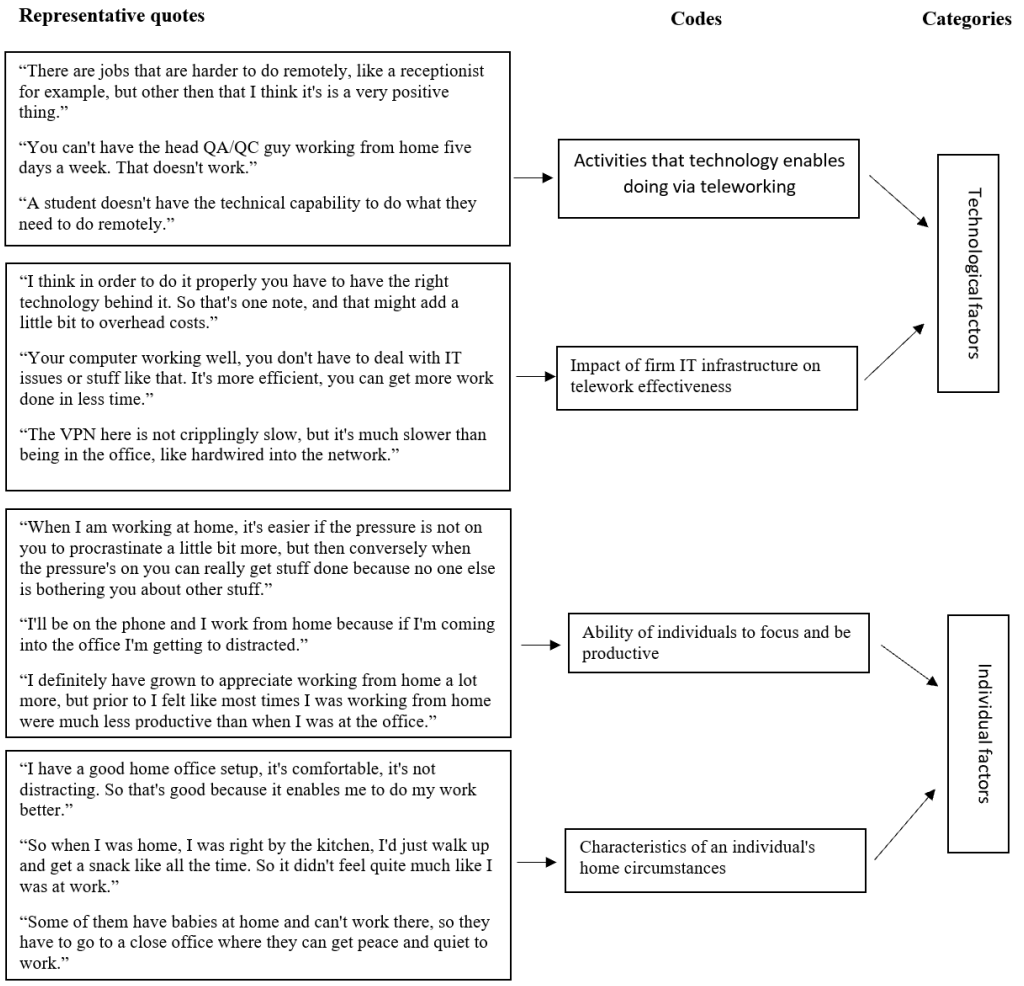
The data analysis stage started concurrently with the interview process once a sufficient amount of data had been collected, specifically after having completed four full interviews. My initial approach to analysis was heavily inspired from *grounded theory* (Strauss & Corbin 1994). The main features of grounded theory are outlined by Bryman (2012), however, there are many facets not covered. Due to time constraints of this thesis, I could not feasibly apply grounded theory in its full capacity, but instead rested on its core tools which are *theoretical sampling*, *coding*, *theoretical saturation*, and *constant comparison* (Bryman 2012). I applied all of them to varying extents, except for theoretical sampling which seemed to require more expertise in theory building skills than I perceived I had during the interview process. Nevertheless, my purposive sampling strategy seemed to have reasonably assured avoiding theoretical oversaturation anyways, which is the main point of theoretical sampling.

As recommended by Bryman (2012), I started the coding process by first reading through the transcripts with a fresh mind and jotting down a few notes. Following that, the coding process continued and generally involved "a movement from generating codes that stay close to the data to more selective and abstract ways of conceptualizing the phenomenon of interest" (Bryman 2012, p.570). Initially, coding was performed nearly sentence by sentence in an attempt to stay close to the data, however, after struggling to make sense of hundreds of codes, I restarted using some higher level concepts inspired by this initial coding process. Aside from the challenges of dealing with large numbers of codes, it was also difficult to develop meaningful concepts that fit the research question. Many coding iterations were required to develop a smaller set of codes which reasonably fit the research question and data. Although I often felt that I was going in circles during this process, I eventually discovered this was likely the grounded theory process of constant comparison that Bryman (2012) had referred to.

The process of developing a final set of codes and organizing them into larger categories generally resembled the approach by Gioia et al. (2013). Parts of the transcripts were assigned a code, and these codes in turn linked to

a larger overall category. This approach helped to manage the large amounts of qualitative data collected. A few examples of how the raw empirical data was transformed into codes, and subsequently categories, is illustrated in Figure 3.1.

Figure 3.1: Examples of coding structure



The majority of this intensively iterative coding process was performed during analysis of the first four interviews. After that point, I used the concepts developed to date to *thematically code* (Bryman 2012) the remaining interview data as it was collected. Essentially, the empirical data collected from the final three interviews was coded strictly using the set of codes refined during analysis of the first four interviews. This was a more efficient way to process the remaining data which was necessary considering the time constraints. Unfortunately, it also represented a departure from the principles

of grounded theory. On the other hand, about 40% of the qualitative data benefited from the detailed coding process which could have been enough to theoretically saturate the main underlying themes of the topic. Nevertheless, this remains a potential weakness of the research methodology imposed by realistic time constraints.

The software NVivo 12 was utilized throughout the analysis phase, which I generally found to be a useful and efficient tool. The process of learning the software was relatively smooth, although my experiments with some of the more advanced features (e.g. automatic coding) either failed in technique or the features themselves proved to not be considerably useful. For example, the automatic coding tool generated a set of codes that did not seem intuitively connected or reflective of the main themes I had envisioned through conducting the interviews. Nevertheless, the software properly served its main purpose which was to assist in organizing the complex web of codes and transcripts inherent in the analysis phase. I predominantly used the software to keep track of different versions of coding sets, all of which I manually coded myself.

The concepts developed during the analysis stage ultimately ended up shaping the structure of Chapter 4 (*Empirical data*). The third level sections in that chapter represent the concepts developed, and the second level sections represent the categories that the concepts were organized into (e.g. contextual factors, individual factors, etc.). Organizing the chapter in this fashion facilitated presenting the empirical data because all of the relevant points could be easily accessed through NVivo 12 during the writing process. Furthermore, the process of writing out the empirical data inherently involved comparing data between individuals and between case firms, which ultimately inspired the propositions and supporting theory introduced in Chapter 2 (*Theoretical background*). As mentioned in Chapter 2 (*Theoretical background*), the structure of that chapter is based on an adaption of an existing telework model rather than the empirical categories developed through the coding process, although they are fairly similar.

The process of analyzing propositions generally involved searching the available data from Chapter 4 (*Empirical data*) for supportive and contrary points. For each proposition, the empirical data was organized based on whether it supports the proposition, disproves it, or has no impact. This provided a clear overview for assessing each proposition, and enabled writing an engaging analysis. In addition, it is worth mentioning that some iteration was involved as the implications of the results on theory was being rationalized, which in some cases required returning to the empirical chapter to present additional data related to a nuanced theoretical point. Overall, I attempted to maintain a balanced analysis and discussion by constantly

challenging both sides of an argument and finding *rivalry explanations* (Yin 2009). Hopefully this reduced bias in the research, however, it is impossible to completely remove bias due to the nature of social research.

The research strategy, design, and methods employed in this thesis have now been explained, and the next section aims to evaluate the quality of this research setup.

3.3 Evaluation of research quality

Evaluating the quality of research is commonly done by considering its *reliability* and *validity* (Yin 2009), however, some researchers assert that these terms are more applicable to quantitative research than to the qualitative approach taken in this thesis (Bryman 2012). The terms *trustworthiness* and *authenticity* have been suggested as alternatives for qualitative research specifically (Lincoln & Guba 1986), and therefore these are used in evaluating the quality of research of this thesis.

3.3.1 Trustworthiness

When judging the trustworthiness of qualitative research, there are four main criteria to consider: *credibility*, *transferability*, *dependability*, and *confirmability*. For a transparent and clear evaluation, each one of these aspects will be touched upon individually.

Credibility

The credibility criterion evalutes the extent to which the results likely reflect the true social reality (Bryman 2012). A few measures were taken during this thesis that support its credibility. First of all, aspects of grounded theory were employed which kept the concepts and categories developed close to what participants actually said. Secondly, the semi-structured interview process involved open ended questions that were neutrally phrased such that the data collected primarily represents the participants' perspectives. These two elements were very positive for credibility, however, there are a few potential disadvantages as well.

First, my previous relationships with the participants, the industry, and my personal perspective on teleworking could potentially have biased the results. However, I did take measures to reduce bias, such as employing grounded theory, asking open ended questions, and constantly seeking out

rivalry explanations that challenged my own viewpoint. The second disadvantage is that there was not enough time for *respondent validation* (Bryman 2012), which would have involved confirming with the participants if their perspectives were properly interpreted in the findings. I do have plans to circulate the findings to the participants for feedback post-research, however, it remains a gap in the current state of this project. Nevertheless, the communication in the interviews seemed effective and I do not have any reason to suspect that the results were misinterpreted, especially after rereading the transcripts.

Overall, I believe that the results from this research are credible because of the measures taken, notwithstanding that certain aspects could have been improved if there was more time.

Transferability

The transferability criterion evaluates how well the findings of the research apply to outside of its context (Bryman 2012). Recall that one of the purposes of this research was to explore teleworking in the context of consulting engineering firms. To this end, I believe that the results are applicable to consulting engineering firms. However, all of the case firms included in this study were from the same geographical area which could limit its transferability to other cultures or geographical regions. Moreover, the case firm Seinfeld Inc. was quite small and all employees had close working relationships which likely made collaboration easier, and it is unclear if teleworking would work as well outside of these conditions. Similarly, relationships at Benes Inc. were developed through frequent collaboration in an office environment, and this in turn could have made teleworking easier for them during COVID-19. Nevertheless, I believe that the context of these firms is well described, as well as its implications for teleworking, which should enable future researchers to transfer applicable parts of the results to other contexts at their own discretion. Therefore, the transferability aspects if this research appears to be reasonable.

Dependability

The dependability criterion evaluates the extent to which the research is documented, traceable, and auditable (Bryman 2012). In terms of documentation and traceability, I took diligent notes throughout the process and attempted to describe in as much detail as possible the methodology that was followed. From this respect, the detailed methodology should allow readers to understand the steps taken which contributes towards dependability. I

did not have any external auditors during this research project because it is not typical for a Master's thesis to do so. Moreover, auditing is generally not common in social research and is sometimes impractical (Bryman 2012). On the other hand, I did have an excellent supervisor throughout the research process who provided timely feedback, and this arguably represents a partial form of auditing. Therefore, I believe that a reasonable standard of dependability was met in this research.

Confirmability

The confirmability criterion evalutes the extent to which the research has acted in good faith to remain objective (Bryman 2012). As previously mentioned, I took a number of steps in order to limit my personal bias from this thesis. These measures included open-ended and neutral questions during interviews, grounded theory inspired analysis, and constantly challenging my personal beliefs to explore rival explanations. Although it is impossible to completely eliminate bias from social research, I believe that the confirmability of this study is satisfactory.

3.3.2 Authenticity

The authenticity aspect is more difficult to judge than trustworthiness, and generally evaluates the contribution of the research to society (Bryman 2012). I believe that teleworking is becoming more prominent in society, especially after COVID-19, which increases the relevancy of this research. Moreover, a variety of perspectives have been explored in this research to help society understand the perspectives of supervisors and technical workers, as well as how the personal circumstances of different individuals impact their ability to telework. Therefore, I believe that there is sufficient value for society in this research to satisfy the authenticity criterion.

3.4 COVID-19 situation

As this thesis took place between January 2020 and July 2020, it was impacted by the COVID-19 situation. Fortunately, most of the interviews were planned to be conducted via video call anyways, so the interviews were not the aspect that was impacted. Instead, it mostly had a positive impact on the opportunity to collect relevant data. For example, I initially sampled a case firm that had little telework experience with the aim of obtaining negative viewpoints of teleworking, however, due to COVID-19 this firm switched

to teleworking which enabled me to collect data on their experiences with switching to teleworking. I believe that a professional researcher could have capitalized on the situation even more, however, I did not have as much flexibility because half of my interviews were already completed and I could not afford to develop a new research plan based on my schedule. Another advantage has been in the relevancy of this research for society. I originally set out on this research out of personal interest, and at the time it was a fairly niche area, however, the popularity of teleworking has now exploded due to COVID-19 which is interesting.

From a personal perspective, working on a thesis during the COVID-19 situation has been difficult, but manageable. The nature of the situation created a lot of stress which I believe impacted my motivation to some extent. Moreover, access to university resources was more limited (e.g. libraries and study halls were closed for a few months). As I wrote this thesis alone, I particularly missed the study hall as an environment to share my experiences with my fellow classmates. Writing the thesis without this environment did enable me to emphasize more with people who are opposed to teleworking because of its isolative nature. Overall, I would say that the COVID-19 situation limited my productivity to a moderate degree, but it did not have a detrimental impact on the research. As mentioned, the situation mostly resulted in positive impacts on this research project.

3.5 Personal reflections

At the beginning of this research, I set out to learn about teleworking in the consulting engineering industry because it is a topic that I was personally interested in based on my previous consulting engineering experience and positive attitude towards teleworking. Upon reflection, there have been several advantages with researching an area in my field. First, this strategy allowed excellent accessibility to participants from consulting engineering firms due to my existing network. I believe that a diverse mix of candidates were interviewed, from junior engineers up to presidents, which enabled viewing the practice of teleworking from different angles. Second, asking relevant questions was much easier during the interviews because of my familiarity with the industry. I do not believe someone who has not worked in consulting engineering would have been able to responsively ask the types of follow up questions that I did. Moreover, as previously mentioned, my relationship with the participants seems to have allowed the interviews to flow better and perhaps made the participants more comfortable with sharing in an open and honest manner. In addition, I also fulfilled my goal to learn more about

teleworking in consulting engineering firms.

On the other hand, this type of approach has had a couple potential disadvantages for the research quality. The main disadvantage of this strategy has been the potential for it to introduce bias. For one, my predisposed belief in the value of teleworking could have biased the results towards favouring the positive aspects of teleworking. I was aware of this potential from the beginning, and consequently took several measures to reduce the potential for bias. I do believe that these measures worked to some extent because I personally have changed aspects of my views on teleworking by challenging them. Another more subtle potential for bias is that, based on my previous experience in the consulting industry, I did not have an outsider perspective which could have introduced a bit of tunnel vision to the research. For example, I may have not asked as many "outside of the box" type questions that an industry outsider would have because I shared the same paradigm as most of the participants. However, in my opinion, the advantages gained from this research approach have far outweighed these disadvantages.

The overall research process was fairly challenging and messy, which Bryman (2012) indicates is not unusual even for professional social researchers. The biggest challenge in my eyes has been the iterative nature of the research. As an engineer, I am used to defining a problem first and then working towards creative solutions. However, in this type of social research, even something as fundamental as the research question you are trying to answer can change several times over the course of the project. I now understand that a quality piece of social research is one in which the research has been continuously and persistently revised to the point that the research question, data, analysis, and discussion are in harmony.

My research is presented in a fairly linear fashion in this thesis for simplicity, however, this does not accurately reflect the reality of how the research process went. One of the biggest examples of this is that the research began with a deductive approach, but ultimately ended up primarily using an inductive approach. The initial deductive approach attempted to dissect consulting engineering firms into finite strategic elements that could be explored in terms of their relationship to teleworking. Indeed, the initial research guides that were used on approximately half of the participants were developed in accordance with this approach (see version 1 research guide in Appendix C). However, the main problem encountered was that the strategic elements of consulting engineering firms and their interrelationships were difficult to define, and could have been a worthy research topic in themselves. It became clear that the scope of this thesis could not possibly develop a reasonably comprehensive model of consulting engineering firm strategy *and* its relationship to teleworking.

Thereafter, a new framework was needed to structure the research around teleworking, since it could no longer be structured according to a strategic model of the consulting engineering firms. Based on the collected empirical data at the time, a series of codes and categories were developed and initial propositions were formed based on these. The theoretical basis for these propositions followed afterwards, and in some cases resulted in minor modifications to the propositions. I found a significant advantage of this approach to be its facilitation of focusing the development of the theoretical framework. For example, the initial theoretical framework based on the deductive approach included a lot of theory that did not end up being used because it was irrelevant to the collected empirical data.

There were some positives of beginning with a deductive approach since it enabled the research to start building momentum in an ordered fashion. However, it was important to discard this approach as soon as its limitations for answering the research question became evident, despite the fact that it required reworking the entire theoretical framework. Overall, I believe the inductive approach has benefited this thesis and the process has given me a new appreciation for the feasibility of inductive approaches compared to deductive ones.

3.6 Summary

In this chapter, the following main points were covered:

- the research strategy, design, and method were explained in detail;
- an evaluation of the research quality was provided;
- an explanation of the impacts of COVID-19 was presented; and,
- my final reflections on the overall research process was provided.

In the next chapter, the empirical data collected through the interview process is presented.

Chapter 4

Empirical data

As mentioned in Section 3.2 (*Research method*), the empirical data collected in this research project involved in-depth interviews of seven employees from two consulting engineering firms. The purpose of this chapter is to present the empirical data collected in an organized manner. First, a description and comparison of each participating firm is provided for context. Then, the remainder of the chapter presents data from the interviews and is structured based on the codes and categories developed through analysis of the data, as discussed in 3.2.6 (*Analyzing the data*). The data presented in this chapter forms the basis of evidence used in Chapter 5 (*Analysis*) for evaluating the propositions previously established in Chapter 2 (*Theoretical background*).

4.1 Case firm descriptions

In this research project, two consulting engineering firms were selected for data collection which are henceforth referred to by their fictional names of Seinfeld Inc. and Benes Inc. Both firms primarily operate in the Greater Toronto Area (GTA), the largest metropolitan area in Canada, which means teleworking is optional since they are located relatively close to both staff and clients. Moreover, high-speed internet access is prominent in this area and does not represent a barrier towards teleworking. Therefore, the teleworking practices that have developed at each firm are due to reasons beyond these rather obvious factors. The teleworking practices of each firm are drastically different despite being subject to the same geographical and industrial context, which allows for a unique insight into how teleworking practices are shaped in isolation of these factors. The following subsections briefly describe each case firm and compare them in terms of relevant firm characteristics.

4.1.1 Seinfeld Inc.

Seinfeld Inc. is a small engineering consulting firm with a total staff size of five, consisting of four engineers (including the president) and one administrative staff. It has been in operation for about one year, and all of the engineering staff have good relationships with each other based on prior work experiences. A unique aspect of Seinfeld Inc. is that they operate almost exclusively via teleworking, with the exception of occasional duties such as client meetings, field work, or strategic planning. There is no central office at Seinfeld Inc., and due to this staff are free to work from their homes, which is most common, or wherever they are able to work effectively. Their client meetings typically take place at their clients' offices and field work at the respective project sites, however, such non-telework activities represent only a small portion of their project work. Although staff are free to choose their work location, they are required to work during certain core hours which essentially results in about 75% or more of their regular working hours being shared collectively. All staff at Seinfeld Inc. are provided with laptops, monitors, and a printer/scanner for their home. They use the Office 365 platform extensively for teleworking to, for example, handle file sharing through Sharepoint and day-to-day communication through Teams.

4.1.2 Benes Inc.

Benes Inc. is a medium size engineering consulting firm with 225 employees total, where approximately 70% of employees are engineers. Over its nearly decade long history, the majority of employees have been stationed at its head office, however, they have also established a few small offices across the GTA for employee convenience. Despite corporate encouragement towards teleworking in recent years, it is still commonplace for the majority of employees to work at a physical office location. The official corporate policy on teleworking places the decision authority with direct supervisors, which means that telework practices can vary from team to team within the firm. All employees are equipped with laptops to enable teleworking, however, there is a limited number of VPN licenses for connecting to the central server remotely. The primary software used for teleworking is Skype for Business. Similar to Seinfeld Inc., staff at Benes Inc. are also required to work during certain core hours which results in comparable overlapping of employee regular work hours.

4.1.3 Comparative overview of case firms

A comparative overview of the relevant firm characteristics previously described is presented in Table 4.1 below.

Table 4.1: Detailed comparative overview of Seinfeld Inc. and Benes Inc.

Firm characteristic	**Seinfeld Inc.**	**Benes Inc.**
Geographic business focus	Greater Toronto Area	Greater Toronto Area
Approximate firm age (years)	1	8
Number of employees	5	225
Number of offices	0	4
Teleworking practice	Primarily teleworks	Rarely teleworks
Teleworking hardware	All employees provided with laptops, monitors, and printer/scanner for home	All employees provided with laptops
Teleworking software	Office 365 (e.g. Sharepoint, Teams)	Central server, Skype for Business
Employee work schedule flexibility	Min. 75% overlap in regular work hours firm wide	Min. 75% overlap in regular work hours firm wide

In the following sections, empirical data from both of these case firms is presented under the categories of technological, contextual, individual, and organizational factors that influence teleworking.

4.2 Technological factors

Technological innovation is the sole reason that teleworking is even possible today. However, there remains questions as to what type of work this technology enables doing via teleworking and how effectively it is being employed in firms. This section examines the technology of each firm at the hardware and software level to illustrate how it influences the teleworking practices of each firm.

4.2.1 Activities that technology enables doing via teleworking

All interviewees at Seinfeld Inc. agree that the majority of their work is completed via teleworking, however, they also undertake some activities that are clearly not done by teleworking. It is common for all interviewees to complete technical project work at home, which represents the bulk of their regular duties. This includes activities such as performing calculations, preparing CAD drawings, and writing reports. Additionally, some of the interviewees conduct managerial and support activities from home, such as project management, proposals, and company management. None of the interviewees claim that technology hinders these types of activities. An exception to this is training new engineers, which all interviewees perceive to be potentially problematic via teleworking, although none had actually attempted it yet. Furthermore, every single interviewee says that they hold project meetings with clients in a physical space, usually at the client's office. Similarly, meetings with suppliers are typically done over lunch and attending industry conferences requires being present at the venue. Moreover, their first annual company meeting was held at a physical meeting space. Everyone seems to take for granted that these meetings happen face-to-face without elaborating on the underlying rationale. Aside from meetings, project field work (e.g. surveying measurements) is performed by all interviewees at the respective job site and cannot be done by teleworking because of the level of detail and accuracy their designs call for. This represents a technological barrier for the firm that restricts these types of tasks from being conducted via teleworking, in contrast to the meetings which could theoretically be conducted by teleworking yet are not. In general, it is important to emphasize that all interviewees considered the firm to be fully oriented towards teleworking because nearly all of their work is done from home, and the aforementioned activities represent the exception rather than the rule.

> *"Everyone generally works from home. You have the freedom to work the hours when you want to work the hours." (Newman - Engineer, Seinfeld Inc.)*

Similarly, at Benes Inc. the practice of teleworking seems to depend on the type of activity being performed, whereby some activities require being in the office and others are more conductive to teleworking. All manager interviewees could name at least one position that could not be performed with teleworking because of the type of regular duties they require. These positions included front-desk receptionists and administrative staff involved in sending packages to clients. During COVID-19, these were the only employees who

continued to use the office, whereas all other positions could be performed by teleworking to varying degrees of success. In general, teleworking seems to have no negative impact on many activities, such as calculations, report writing, and emails. In fact, some activities that require concentration appear to benefit from teleworking, such as writing reports. In contrast, the effectiveness of certain activities varies due to technical issues further elaborated on in the next section. Notably, the connection speed to the firm's server seems to cause performance issues with activities related to CAD work, intensive modelling programs, and even simply creating PDFs, according to the views of all employees interviewed and some managers. Additionally, all managers occasionally physically meet with external stakeholders such as clients and municipalities, which seems to be important to do physically although the rationale for this was not made explicit by interviewees. Furthermore, supervision of junior staff appears to be difficult to do via teleworking without being able to glance over at their screen to ensure they are on track and not exceeding a project budget, for example. Overall, the technology employed at Benes Inc. seems to enable the majority of activities to be performed via teleworking, however, there are clearly some activities that are more limited than others.

> *"There are jobs that are harder to do remotely, like a receptionist for example, but other then that I think it's is a very positive thing." (Elaine - President, Benes Inc.)*

4.2.2 Effectiveness of the firm's IT infrastructure for teleworking

The satisfaction of interviewees at Seinfeld Inc. with their IT infrastructure for teleworking appears to be high, which indicates it is functioning effectively. None of the interviewees have any significant issues with the hardware and software they use on a daily basis. When it comes to hardware, all interviewees are satisfied with their laptops which have additional computing power to support the various CAD and modelling softwares they run. One interviewee mentioned that a desktop computer would be more advantageous for running intensive softwares simultaneously, however, this is not generally an issue for them. Furthermore, the laptops are a key piece of hardware that allows team members to attend meetings together or work from locations other than their home. None of the interviewees seem to have issues related to their home network or internet. In terms of software, all interviewees are very satisfied with Sharepoint and Microsoft Teams for collaborating. All of their project files are automatically synced through Sharepoint, and they are

able to communicate effectively with each other through Microsoft Teams by using features such as the chat, audio calls, and screen sharing. All of the participants reported that video chats were rare, and that chat, audio calls, and screen sharing were the primary communication methods. Overall, the cloud tool setup at Seinfeld Inc. appears to function very well for teleworking purposes, although the president says that an internal firm network would probably be more economical if the firm ever scaled up significantly.

> *"It's super easy to work together or figure stuff out. Even if you have a quick question, you can shoot someone a Teams message and if they're there and can see it they'll respond, or if they won't see if for three hours, then whatever." (Kramer - Engineer, Seinfeld Inc.)*

At Benes Inc., a transition has been made over recent years to provide all employees with the software and hardware to telework. The functionality of this telework technology is not absolutely critical since Benes Inc. has multiple office locations across the Greater Toronto Area that each have a focus and operate like a mini company. Nevertheless, when it comes to teleworking, some interviewees describe issues with connecting to the firm's server and performing certain tasks. First, only approximately 60% of employees may be remotely connected to the company server at any given time due to a limited number of VPN licenses. Under normal operating conditions this is not generally an issue, however, during COVID-19 it did present problems. Furthermore, employees frequently experience slow speeds when using CAD and intensive models, and one interviewee has speed issues with simply creating PDFs. Interestingly, when probed about the CAD issues, one interviewee admits that it is not a problem with all projects but could not identify a pattern of causality. Another interviewee theorized that any software required to access multiple files at once has issues, however, the true cause was never conclusively identified. Aside from these issues, none of the interviewees experience problems with their laptops or with the software they use to collaborate when teleworking (Skype for Business). However, all interviewees mentioned that they primarily used the chat function of Skype for Business and rarely used video chat or screen sharing.

> *"The VPN here is not cripplingly slow, but it's much slower than being in the office, like hardwired into the network." (George - Engineer, Benes Inc.)*

4.3 Contextual factors

No firm is immune from its environment, and that holds true when it comes to teleworking practices. The purpose of this section is to illustrate key contextual factors that seem to have played a role in shaping teleworking practices at each firm.

4.3.1 Urban issues that can encourage teleworking

Two factors common in large urban areas, such as the GTA in this particular case study, is that both commute time and rent prices are high which have encouraged teleworking at Seinfeld Inc. In terms of commuting, all interviewees at Seinfeld Inc. agree that its absence is a major benefit of teleworking. Employees save both time and costs of transportation by working from home, with the time factor seeming to be the more valuable of the two to interviewees. The high rent prices in the GTA sharpen the competitive cost advantage that Seinfeld Inc. gains from not owning an office. The president at Seinfeld Inc. says that they would need to spend at least an additional 10% in overhead costs to secure an office for their size. Moreover, as a new firm that started teleworking, there was no costs for switching over to a teleworking setup. This appears to be a win-win-win, where employees save personal time, the firm saves office costs, and the GTA gets a few less cars during rush hour. It would be interesting to see if such a firm chose a teleworking set in a different geographical location where commute times and rent prices are more reasonable, such as a more rural area, however, for now they appear to be fundamental conditions for the teleworking practice at Seinfeld Inc.

> *"I have an extra hour to an hour and a half every day to spend at home, preferably not working, but it's also available to work if I need to." (Jerry - President, Seinfeld Inc.)*

Both of these factors seem to play a role in driving teleworking at Benes Inc. as well, despite the tendency for employees to continue commuting to the office. All interviewees agree that commuting takes a significant amount of time and can be a stressful endeavor for employees. Moreover, the danger of commuting in terms of car accidents is a concern for at least one interviewee. On the other hand, one interviewee purposely lives close to the office, and so traffic does not directly impact that person or influence their propensity towards teleworking. However, some employees prefer to live the downtown lifestyle where Benes Inc. does not have an office, and for these employees the traffic is unavoidable and has been a cause for departure. Clearly at such

a big firm the impact of traffic can vary from person to person, however, it generally appears to be an issue for several employees. In terms of rent prices, Benes Inc. is aware of the savings potential if more employees worked from home, however, since the majority continue to use the office they are unable to save on rent. The president of Benes Inc. believes that the decision to transition to teleworking should be with direct supervisors, and so the corporate level would not forcibly implement teleworking to save on rent, but rather encourage it and welcome any savings by adaptably leasing out office space no longer used.

> *"Think of the alternatives, with the amount of space we have here, if we could sublease half of it and encourage people to work from home we'd save a lot of money on rent." (Elaine - President, Seinfeld Inc.)*

4.3.2 Societal issues that can encourage teleworking

The COVID-19 pandemic threw the world into chaos prompting masses to adapt with teleworking to combat the virus. Seinfeld Inc. already primarily teleworked, hence this virus did not largely impact their normal operations, however, for Benes Inc. nearly the entire company switched to teleworking. One interviewee expressed that, despite some technical issues, teleworking has worked better than anticipated and that the situation could prompt new ways for them to approach teleworking in the future, although this would depend on an official post review of what worked well and what did not. COVID-19 seems to have had an undeniable influence on the teleworking practices of Benes Inc, but there is another even bigger societal issue to be explored: climate change. The most notable outcome of COVID-19 at Benes Inc. was the adaptation of employees to teleworking. The majority of employees described initially suffering from low productivity due to distractions, but later improving their productivity as they became more familiar with teleworking and implemented better home offices. Some of the interviewees at Benes Inc. believe that teleworking could reduce carbon footprints by eliminating the lengthy commutes to an office. However, the influence of this on their teleworking practices seems to be small and more of a side benefit than a determining factor. Similarly, this plays no influence on teleworking practices at Seinfeld Inc., whose interviewees did not mention it as a potential benefit. As society continues to fight the battle against climate change, it would be interesting to see if teleworking practices ever becoming part of the solution like they had during the COVID-19 pandemic.

> *"My view's changed in the sense that almost every single person*

> *that I communicate with is working from home. That includes other consultants, and the municipalities also have their staff at home." (Susan - Manager, Benes Inc.)*

4.4 Individual level factors

Every individual has unique circumstances, however, they also collectively experience some things similarly. This continues to apply when it comes to teleworking which can greatly impact the way individuals work daily. This section explores the personal inclinations that people have either towards or against teleworking to shed light on how they influence the firm's overall teleworking practice.

4.4.1 Ability of individuals to focus and be productive

Focus is an important aspect for knowledge workers and one that most interviewees at Seinfeld Inc. agree can be improved when working from home. The emphasis is on *can* because it seems to depend on the sense of urgency associated with the task. If there is little pressure on a certain task, then all interviewees agree that it is easier to procrastinate or become distracted while at home compared to in an office where they feel a stronger obligation towards working. On the other hand, when the pressure is on, employees are able to be extremely productive in a short period of time because they can completely immerse themself in the task without being interrupted by coworkers like is often the case in an office environment. Due to this, the majority of the interviewees seem to think that teleworking requires more self-discipline than office work. Working hours may also be expanded during these intense periods since the work-home interface is blended and the employees have extra time from not commuting and taking care of household chores during low productivity times. Moreover, these short bursts of productivity do not seem to impact the quality of work delivered. The dependence of individual focus on task urgency at Seinfeld Inc. influences their teleworking practices in terms of how productivity is spread over time, resulting in a more pronounced "hockey stick effect".

> *"When I am working at home, it's easier to procrastinate a bit more if the pressure is not on, but conversely, when the pressure is on you can really get stuff done because no one else is bothering you about other stuff. " (Jerry - President, Seinfeld Inc.)*

Interviewees at Benes Inc. appear to either not be distracted when working from home or are not as candid about these temptations. Moreover,

their belief in how productive others are at working from home varies. All interviewees are in agreement that working from home is not for everyone, however, their viewpoints diverge thereafter. Some believe that the majority of employees are able to work effectively from home and that any rumour otherwise is due to a few "bad apples", whereas others are highly skeptical that employees are actually working as hard at home. It is difficult to see which perspective is more accurate, however, some insight may be gleaned from the COVID-19 situation where all employees teleworked, and one interviewee with the latter perspective actually believed performance was okay but stopped short of claiming it was optimal. In addition, the majority of interviewees agree that the office can be distracting in itself. In this sense, teleworking clearly seems to be a tool to help escape a distracting office environment and focus. On the other hand, some of the interviewees also discovered through the COVID-19 situation that it can be difficult to work from home because there are so many distractions. Moreover, some interviewees did mention they could easily focus at work without many distractions. This appears to vary based on personality types and home office setups.

> *"When I'm motivated and focused, there's not a huge difference between the office and home. However, at home when I'm not really feeling it, to bring myself to work is almost impossible to do." (Leo - Manager, Benes Inc.)*

4.4.2 Characteristics of the home situation of individuals

At Seinfeld Inc., all interviewees seem to have a space at home where they can work effectively. Most interviewees say that their home office setup is free from a lot of distractions which helps them focus and be more productive during the day. Others mention some factors completely outside of their control that are infrequent but nevertheless interrupts their work, such as power shutoffs due to construction or fire alarm testing. Moreover, the majority of the interviewees mentioned that there are many distractions at home, such as the option to go make food at any time. Most of the interviewees did not have children or appear to have other friends or family at home that could distract them, however, one interviewee did mention that they became distracted by their kids when they returned from school. Furthermore, not all individuals solely work at home. The majority have worked from a local coffee shop on occasion to get out of the house and be with people, but this is only possible sometimes based on the types of tasks being done. For example, one interviewee could not work at coffee shops when doing work that

required two screens, which at the time occurred fairly frequently. None of the interviewees discussed the environment at the coffee shops or the consequences it had for their work, although one could imagine it comes with its own unique challenges.

> *"I have a good home office setup. It's comfortable and not distracting, which is good because it enables me to do my work better." (Kramer - Engineer, Seinfeld Inc.)*

For Benes Inc., if employees are not working in the office, then they are working from home. None of the interviewees discussed working from coffee shops, although one mentioned employees could work there so long as they could do so effectively. As a large firm, it is not surprising that employees have a variety of circumstances relating to their home situation that influences their teleworking practice. Some interviewees say that employees with babies or young children are not able to work effectively from home and actually need the office environment. On the other hand, some employees occasionally work from home because of special circumstances requiring them to care for their child. Another characteristic is how far employees live from the office. Some live especially far from the office which seems to favour them working from home a few days a week, whereas others live close to the office and are consequently not as inclined towards teleworking. The home office setup of employees also plays a big role, with most employees emphasizing the importance of minimizing distractions while at home, an insight primarily gained from their experience with COVID-19. The majority of the participants interviewed during COVID-19 had reported they did not have good home office setups (e.g. some worked from their kitchen), but discovered it was necessary to start improving their home office setup if they were to work effectively from home on an extended basis.

> *"I've tried to create a situation where I have less distractions, whereas prior to COVID-19 I found a drastic difference in the amount of distractions between the office and home because at home there are so many more distractions." (Leo - Manager, Benes Inc.)*

4.4.3 Desire to work from an office environment

Clearly employees who choose to work at a primarily teleworking firm such as Seinfeld Inc. are okay with working from home. Indeed, all interviewees enjoy the benefits of working from home, but they also still have a desire to work in an office environment, it is just that it is not strong enough

to give up the perks of teleworking (e.g. no commute). When asked, the majority of interviewees agree that it would be ideal to have the option to come to an office a couple days a week for a variety of reasons. They enjoy the social atmosphere, comradery, and the culture that comes with an office based on their experience from previous positions. However, it would depend on the particular office setting since some can be toxic. Moreover, an office helps employees be more productive by freeing them from the distractions of their house. Furthermore, the majority seem to get tired of being at their house, evident by their trips to coffee shops, which further supports their desire for an office environment as a change in scenery. Additionally, the office provides a natural opportunity for some exercise by walking to/from meetings and such, which does not exist when working from home where purposeful exercise throughout the day is needed. The positive aspects of an office environment are not lost on the employees of Seinfeld Inc., rather they choose to telework by balancing tradeoffs between both modes of working.

> *"Working in an office on a part-time basis would be good. It would really even out the pros and cons because you get the best of both worlds." (Newman - Engineer, Seinfeld Inc.)*

At Benes Inc., there are several positives that employees seem to gain from being in an office environment. The office is a space where employees are able to focus and be productive which is not possible at home for some individuals. One interviewee found they were more effective by being able to physically supervise people, as well as be available in person for anyone in the office to drop by with questions. Similarly, one interviewee described a junior staff at Benes Inc. who sees the office as a learning environment and fears that working from home would mean forfeiting a chance for development. Moreover, all of the interviewees find enjoyment in keeping in touch with their coworkers and interacting on a regular basis, which happens naturally when in the office. At least one employee left Benes Inc., despite having teleworking available as an option, because they found a position closer to home where they had the type of office environment they thrived in. Furthermore, it seems important that people in the office actually work together on shared projects, since previous satellite offices at Benes Inc. had failed where there was a random assortment of employees solely unified by their resident location. Shifting towards a more telework oriented practice would require letting go of or finding substitutes to the needs that the office currently meets for everyone at Benes Inc. Another aspect is that some interviewees mentioned a preference to keep work and home life separate, which involved a preference for office work or diligently distinguishing between work and home time when teleworking during COVID-19. One of the employees mentioned

that the blending of home and work life become more acceptable as they became more interested in career progression. In general, the majority of the employees interviewed appeared to prefer working in an office environment, but were open to occasionally working from home.

> *"I think I really benefit from being in the office and having that accountability of supervisors and coworkers nearby who might check up on me. That helps keep me on task." (George - Engineer, Benes Inc.)*

4.5 Organizational level factors

4.5.1 Supervisor trust in employees teleworking

There is only one supervisor at Seinfeld Inc., however, they expressed some level of concern related to trusting employees in teleworking. The level of trust a supervisor has in their employee seems to depend on both their relationship with that employee and the employee's respective experience level. All of the employees currently working at Seinfeld Inc. are experienced and capable of working independently, and also had preexisting relationships with their supervisor from positions at other firms. Consequently, the supervisor at Seinfeld Inc. trusts them to complete their work, despite needing to adjust to the inability to physically check-in once in a while. The adjustment requires them to focus more on reviewing outputs and budgets rather than behaviours. Although there are no supervisor-employee trust issues currently at Seinfeld Inc., it does play a factor in that they avoid hiring inexperienced junior engineers. Similarly, someone who is experienced but without an existing relationship with the supervisor could be hired but with some skepticism. In that case, supervision would rely almost entirely on traditional project management controls instead of physical supervision. This skepticism is not uncommon in hiring, however, it seems particularly stronger in this case because of the absence of a physical work setting. Another interesting point is that managers conversely need to trust that employees will not overwork themselves since their work is so easily accessible.

> *"I know the people I am working with and I know their capabilities, if it's someone I don't know then it's going to be different." (Jerry - President, Seinfeld Inc.)*

At Benes Inc., the supervisors' trust in employees to telework varied based on the supervisor's past experience with teleworking. All of the managers interviewed at Benes Inc. understood their authority to give permission to

their subordinates to telework, and did not feel any cultural pressure within the organization to decide one way or another. One supervisor had worked extensively in teleworking settings at previous firms and seemed to have much more trust in employees teleworking, and especially in their ability to supervise employees who telework. On the other hand, one supervisor with little to no previous telework experience expressed doubts that employees actually worked at home, and if they did, if they worked as optimally as in an office setting. Moreover, that person was more likely to trust someone who is consistently focused at the office compared to someone who is frequently socializing or distracted. Another manager had experienced unproductive days themselves while teleworking, and by extension felt that others could easily be as unproductive since they considered themselves to be a fairly disciplined person. The uncomfortable part about supervising in a telework setting, for that person, was not being able to glance over at screens to see if employees were on track or not, which had implications for seemingly tight project budgets. Furthermore, all of the managers interviewed at Benes Inc. noted training new engineers to be especially problematic via teleworking. One of the interviewees did appear to adapt to onboarding a new engineer during COVID-19, however, they did emphasize it would have been easier to do in person where they could oversee that person's work more closely.

> *"Do I have an underlying suspicion that this person is going to be doing what they say they're going to be doing? I do." (Susan - Manager, Benes Inc.)*

4.5.2 History of firm and culture related to teleworking

Due to the relatively young age of Seinfeld Inc., there is not much history or culture that has been developed. The absence of this seems to have provided a fresh slate that enabled designing a fully telework oriented firm from the very beginning. Moreover, a teleworking setup appears to have been preferred over an office setup because of it's lower capital cost, which is particularly important for a new firm with unsteady cashflow. Everything about the firm has been designed around the concept of teleworking, from the type of technology employed to the type of employees hired. All interviewees previously knew each other prior to joining the firm and seem to have developed their own culture in a telework setting by chatting with each other daily, despite not being in the same physical location. Some interviewees think it could be intimidating for someone new joining the firm to integrate with the team, however, not impossible. The fact that everyone is in a similar

situation by teleworking, and believes in its benefits in terms of the tradeoffs being made, seems to unify the team and motivate them to find solutions and work effectively.

> *"Where it excels is that we all enjoy having the freedom of this setup. It's pretty sweet and I think that all of us are in the same boat of really trying to put our best foot forward to make this work." (Newman - Engineer, Seinfeld Inc.)*

The history and culture surrounding office work at Benes Inc. plays a strong role in shaping its teleworking practices today. All interviewees agree that it is commonplace to work in the office, and that only in recent years has the option to telework been introduced. There are examples of some employees who moved to a distant office and suddenly ceased being used as an asset to teams at their former office, despite being readily available via email, Skype for Business, or phone. Some interviewees strongly believe that people holding certain positions, such as head of quality control, must be at the office the majority of the time to be physically accessible to others. Moreover, some interviewees believe that an office setting is an integral part of their team building and that it would not develop in a similar manner if done via teleworking. Furthermore, the culture and atmosphere of their office serves to attract some employees who prefer that to teleworking, and consequently it seems to create a reinforcing circle favouring office work. In addition, aside from soft factors, Benes Inc. had to invest in IT to enable the possibility for employees to simply telework because they previously only needed IT to support an office environment. The energy that has been involved to introduce to a more telework orientation seems to be quite large at Benes Inc., partly due to these historical and cultural factors.

> *"When people don't see me at the office they get upset, like you're not around. Yea, I'm not around because I'm doing something, I'm not hanging out on the beach." (Elaine - President, Benes Inc.)*

4.6 Summary

The main purpose of this chapter has been to present the empirical data collected from the interview process. The data was presented in accordance with a structure based on the codes and categories developed through analysis of the data, as described in 3.2.6 (*Analyzing the data*). In the next chapter, this empirical data will be referenced in order to evaluate the validity of the propositions established in Chapter 2 (*Theoretical background*).

Chapter 5

Analysis

In this chapter, the theoretical propositions established earlier in Chapter 2 (*Theoretical background*) are evaluated on the basis of the empirical data presented in the previous chapter, Chapter 4 (*Empirical data*). Similar to the structure of Chapter 2 (*Theoretical background*), this chapter is divided based on the four levels of teleworking: job, individual, organizational, and environmental and societal. A summary of the analysis results for each level is provided at the end of each section, and at the end of this chapter, an overall summary of the analysis results is provided. Note that this section purely focuses on assessing the validity of the propositions, and the implications of the analysis for telework theory is provided in the following chapter, Chapter 6 (*Discussion*).

5.1 Job level

As mentioned in Section 2.2 (*Job level*), the job level covers aspects related to the characteristics of the work being done and their implications for teleworking. Two main concepts on the job level were explored: the influence of communication technology on telework effectiveness, and the general conduciveness of engineering consulting to teleworking.

5.1.1 Influence of communication technology on telework effectiveness

J1: Consulting engineering firms that implement effective communication technology for teleworking are effective in teleworking.

In Section 2.2.1 (*Influence of communication technology on telework effectiveness*), the importance of communication technology for teleworking was highlighted. The media richness of a communication technology contributes to its ease of use, and the adaptiveness of an employee with using such technology also contributes to effective communication. Both of these factors are trending upwards which increases the likelihood that an organization can effectively communicate while teleworking. Considering the emphasis of telework literature on communication technology, this proposition intended to test whether organizations who effectively use this technology are in fact effective at teleworking.

Based on the empirical evidence in Section 4.2.2 (*Effectiveness of the firm's IT infrastructure for teleworking*), both case firms in this study employ effective communication technologies such as Skype for Business or Microsoft Teams. According to the theory, both of these firms should be effective in teleworking because of the high media richness associated with these technologies. However, the empirical evidence also suggests that Seinfeld Inc. is more effective in teleworking than Benes Inc. is, despite them employing similar communication technologies.

A potential cause for this could be due to differences in how each firm trains their employees in using these technologies. However, none of the participants raised any issues with being able to use the communication technology. Moreover, some interviewees expressed confidence in being able to quickly self learn less common features if they had to. Another potential cause could be differences in how each firm uses the technology, whereby firms taking less advantage of the media richness would perform worse in teleworking. There is some evidence of this from Section 4.2.2 (*Effectiveness of the firm's IT infrastructure for teleworking*). Seinfeld Inc. uses screen sharing extensively whereas Benes Inc. generally does not use this feature. Interestingly, neither firm uses the media richness to its full potential because they generally favour chat or phone calls over video calls. Therefore, the difference in teleworking performance between the two firms could be explained by the fact that Seinfeld Inc. leverages media richness more than Benes Inc., even though it is not optimally used.

On the other hand, there are several alternative explanations for the difference in telework performance that are not necessarily because of communication technology, but rather due to other factors. From Section 4.2.2 (*Effectiveness of the firm's IT infrastructure for teleworking*), the empirical evidence shows that a major limiting factor for the telework performance at Benes Inc. is their information technology since critical tasks are limited both by accessibility (e.g. max number of VPN licenses) and speed (e.g. slow CAD work). Neither of these are issues at Seinfeld Inc., which is clearly a

big contributing factor to the difference in telework performance between the two firms. In addition, from Section 4.4.2 (*Characteristics of the home situation of individuals*), the employees at Seinfeld Inc. have better home office setups than employees at Benes Inc. which could also explain differences in telework performance. Moreover, the telework performance of employees at Benes Inc. appeared to improve during COVID-19 when they improved their home office setup. Furthermore, as a purely teleworking firm, Seinfeld Inc. likely has attracted the types of employees who perform well when teleworking. From Section 4.4.1 (*Ability of individuals to focus and be productive*) and 4.4.3 (*Desire to work from an office environment*), the empirical evidence shows that more employees at Benes Inc. prefer an office environment and perceive themselves as less productive at home.

In summary, both case firms in this study employ effective communication technology, however, there is clearly a difference in how effective each firm is with teleworking. Although there is some evidence to suggest this is because differences in how the communication technology is leveraged, the difference is more likely attributed to external factors aside from communication technology. Therefore, the proposition is false because effectively implementing communication technology does not automatically lead to effective teleworking.

5.1.2 The technological feasibility of consulting for teleworking

> *J2: Technology in general has advanced sufficiently to enable effective teleworking in consulting engineering firms.*

In Section 2.2.2 (*The technological feasibility of consulting for teleworking*), theory was presented that suggests consulting engineering firms are highly amenable to teleworking because of their autonomy and ability to perform work via computer technology. In contrast, theory shows that some consulting tasks are not performed well via teleworking, such as client meetings, however, these are the minority. The purpose of this proposition is to test how well the current state of technology is supporting teleworking in consulting engineering firms.

Based on the analysis from the previous section, communication technology generally seems to support the needs of consulting engineering firms. In fact, technological innovation seems to have outpaced the actual usage of communication features in some cases. For example, from Section 4.2.2 (*Effectiveness of the firm's IT infrastructure for teleworking*), none of the

firms extensively use video chat and only one of the firms uses screen sharing. In contrast, empirical evidence from Section 4.5.1 (*Supervisor trust in employees teleworking*) shows that managers perceive there to be difficulties with communicating with entry-level staff, specifically during training which requires close interaction. Both firms assert that these intensive interactions need to be done face-to-face, which implies they perceive the technology to be insufficient for this. For Benes Inc. this has implications for who they allow to telework, whereas for Seinfeld Inc. it has implications for who they can hire because they do not have an office, which suggests the impact of this aspect depends on the extensiveness of teleworking in the firm. Furthermore, in line with the theory, client meetings are typically done face-to-face based on Section 4.2.1 (*Activities that technology enables doing via teleworking*), potentially because of the importance of high quality interaction in these situations, although the evidence does not offer an explicit explanation.

Aside from communication technology, engineering consulting firms also require intensive computing power and a high speed connection to the server to run their software effectively. Based on Section 4.2.2 (*Effectiveness of the firm's IT infrastructure for teleworking*), the laptops and cloud software employed at Seinfeld Inc. appear to effectively satisfy their needs which suggests that technology has advanced sufficiently in this respect. However, even though the technology is available, it only helps if it is implemented properly. From Section 4.2.2 (*Effectiveness of the firm's IT infrastructure for teleworking*), the laptops work well but the accessibility and speed of the server connection is poor at Benes Inc. compared to when employees are in the office. The difference between technological implementations at Seinfeld Inc. and Benes Inc. can be explained by the history of the firms. From Section 4.5.2 (*History of firm and culture related to teleworking*), empirical evidence shows that the cost of transitioning to teleworking in an existing firm is difficult because they must sustain offices at the same time, whereas start up companies are able to only invest in teleworking from the beginning. Therefore, despite advancements in technology, the cost of implementing it is still a barrier for consulting engineering firms, particularly medium sized regional firms.

Therefore, mainly based on Seinfeld Inc. as a proven example, the proposition must be true. However, it is clear that there is a gap between the state of technology and the implementation of it, and the cost of implementing telework technology can be a barrier to effective teleworking. Moreover, the state of technology has not sufficiently advanced to complete every aspect of consulting engineering equal to in an office environment, but it has advanced enough to enable the possibility of a firm that primarily operates via teleworking.

5.1.3 Summary of job level analysis

A summary of the results of the proposition analysis for the job level is presented in Table 5.1 below.

Table 5.1: Summary of job level analysis results

ID #	Proposition	Validity
J1	Consulting engineering firms that implement effective communication technology for teleworking are effective in teleworking.	✗
J2	Technology in general has advanced sufficiently to enable effective teleworking in consulting engineering firms.	✓

5.2 Individual level

In Section 2.3 (*Individual level*), the individual level was introduced as including topics that relate to an individual's unique circumstances, as well as the implications of those for teleworking. Three concepts at the individual level were introduced: how teleworking influences productivity in general, how it changes the level of distractions, and how it influences the number of hours employees work.

5.2.1 General influence of teleworking on productivity

> *I1: Teleworking does not negatively impact employee productivity in consulting engineering firms.*

In Section 2.3.1 (*General influence of teleworking on productivity*), theory was presented that demonstrates teleworking is generally associated with either a neutral or slightly positive effects on productivity, although the evidence is somewhat thin. Moreover, and of particular interest due to its implications for managerial policy decisions regarding teleworking, the theory suggests that teleworking does not have a negative impact on employee productivity. The purpose of this proposition is to test that assertion.

There is a lot of evidence to suggest that this proposition is false in the strictly literal sense. From Section 4.2.2 (*Effectiveness of the firm's IT infrastructure for teleworking*), it is clear that the technology a firm employs

can either support or hinder employee productivity in regards to teleworking. The empirical data shows both cases, where Seinfeld Inc. experiences no technological issues and Benes Inc. experiences critical technological issues that impacts employee productivity when teleworking. Moreover, looking at empirical evidence from Section 4.4.2 (*Characteristics of the home situation of individuals*), the home environment of an employee can negatively impact the productivity of teleworkers in certain cases (e.g. small children at home). Furthermore, Section 4.2.1 (*Activities that technology enables doing via teleworking*) shows that some activities are less productive to do via teleworking compared to in an office, such as training new employees or meetings in general. Lastly, Section 4.4.1 (*Ability of individuals to focus and be productive*) shows that teleworking can make it difficult for employees to get motivated without the pressure of a deadline. Therefore, there are several examples of teleworking negatively impacting employee performance which renders this proposition false in the strict sense.

Speaking in a general sense, however, the empirical data seems to be in line with the theory in that teleworking generally has either a neutral or slightly positive effect on productivity. I already raised the concept of highs and lows of productivity being more pronounced based on empirical data from Section 4.4.1 (*Ability of individuals to focus and be productive*), and this inherently includes positive influences on productivity during the high points. The main reason cited for this is that employees are not subject to typical office interruptions, such as unnecessary meetings. Despite the fact that this is only a temporary boost in productivity, several employees also mentioned they felt at least as productive overall at home when implementing measures to reduce distractions. In addition, evidence from Section 4.2.1 (*Activities that technology enables doing via teleworking*) shows that teleworking can positively benefit productivity of certain tasks that fair well with independent concentration, such as report writing. This is in contrast to the previously mentioned negative impacts on tasks that require intense collaboration, and the net effect on productivity may also therefore be dependent on whether firms provides the option to work both via teleworking and in an office, such that an employee can optimize their schedule based on their specific role. Furthermore, based on evidence from Section 4.3.2 (*Societal issues that can encourage teleworking*), there appears to be potential for some negative impacts on productivity to be mitigated as employees become more experienced with teleworking. Lastly, in a more broader sense, a major benefit of teleworking is eliminating time wasted in a commute, as evidence from Section 4.3.1 (*Urban issues that can encourage teleworking*) shows, and this time saved can improve productivity in either home or work duties, depending on where it is reallocated.

Overall, based on the fact that teleworking can negatively impact employee productivity in some cases, this proposition must be false if considered as a strict rule. However, as mentioned, the empirical data generally shows a neutral or slightly positive effect on the productivity of employees. Moreover, there is potential for some of the negative impacts of teleworking to be mitigated.

5.2.2 Environmental distractions and teleworking productivity

> *I2: Teleworking reduces the work environmental distractions an employee is subject to in consulting engineering firms.*

In Section 2.3.2 (*Environmental distractions and teleworking productivity*), theory was presented that suggests teleworking decreases work-related distractions, which has a positive influence on productivity. This particularly applies to knowledge workers who require focus to be productive. On the other hand, teleworking also subjects employees to other types of distractions from their home environment. The net outcome on productivity seems to depend on the differential between distractions at home and the office, and this proposition aims to test which environment has more distractions.

Empirical data from Section 4.4.2 (*Characteristics of the home situation of individuals*) shows that all of the employees at the primarily teleworking firm (Seinfeld Inc.) find their home environment to be less distracting than the office, whereas most interviewees from the primarily office firm (Benes Inc.) find the exact opposite. This discrepancy suggests that the level of distractions perceived by an employee depends on factors in addition to teleworking as well.

Based on the collected empirical data, there appears to be two dimensions of distractions which will briefly be introduced to assist with the analysis. The first dimension is *activeness*, which describes the level of urgency the distraction places on an employee's attention. For example, a coworker interruption is an active distraction, whereas the presence of a kitchen to make food in is a passive distraction. The second dimension is *controllability*, which describes the extent of control an employee has to mitigate the distraction and hence maintain their productivity. A coworker interruption is a somewhat controllable distraction (e.g. closing a door, wearing headphones), whereas the presence of a kitchen is an uncontrollable distraction since the kitchen cannot simply be removed during working hours.

In general, the home environment appears to be associated with decreased levels of active distractions. Based on empirical data from Section 4.4.2

(*Characteristics of the home situation of individuals*), the majority of employees discussed their home working location as a place that allows them to escape interruptions typical in an office environment for when they need to focus on a task. The data does not include which measures, if any, that employees take to mitigate these interruptions while in the office. Nevertheless, most employees clearly find the interruptions in an office to be an issue, which suggests the controllability of office distractions is low. An alternative perspective is that employees simply have not tried to mitigate office interruptions, however, this seems rather unlikely for professional workers who tend to be more career driven. An additional case not included in the data is employees with small children or babies, which is a specific case that could foreseeably involve more active distractions than an office. However, in general, teleworking does appear to reduce the level of active distractions that an employee is subject to.

In contrast, the home environment appears to be universally associated with increased levels of passive distractions, however, these do not necessarily impact productivity. The empirical data from Section 4.4.2 (*Characteristics of the home situation of individuals*) demonstrates that the majority of employees experience difficulties with concentrating at home because there are too many distractions around. For example, the tendency to make snacks or more intensive meals in the kitchen appears to be common amongst employees when teleworking, potentially because kitchens are in every household and are an uncontrollable distraction. The impact of passive distractions on productivity does seem to vary based on the quality of an employee's home office setup, which is related to their experience with teleworking. For example, empirical data from Section 4.4.2 (*Characteristics of the home situation of individuals*) shows that most employees at Seinfeld Inc. had home offices designed to minimize distractions, whereas employees from Benes Inc. generally did not have quality home offices prior to COVID-19. Employees with more teleworking experience seem to understand the importance of a distraction-free home office more than those with less teleworking experience who tend to see teleworking as an exception to their normal work routine, with the possibility to catch up on lost productivity when they eventually return to the office. Indeed, this was the case for most interviewees at Benes Inc. who realized during COVID-19 that an improved home office setup was needed to reduce distractions and maintain their productivity. Therefore, teleworking does subject employees to increased levels of passive distractions, however, some of these are controllable through improved home office setups which consequently reduces their impacts on productivity.

A potential consequence of the transition from active to passive distractions is that it places more stress on an employee's self-discipline and will

power, which seems to have a few implications. From Section 4.4.1 (*Ability of individuals to focus and be productive*), a few of the interviewees mention that teleworking requires more self-discipline. Moreover, some prefer working in an office simply because its environment inherently motivates them to be productive, as shown in Section 4.4.3 (*Desire to work from an office environment*). In an office environment, you are expected to be working and there is not much else to do, whereas at home, no one is looking over your shoulder and there are several other things to be doing. Another implication is that, based on the empirical data from Section 4.4.1 (*Ability of individuals to focus and be productive*), self-discipline and will power alone are not enough to overcome passive distractions, and employees need to instead rely more heavily on deadline pressures for motivation. In this respect, the transition towards passive distractions combined with limited self-discipline explains why the high and low peaks of productivity are accentuated among teleworkers. Furthermore, although this did not show up in the empirical data, this may contribute to more employee stress if they blame their self-discipline for lack of productivity rather than office interruptions, and this stress could in turn lead to lower productivity levels.

Overall, this proposition is false because teleworking does not universally reduce environmental distractions. As discussed, teleworking reduces active distractions which are typically cited reasons for increased productivity, with the exception of employees with small children at home. On the other hand, the periods of lower productivity at home could potentially be attributed to the increase in passive distractions as compared to the office.

5.2.3 Influence of teleworking on total work hours

> *I3: Consulting engineering firm employees work more hours total when working from home as compared to in the office.*

The theory presented in Section 2.3.3 (*Influence of teleworking on total work hours*) suggests that employees can become more productive from teleworking simply because they work extra hours. This is in part because more time is available from eliminating the commute, but also because work is more accessible at home. On the other hand, theory suggests that some employees with telework experience may be less susceptible to working extra hours at home. This proposition tests whether employees do work more hours at home compared to in the office.

From the empirical data collected, there is some evidence to support this proposition. From Section 4.5.1 (*Supervisor trust in employees teleworking*), one manager expressed that teleworking is suited to employees who are able

to turn work mode off at home, which illustrates there is concern about overworking when teleworking. Interestingly, managers can also be concerned about telework employees not working, so a bit of a paradox exists. Moreover, Section 4.3.1 (*Urban issues that can encourage teleworking*) shows that employees save time from eliminating their commute, which can be reallocated to work. On the other hand, working additional hours in this scenario may not be associated with the typical negative effects (e.g. burnout) since this time could otherwise be spent during a stressful commute, depending on the employee. Furthermore, from Section 4.4.1 (*Ability of individuals to focus and be productive*), it appears that employees are more prone to work additional hours from home when deadlines are approaching, especially if they telework fulltime since it can be difficult to self motivate without the pressure of a deadline. However, employees also mention being more efficient during those crunch periods, so it is difficult to say if they spend more hours overall when teleworking or not.

In contrast, the issue of working additional hours when teleworking was not explicitly raised as a concern by the majority of the employees, with the previously mentioned manager being the exception. This could be because either: a) employees are not working extra hours; or b) employees are satisfied with the extra hours being worked. Further data would need to be collected to confirm this, however, there is some evidence suggesting employees do not end up working extra hours because of teleworking. First, from Section 4.4.3 (*Desire to work from an office environment*), some employees prefer to keep their home and work life separate, and one way they do this is by removing their workspace when they are done working (e.g. closing their home office door, or packing everything up and putting it away). This suggests that employees are conscious about separating home and work life, whereas the combination of these two is the underpinning reason why theory suggests employees could end up working extra hours. Second, some telework employees may end up working extra hours, however, this is not necessarily due to teleworking itself. In Section 4.4.3 (*Desire to work from an office environment*), employees with more career ambition may be more willing to telework because they are satisfied with the potential of working extra hours to advance their career. Therefore, employees do seem to be able to control the number of hours they work, any additional hours worked are more likely to be due to another cofounding factor rather than teleworking itself.

Overall, it is difficult to evaluate this proposition in a literal sense without quantitative data. In general, it does not appear to be the case that teleworking causes employees to work additional hours because measures exist to limit its accessibility at home. On the other hand, teleworking does introduce the potential for working additional hours because of it's accessibility

at all times. Therefore, this proposition is inconclusive since the empirical data does not sufficiently confirm or deny its validity.

5.2.4 Summary of individual level analysis

A summary of the results of the proposition analysis for the individual level is presented in Table 5.2 below.

Table 5.2: Summary of individual level analysis results

ID #	Proposition	Validity
I1	Teleworking does not negatively impact employee productivity in consulting engineering firms.	✗
I2	Teleworking reduces the work environmental distractions an employee is subject to in consulting engineering firms.	✗
I3	Consulting engineering firm employees work more hours total when working from home as compared to in the office.	?

5.3 Organizational level

In Section 2.4 (*Organizational level*), the organization level was described as the level which looks at how supportive the organizational culture is towards teleworking and the implications of this. Two main concepts under this level were reviewed, namely the influence of teleworking policies and the importance of supervisor trust for teleworking.

5.3.1 Influence of telework policy on the practice of teleworking

> *O1: The practice of teleworking in consulting engineering firms is influenced by supervisors.*

In Section 2.4.1 (*Influence of supervisors on the practice of teleworking*), theory was presented that suggests that a corporate policy does not necessarily dictate the extent of teleworking in an organization. This is because supervisors are often delegated the authority to decide if their subordinates are permitted to telework. Accordingly, this proposition tests if supervisors have

a greater influence on the practice of teleworking in an organization than the policy itself.

The empirical evidence collected during this thesis generally supports this proposition. As described in Section 4.1 (*Case firm descriptions*), the case firm Benes Inc. has an official corporate policy on teleworking which allows employees to telework at the discretion of their supervisor. This type of policy is exactly what theory suggests is common, and places the decision within the hands of supervisors. From Section 4.5.1 (*Supervisor trust in employees teleworking*), it is clear that supervisors understand this responsibility and feel that it is truly their decision to make free of any external influence. Accordingly, some supervisors are more supportive of teleworking than others are, which leads to its practice being different from team to team in the organization. Moreover, a big factor in the decision of supervisors to permit or not permit teleworking is their trust in employees. Empirical data from the case firm Seinfeld Inc. does neither support or not support this proposition because the firm itself is too small to have such policies, and in addition, there is only one supervisor who is also the president that makes the policy.

Therefore, it does appear that supervisors influence telework practice because corporate policy empowers them to have such influence. It is certainly possible that firms exist with policies that enforce teleworking at the corporate level which may reduce the importance of supervisors. However, based on the evidence available in this thesis, the proposition is true.

5.3.2 Supervisor trust in employees teleworking

> *O2: In consulting engineering firms, managers with less telework management experience are more likely to have less trust in employees to telework effectively.*

In Section 2.4.2 (*Supervisor trust in employees teleworking*), theory was presented that illustrates there is a tendency towards supervisor-emplyee trust issues when considering teleworking arrangements. However, the theory also demonstrates that this could become less of an issue as managers gain more teleworking management experience, which formed the basis for this proposition.

From Section 4.5.1 (*Supervisor trust in employees teleworking*), managers with minimal telework management experience did tend to express less trust in how optimally their employees would work during teleworking. Their trust in employees to actually work while teleworking seems to be primarily based on their past experiences with that employee from the office setting. For example, one manager did not trust people who get frequently distracted at

work to work effectively when teleworking. Moreover, they expressed discomfort with managing employees who telework because of not being able to physically check in on what an employee is doing. Another interesting source of distrust was that managers with minimal telework experience themselves realized that they could not always telework themselves effectively, and therefore extended this to their subordinates, despite not having implemented even basic telework best practices such as having a dedicated, distraction free office space.

On the other hand, Section 4.5.1 (*Supervisor trust in employees teleworking*) shows that managers with more telework management experience have more trust in their employees to effectively telework. One manager had extensive experience from a previous position at a large international firm where telework was common, and consequently had no issues with managing employees who lived in a different country even. Moreover, another manager who had been developing telework management experience for two years expressed that it took a while to get used to not being able to physically check in on employees, but it works well now. In addition, the management style adopted by this manager is to assign tasks and hour budgets to employees, and if the work is completed in that time then everything is good, but if not, then they are able to sense something is going on that way without needing to physically check in. This agrees with the theory which indicates output-based performance monitoring is more suitable for teleworking to overcome trust issues. However, this only seems to work because of the manager's familiarity with their subordinates capabilities, and that it could potentially be different with a new employee.

Furthermore, the COVID-19 situation provided an opportunity for managers with little telework management experience to truly experience it. From Section 4.3.2 (*Societal issues that can encourage teleworking*), managers that were previously skeptical of teleworking were seemingly surprised to see little to no drop in productivity in their employees. Moreover, these managers mentioned that they would likely do a review after COVID-19 to see what has been learned from this experience, and decide whether they should revise their policy towards teleworking or not.

Therefore, based on the empirical data, this proposition is true. Furthermore, the data suggests that as managers gain experience with teleworking, their trust in employees to telework themselves increases.

5.3.3 Summary of organizational level analysis

A summary of the results of the proposition analysis for the organizational level is presented in Table 5.3 below.

Table 5.3: Summary of organizational level analysis results

ID #	Proposition	Validity
O1	The practice of teleworking in consulting engineering firms is influenced by supervisors.	✓
O2	In consulting engineering firms, managers with less telework management experience are more likely to have less trust in employees to telework effectively.	✓

5.4 Environmental and societal level

The environment and societal level is a broad category that generally includes factors other than the individual, the organization, or the work itself. In this section, theory is presented on how local commuting conditions can influence teleworking, as well as the role that teleworking can play in mitigating environmental threats.

5.4.1 Nature of the local commuting environment

> *ES1: The duration and perceived stressfulness of a commute influences the decision of consulting engineering firm employees to telework.*

In Section 2.5.1 (*Nature of the local commuting environment*), theory was presented that suggested commuting is not universally bad for everyone and that the inclination of employees towards teleworking partially depends on two factors related to their unique commuting experience: commute time and commute stressfulness. Longer and more stressful commutes drive employees towards teleworking, whereas employees with unstressful or even positive commuting experiences may be less inclined towards teleworking regardless of their commute time.

From the empirical evidence in Section 4.3.1 (*Urban issues that can encourage teleworking*), there is ample evidence that supports this proposition and little that disproves it. To start with, the potential to save time commuting is acknowledged as a benefit of teleworking by all participants at each case firm. The level that this influences employee decisions to telework also seems to vary with duration. At Seinfeld Inc., all participants especially emphasize the value of the time they save by not commuting which implies a strong influence on their decision to telework. In contrast, a participant not particularly supportive of teleworking at Benes Inc. lives close to the office and consequently has a small commute time. This demonstrates

two contrasting examples of commute time and how they influence employee decisions to telework.

Furthermore, all participants at each case firm express that commuting can be a stressful endeavour. None of the participants were asked what in particular about the commute was stressful, however, all participants either currently or previously commuted by car. Moreover, none of the participants raised any points about enjoying their commute. It may be that the sample of participants missed employees with positive commuting experiences which is unfortunate. Therefore, this proposition can be considered to be true.

5.4.2 Teleworking as a risk mitigative measure for emergencies

> *ES2: Teleworking is an effective strategy for consulting engineering firms to mitigate the impacts of an emergency that prevents working in an office.*

In Section 2.5.2 (*Teleworking as a risk mitigative measure for emergencies*), theory was presented that suggested teleworking can help reduce economic impacts during emergencies that prevent employees from working in an office. Considering that this thesis occurred during the COVID-19 pandemic, an opportunity arose to test this as a proposition.

Based on the empirical evidence from Section 4.3.2 (*Societal issues that can encourage teleworking*), teleworking does appear to have allowed both case firms to continue operating throughout COVID. However, the extent to which each firm was performing optimally did vary based on their experience with teleworking. At the Seinfeld Inc. case firm, teleworking is business as usual and therefore COVID-19 did not have a significant impact on their operations. In contrast, Benes Inc. had a few technical issues that limited the performance of the firm. Benes Inc. had invested enough to provide employees with laptops to telework during COVID, however, they had not purchased enough VPN licenses for the entire firm to access the server at the same time. Thus, the effectiveness of teleworking as a strategy to mitigate economic impacts during an emergency requires actually planning for the entire company to be teleworking. Benes Inc. did not appear to have had such a business continuity plan, rather, they already had plans to slowly transition towards a setup that allows employees to flexibly choose when they want to telework. Furthermore, the majority of employees at Benes Inc. had minimal experience with teleworking and were fairly ill prepared. This required employees to learn how to effectively telework during the pandemic, which consequently resulted in a few days that were not as productive as

they could have been. This implies that training employees in advance to effectively telework could have made the transition process more smooth during the emergency.

Overall, teleworking does appear to have allowed both case firms to continue their operations during COVID. Even at Benes Inc. where severe technical limitations existed and employees were not as skilled in teleworking, productivity appears to have been maintained at a relatively reasonable level. Therefore, this proposition is true.

5.4.3 Summary of environmental and societal level analysis

A summary of the results of the proposition analysis for the environmental and societal level is presented in Table 5.4 below.

Table 5.4: Summary of environmental and societal level analysis results

ID #	Proposition	Validity
ES1	The duration and perceived stressfulness of a commute influences the decision of consulting engineering firm employees to telework.	✓
ES2	Teleworking is an effective strategy for consulting engineering firms to mitigate the impacts of an emergency that prevents working in an office.	✓

5.5 Summary

In this chapter, all of the propositions previously established in Chapter 2 (*Theoretical background*) were evaluated using the empirical evidence from Chapter 4 (*Empirical data*). At the end of each of the four categories (job level, individual level, organizational level, and environmental and societal level), a summary of the results of the proposition analysis was provided for the respective category. In Table 5.5, all of these tables are combined to present an overview of the results of the proposition analysis from this chapter.

Table 5.5: Overall results of proposition analysis

Category	ID #	Proposition	Validity
Job level	J1	Consulting engineering firms that implement effective communication technology for teleworking are effective in teleworking.	✗
Job level	J2	Technology in general has advanced sufficiently to enable effective teleworking in consulting engineering firms.	✓
Individual level	I1	Teleworking does not negatively impact employee productivity in consulting engineering firms.	✗
Individual level	I2	Teleworking reduces the work environmental distractions an employee is subject to in consulting engineering firms.	✗
Individual level	I3	Consulting engineering firm employees work more hours total when working from home as to compared to in the office.	?
Organization level	O1	The practice of teleworking in consulting engineering firms is influenced by supervisors.	✓
Organization level	O2	In consulting engineering firms, managers with less telework management experience are more likely to have less trust in employees to telework effectively.	✓
Environment and society level	ES1	The duration and perceived stressfulness of a commute influences the decision of consulting engineering firm employees to telework.	✓
Environment and society level	ES2	Teleworking is an effective strategy for consulting engineering firms to mitigate the impacts of an emergency that prevents working in an office.	✓

In the following chapter, I discuss the implications of this analysis for teleworking theory.

Chapter 6

Discussion

The focus of this chapter is on discussing the theoretical implications of the analysis in the previous chapter, Chapter 5 (*Analysis*). Recall that in Chapter 2 (*Theoretical background*) several theoretical propositions were posed on the basis of existing theory to assist in answering the following overarching research question:

> *How is the practice of teleworking in consulting engineering firms influenced by conditions on the job, individual, organizational, and environmental and societal levels?*

Now that these theoretical propositions have been evaluated based on the empirical data, the applicability of the existing theory for describing the practice of teleworking in consulting engineering firms can be assessed. Similar to Chapter 2 (*Theoretical background*), this chapter is organized based on the theoretical framework developed in 2.1.2 (*Theoretical framework*). The chapter covers all four levels of the theoretical framework (job, individual, organizational, and environmental and societal. At the end of the chapter, a common theme between all levels is identified and discussed, which also represents the most important finding of this thesis.

6.1 Job level

In Section 2.2 (*Job level*), the job level aspect of teleworking was introduced as the factors and concepts relevant for completing actual work tasks during teleworking. The main concepts reviewed were the influence of communication technology on telework effectiveness and how well technology supports teleworking for engineering consulting firms. Two propositions were formed in regards to these concepts (J1 and J2), which were then analyzed in Section

5.1 (*Job level*) in accordance with the empirical data collected in Chapter 4 (*Empirical data*). The results of the analysis generally showed that communication technology does not predict effective teleworking by itself, and that technology generally supports teleworking in engineering consulting firms. The purpose of this section is to discuss the theoretical implications that have arisen from this analysis.

The importance of communication technology for teleworking has been identified on numerous occasions (Allen et al. 2015, Gilson et al. 2015). However, the results of the analysis in this thesis questions the extent of how important communication technologies are for successful teleworking. To start with, based on the analysis of proposition J1, the mere availability of communication technologies does not automatically lead to successful teleworking. One reason for this is that there are several additional factors that contribute towards successful teleworking (e.g. effective home office, long commute time, self-discipline), and if an organization ignores these additional factors while concentrating solely on communication technologies, then teleworking is bound to be ineffective for them. In contrast, teleworking would be nearly impossible without communication technologies. Thus, effective teleworking requires access to communication technologies as a minimum, but there are additional factors for optimizing performance while teleworking. However, if one looks purely at communication technology, the effectiveness of teleworking seems to partly depend on the concept of media richness.

Daft & Lengel (1986) identify media richness as a characteristic of communication technology that indicates the effectiveness of that technology in emulating face-to-face communication. An interesting observation from the empirical data in this study has been the need to draw a distinction between the *availability* and the *usage* of communication technology in an organization. Both case firms in this study had similar communication technology setups (i.e. Skype for Business and Microsoft Teams) which enabled features such as video chats and screen sharing that are associated with relatively high media richness. However, neither firm tended to use video chat extensively, and only one of the firms made use of screen sharing, which demonstrates that the effective media richness of each firm is quite lower than should be expected if one looked solely at the technological setup. Therefore, while theory mostly focuses on communication technology itself, it is perhaps more important to take into account the usage of communication technology. Considering that the media richness of communication technology is trending upwards (Messenger & Gschwind 2016), ensuring the full extent of these features are being used could be an increasingly important factor for telework success at the job level. Malhotra & Majchrzak (2014) supports this by suggesting research should focus on the how communication technologies are used rather

than the type of technology implemented. Nevertheless, even the usage of communication technology did not appear to be a significant barrier to teleworking based on the relatively easy collaboration at Seinfeld Inc. despite their limited use of video chat. On the other hand, all employees at that firm had longstanding relationships that likely made collaborating without the full extent of media richness possible.

Recall from Section 2.2.2 (*The technological feasibility of consulting for teleworking*) that telework literature generally suggests consulting engineering is amenable to teleworking because of the high level of autonomy involved (Baruch & Nicholson 1997) and the capacity for it to be performed through computer technology (Golden 2012). Based on the analysis of proposition J2 (Section 5.1.2), the empirical data generally supports this, however, there are some significant areas in which teleworking performs poorly in consulting engineering firms. Theory previously suggested that this was primarily limited to client meetings and team meetings for consulting (Baruch & Nicholson 1997), however, my data highlights four notable areas: client meetings, training new engineers, intensive computing, and field work.

The challenge with the first two types of tasks (client meetings and training new engineers) appears to be limited by the usage of communication technology. When it comes to meetings, an interesting observation from the data was that team meetings appeared to be viable via teleworking, whereas client meetings tended to happen in person. It is unclear from the data as to why this occurs, however, possible explanations could include the need for especially effective communication or the desire to build better relationships with the clients. This highlights two areas that teleworking may struggle with: intensive collaboration and relationship building. Both of these explanations are consistent with the fact that team meetings appear to have not be hindered by teleworking, possibly because collaboration should be easier amongst a team that continuously works together and builds strong relationships with each other.

Moreover, both of these explanations could be applied to the reason why training new engineers is difficult. From the empirical data, it was revealed that there can be difficulties with training new engineers via teleworking. The most common explanation was that the training requires very close supervision because it is relatively easy for a new engineer to accidentally exceed a project budget by spending too much time on a task, or by making mistakes. Basically, this explanation comes down to the inability of teleworking to provide an effective means of communicating with new engineers. Additionally, the difficulty in building relationships via teleworking could foreseeably contribute to training issues as well, although this was not explicitely found in the empirical data. Again, how the available media richness is used could

play a role as well, and it is unclear from the empirical data in this thesis whether using the full extent of media richness would address these issues. Interestingly, however, none of the participants that were aware of these issues had attempted to leverage all of the media richness at their disposal.

The challenge with the second two types of tasks (intensive computing and field work) appears to be limits set by technology in general. For intensive computing, the empirical data showed that certain CAD and modelling tasks were an issue when teleworking at consulting engineering firms without effective IT infrastructure for teleworking. In contrast, intensive computing is not an issue for consulting engineer firms with effective IT infrastructure. This is similar to the concept of leveraging media richness previously mentioned, however, it relates to how well a firm implements the latest technology to support teleworking. Unlike communication technology which appeared to have little cost barriers to its implementation, the types of technology required to support intensive computing did appear to be more limited by cost. In contrast, field work is a type of task that is simply not feasible to do via teleworking regardless of how well a company implements its technology. This is simply because the engineers must be physically on site to perform these duties.

Therefore, based on the discussion in this section, I can identify two dimensions of technology which influence how well a specific job is supported for teleworking. The first dimension is the *state* of technology, which refers to the existence of technology at the present point in time to support completing a type of task via teleworking. The second dimension is the *implementation* of technology, and it refers to how well an organization leverages technology to support teleworking. The implementation aspect inherently includes building organizational practices to leverage the full extent of media richness in the technologies employed. In general, the state of technology appears sufficient to support the vast majority of consulting engineering tasks, with the exception of field work. On the other hand, the implementation of technology appears to be a major determinant in the effectiveness of teleworking. For example, insufficient implementation of IT has been shown to change the effectiveness of intensive computing. Moreover, the media richness of communication technology appears to not be fully leveraged which could be contributing to the ineffectiveness of tasks such as client meetings and training of new engineers.

6.2 Individual level

The individual level of teleworking was introduced in Section 2.3 (*Individual level*) as including factors that relate to an individual's personal characteristics and circumstances. The primary concepts discussed were the influence of teleworking on individual productivity in general, the influence of teleworking on environmental distractions, and the effect that teleworking has on the total number of hours an individual works. Based on these concepts, three propositions were made (I1, I2, and I3) which were subsequently analyzed in Section 5.2 (*Individual level*) in accordance with the empirical data collected in Chapter 4 (*Empirical data*). All of the propositions were found to be false or inconclusive in the individual level, which suggests that the theory on this level is perhaps too focused on making broad generalizations instead of taking into account the variability introduced by personal characteristics and circumstances, which the discussion in this section is focused on.

Beginning with the general influence of teleworking on individual productivity, the theory presented in 2.3.1 (*General influence of teleworking on productivity*) suggested that teleworking generally has either a neutral or positive effect on productivity. However, the evidence supporting this assertion is primarily based on quantitative studies which could theoretically include individuals which experience both decreases and increases in productivity. Based on the analysis of proposition I1 from 5.2.1 (*General influence of teleworking on productivity*), there are clearly several instances where teleworking has the potential to negatively impact employee productivity. Additionally, the empirical data demonstrates that there are several cases where teleworking can positively impact employee productivity. Therefore, the generalizations made in this instance appear to be too broad for predicting how effective any single individual would be at teleworking, and suggest that a different approach is needed that looks into the underlying drivers connected to productivity. Two such drivers that were explored in this thesis are the environmental distractions an employee is subject too as well as the total number of hours that they work, which were the subjects of analysis in 5.2.2 (*Environmental distractions and teleworking productivity*) and 5.2.3 (*Influence of teleworking on total work hours*).

The theory on teleworking generally suggests that it eliminates distractions normally present in an office which can result in improved employee productivity (Golden et al. 2006, Golden & Veiga 2008, Montreuil & Lippel 2003). At the same time, theory also covers other aspects of teleworking that could be considered as distractions, such as childcare and home responsibilities (Kraut 1989), multiple workers from the same home (Harris 2003), or pre-occupation with family-member needs (Golden 2012). From the analy-

sis of proposition I2 from 5.2.2 (*Environmental distractions and teleworking productivity*), the empirical data shows that environmental distractions are not necessarily reduced when teleworking is implemented, and there is certainly potential for environmental distractions to increase. To assist in explaining this phenomenon, two dimensions of distractions were proposed in 5.2.2 (*Environmental distractions and teleworking productivity*): *activeness* and *controllability.* In general, the empirical results suggest that teleworking tends to reduce active distractions (e.g. office interruptions) while increasing passive distractions (e.g. opportunity to make food in a kitchen). It also follows that the more controllable distractions are, the more productive an employee would be, assuming that the employee is aware of the importance of controlling those distractions.

This distinction between types of distractions does not explicitly exist in the current theory on teleworking, and its introduction could assist in explaining how an individual is either positively or negatively impacted in terms of productivity by teleworking. In terms of the activeness of distractions, the office is generally associated with active types of distractions only, whereas the home environment includes much more passive distractions. For example, the office environment is designed for employees to be productive and primarily includes infrastructure towards that purpose, whereas an individual's home environment is usually designed for comfort and leisure. Moreover, active distractions are found in both office and home environments. Active distractions in the office environment mostly include coworker interruptions, while active distractions in a home environment are from cohabitants of the employee (e.g. partners, kids, roommates). Therefore, the impact that teleworking has on productivity partially depends on whether or not active distractions are reduced enough to offset the negative impacts of the additional passive distractions in a home environment. Additionally, another condition is the change in controllability of the distractions, and whether or not measures are actually taken to mitigate controllable distractions.

Furthermore, employees with minimal telework experience may be ineffective at dealing with passive distractions because they have little practice in doing so due to their absence from the normal office environment. Based on the analysis in 5.2.2 (*Environmental distractions and teleworking productivity*), employees with little telework experience appear to be more susceptible to passive distractions than employees with more telework experience. The primary reason for this seems to be that experienced teleworkers understand the importance of limiting passive distractions, and consequently design home office spaces where they can work effectively. Nevertheless, even experienced telework employees are still subject to some distractions that are not easily controllable (e.g. kitchen). Uncontrollable passive distractions ap-

pear to be one of the key sources that hinder teleworker productivity, and require teleworkers to constantly exert their will power and self-discipline to stay focused on their task.

Theory on teleworking generally suggests that teleworkers work more total hours than when they are in the office (Allen et al. 2015). Based on the analysis of proposition I3 in 5.2.3 (*Influence of teleworking on total work hours*), the empirical data could not be used to either confirm or disprove this. The empirical data did confirm that teleworkers appreciated the time they saved from commuting, however, it is not clear how often this time is allocated to work versus their personal life. Theory that focuses on increases in total work hours is generally concerned with employees becoming overworked, and seeing that as a potential negative of teleworking (Allen et al. 2015). However, while my empirical data is inconclusive when it comes to number of hours worked, an interesting finding is that employees do not seem to mind working extra hours that would otherwise be spent on a stressful commute. Therefore, theory suggesting teleworking leads to stressed employees because of additional work hours may not be necessarily accurate, and should consider the elimination of an employee's commute as well.

6.3 Organizational level

In Section 2.4 (*Organizational level*), the organizational level was described as factors related to organizational support for teleworking. The main theoretical concepts discussed were the influence of supervisors on teleworking practice, as well as the importance of supervisor trust for teleworking. Based on these concepts, two propositions were made (O1 and O2) which were subsequently analyzed in Section 5.3 (*Organizational level*) in accordance with the empirical data collected in Chapter 4 (*Empirical data*). Both propositions were found to be true and consistent with the theory.

Telework theory generally suggests that supervisor characteristics are an important predictor of teleworking practice because corporate policy often empowers them to make control teleworking of their subordinates (Kossek et al. 2006). The empirical data gathered and the analysis of proposition O1 in Section 5.3 (*Organizational level*) seems to confirm this, while also demonstrating variability in supervisor opinions of teleworking. Supervisors with positive views of teleworking seem more likely to allow their subordinates to telework than those with negative views of teleworking. An interesting implication of this is that, for organizations who are trying to strategically transition towards enabling teleworking, supervisors can clearly be a barrier towards full implementation of teleworking in the organization. In some re-

spects, this appears to waste resources that an organization spends on IT infrastructure to enable teleworking. Therefore, theory appears to correctly assert that supervisors can have a big influence on the practice of teleworking in an organization.

Trust is identified as an important factor in theory that supervisors consider when making decisions regarding teleworking (Kaplan et al. 2018, Felstead et al. 2003). Supervisors who allow their subordinates to telework almost universally trust them to work effectively, whereas supervisors that are unsupportive of teleworking usually distrust employees to work effectively. The analysis of proposition O2 in 5.3.2 (*Supervisor trust in employees teleworking*) seems to support this. One explanation for this is that some supervisors rely on monitoring behaviours over outputs of their subordinates Cooper & Kurland (2002), and teleworking removes the ability to monitor behaviours. The empirical data in this thesis also shows that supervisors uncomfortable with teleworking mainly attribute it to their inability to physically oversee employees while teleworking. Moreover, the results of the analysis of O2 demonstrate that supervisors with more telework management experience seem to rely less on monitoring employee behaviours and focus more on trusting them and reviewing their outputs. On the other hand, even supervisors experienced in telework management appear to have less trust in the ability of new engineers to telework because of the extensive training and oversight required. In this case, managing the outputs of new engineers could result in identifying errors too late in the process, resulting in project budgets being exceeded or schedules being delayed. Perhaps supervisors need to further innovate their management strategies for teleworking to enable more frequent check-ins with new engineers when teleworking to ensure errors are corrected as early as possible.

6.4 Environmental and societal level

In Section 2.5 (*Environmental and societal level*), the environmental and societal aspect of teleworking was introduced as a broad category that generally includes factors other than the individual, the organization, or the work itself. The concepts primarily reviewed were the nature of the commuting conditions and the effectiveness of teleworking as an emergency business continuity plan. Two propositions were formed in regards to these concepts (ES1 and ES2), which were then analyzed in Section 5.4 (*Environmental and societal level*) in accordance with the empirical data collected in Chapter 4 (*Empirical data*). Both of the propositions were found to be true, which emphasizes that teleworking is a practice that is shaped by factors external factors as

well.

Telework theory tends to focus on telework as a universal improvement to employee commutes (Stephens & Szajna 1998, Kelliher & Anderson 2008, 2010, Golden 2006), however, in this thesis I also included theories from academic literature on commuting that demonstrate the stressfulness of employee commutes can vary substantially (Hilbrecht et al. 2014, Olsson et al. 2013, Montreuil & Lippel 2003). This inspired ES1 as a proposition, and based on its analysis in 5.4.1 (*Nature of the local commuting environment*), the duration and perceived stressfulness of an employee's commute does appear to influence their decision to telework. It is important to highlight that it is not the duration of a commute alone that influences an employee to chose teleworking, but also the quality of the commute. One limitation of the data collected in this thesis is that all of the participants were car commuters, which is a stressful form of commuting in the Greater Toronto Area, and consequently the data is slightly biased and does not include the perspectives of employees with positive commuting experiences (e.g. walking or biking to work). Nevertheless, the empirical data did support the fact that it is the stressfulness of a commute primarily that influences teleworking, and the duration is only relevant in the sense that it extends the duration of stressfulness an individual is exposed to. The implications of this is that teleworking may be less relevant in geographical areas with minimal traffic issues, either due to low population or exceptional public transportation.

Another connection between teleworking and external factors is the use of telework as a contingency for emergency situations (Allen et al. 2015, Heng et al. 2012). The occurrence of the COVID-19 pandemic during this thesis enabled exploring how effective teleworking served in consulting engineering firms for business continuity. According to the analysis of proposition ES2 in 5.4.2 (*Teleworking as a risk mitigative measure for emergencies*), teleworking appears to be an effective measure for business continuity in consulting engineering firms. However, the empirical data also revealed that the effectiveness varies based on an organization's experience with technology and preparation for quickly transitioning the entire organization over to teleworking. In order for teleworking to be an effective mitigation measure for future emergencies, organizations should ensure that employees are trained in effective telework habits and that all technical issues are proactively resolved. A potential effective activity for this would be telework drills where the entire company transitions to teleworking for a week as practice. However, even without such preparations, teleworking still proved to be an effective measure enabling the majority of consulting engineering activities to continue with little disruptions.

An interesting implication of the COVID-19 pandemic is that it will likely

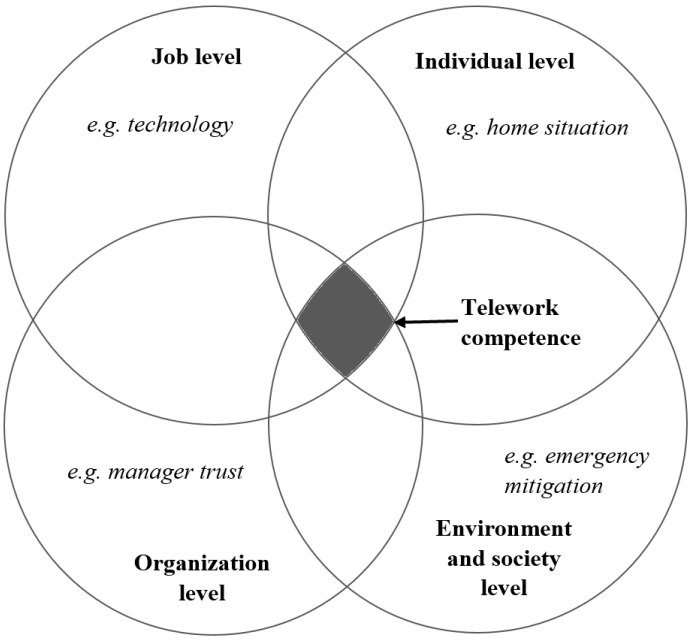
have strong impacts on the future of teleworking. From the empirical data collected in this thesis, all of the participants interviewed during the COVID-19 period believed that teleworking practices at their organization would change in the future as a result of the situation, although it is still uncertain what extent of change is to be expected. The COVID-19 situations essentially acted as a giant societal experiment of teleworking. During this experiment, employees and managers with little telework experience had the opportunity to test it out and experience the pros and cons. Form the empirical data in this thesis, employees and supervisors learned how to telework more effectively as the COVID-19 situation went on, and this in turn instilled a more favourable view of the potential of teleworking in them. Although it is unlikely that all firms switch to full-time teleworking, it appears likely that it will become much more common for employees to work a couple days a week from home.

6.5 Teleworking as a competence

It is a bit surprising that two prominent reviews of telework theory (Allen et al. 2015, Bailey & Kurland 2002) do not emphasize or focus on the importance of teleworking as a competence, since the empirical data from this research project clearly demonstrate its centrality in every level of teleworking. Indeed, a common theme throughout the discussion between Section 6.1 (*Job level*) and Section 6.4 (*Environmental and societal level*) is that teleworking appears to be a competence that can be improved or honed. The only aspect of the literature that seems to emphasize the importance of this is Malhotra & Majchrzak (2014), and even then it is limited in scope to the potential from improvements in usage of communication technologies.

Under each level of teleworking, there are examples of negative aspects of teleworking that can be either reduced or eliminated by implementing certain best practices. Examples of how these different aspects of teleworking can improve with increasing competence in teleworking is provided in Table 6.1. From the COVID-19 situation, it was possible to see the case firm Benes Inc. beginning to move from low teleworking competence to a higher level. Notably, employees improved their telework effectiveness by implementing home offices that limited their distractions, and supervisors adapted their management strategies by actively checking in with their subordinates more often. However, they still suffered from poor IT implementation for teleworking that limited performance. Nevertheless, this case firm serves as an example of the importance of teleworking competence, and how seemingly obvious and simple improvements in this area can improve overall teleworking

Figure 6.1: Model of teleworking



performance.

Furthermore, it seems plausible that there could be additional unknown advantages as competence in teleworking increases, although none of these were specifically identified in the empirical data of this thesis. This perspective of teleworking as a competence has major implications for telework theory. As an example, a study by (Kelliher & Anderson 2010) examined the relationship between teleworking and work intensification, however, it failed to consider how this relationship might change with telework competency. Therefore, it appears important for research on teleworking to identify the competence of both the individuals and organization in teleworking when assessing its outcomes. Based on this, I propose a new model of telework based on Figure 2.1 which includes telework competence at its center, as illustrated in Figure 6.1.

Table 6.1: Examples of how teleworking competence changes the practice

Level	**Competency in teleworking**	
	Low	**High**
Job	• Insufficient IT infrastructure to support intensive computing while teleworking. • Does not utilize full features of communication technology (e.g. video conferences).	• Sufficient IT infrastructure to support intensive computing while teleworking. • Utilizes full features of communication technology to mimic face-to-face interaction (e.g. video conferences).
Individual	• No dedicated home office, works from kitchen. • Frequent family or cohabitant related interruptions.	• Dedicated home office that minimizes distraction levels. • Implements measures to minmize family or cohabitant related interruptions
Organizational	• Supervisors uncomfortable with managing teleworkers. • New employees are not effectively trained while teleworking.	• Supervisors adapt their management style to teleworkers. • Procedures have been developed for training via teleworking
Environmental and societal	• Employees are forced to endure a stressful commute to the office. • Teleworking is not used as a business continuity plan for emergencies.	• Employees reduce or eliminate commuting stress by teleworking. • Teleworking is used as a business continuity plan for emergencies with practice drills.

Chapter 7

Conclusion

The relevancy of teleworking for society has been increasing over the past decade (Gajendran et al. 2015, Allen et al. 2015), and is likely to sharply increase permanently following the COVID-19 situation (Baert et al. 2020, Belzunegui-Eraso & Erro-Garcés 2020). Our theoretical understanding of teleworking shows that it is a complex phenomenon that must be understood by simultaneously examining its context (Allen et al. 2015). Part of the teleworking context includes the industry it takes place in (Bailey & Kurland 2002, Golden & Veiga 2005), and although teleworking theory has generally considered knowledge work (Allen et al. 2015, Bailey & Kurland 2002), it appears to lack specific research on consulting engineering firms. The purpose of this thesis has been to examine teleworking in the context of consulting engineering firms with the following research question:

> *How is the practice of teleworking in consulting engineering firms influenced by conditions on the job, individual, organizational, and environmental and societal levels?*

7.1 Main findings

To answer the research question, a qualitative study of two consulting engineering firms in Canada was undertaken. One of the case firms was a small firm that teleworked extensively, whereas the other case firm was a medium size firm where teleworking was uncommon. Moreover, the participants in the semi-structured interviews (seven total) ranged in position from junior engineer up to president for each firm. The intent of sampling two contrasting firms with a variety of positions was to obtain different perspectives on teleworking in consulting engineering firms, both positive and negative.

A theoretical framework was introduced that divided teleworking into four main levels: the job level, the individual level, the organization level, and the environment and society level. This is similar to the framework by Baruch & Nicholson (1997) with amendments by Belzunegui-Eraso & Erro-Garcés (2020), however, minor modifications were made to better fit the empirical data of this thesis. Within each level, a series of propositions were made based on existing literature. Subsequently, all of the propositions were evaluated based on the empirical data collected from the semi-structured interviews. It is important to note that the propositions did not comprehensively cover each level, which are rather broad. Instead, these areas were focused on because of their perceived importance from the empirical data, and an inductive approach was taken.

Overall, the research findings did not find any specific characteristics of consulting engineering firms that would require them to be considered separately in telework theory. For the most part, they appear similar enough to knowledge-intensive firms, with the potential exception of challenges surrounding intensive computing and field work identified in the job level. Therefore, the findings of this thesis can generally be broadly applied to teleworking in knowledge-intensive firms.

Job level

At the job level, theory on teleworking suggests that teleworking is technologically feasible for knowledge workers. The findings from this thesis generally support this for consulting engineer firms. Some aspects of consulting engineer firms were found to be more challenging to conduct via teleworking, which include: client meetings, training new engineers, intensive computing, and field work. However, the empirical data shows that the technology was often not being fully leveraged to its potential. In some cases this had critical impacts on firm performance (e.g. limited number of VPN licenses), whereas in other cases teleworking could simply be improved by leveraging the technology better (e.g. using video instead of audio).

Individual level

Teleworking theory on the individual level suggests that there is either a neutral or slightly positive impact on productivity. However, the findings from this thesis reveal several circumstances in which teleworking could potentially negatively impact productivity, which questions the validity of such generalized assertions. Moreover, the relationship between distractions and productivity in a telework context was further illuminated in this thesis. Two

dimensions of distractions were proposed to assist in explaining impacts on productivity: *activeness* and *controllability*. Activeness refers to the urgency of the distraction imposed on an individual, whereas controllability refers to the extent to which the distraction can be mitigated. In general, the findings in this thesis demonstrate that teleworking tends to universally increase the number of passive distractions an individual is exposed to, whereas active distractions can be present in both home and office environments. Furthermore, the extent to which individuals take measures to control these distractions influences their productivity. Therefore, highly productive teleworkers could be effective at managing their passive and active distractions moreso than teleworkers with low productivity.

Organization level

At the organization level, teleworking theory suggests that supervisors play a central role in determining the teleworking practices of an organization. The findings from this thesis are consistent with this theory because at both case firms supervisors had the authority to decide if their subordinates could telework or not. Moreover, the empirical data confirms that supervisor trust in teleworkers is relevant for consulting engineering firms as well. The results also demonstrate that adapted management styles for teleworking are possible to reduce discomfort of some supervisors in a telework setting.

Environment and society level

At the environment and society level, telework theory suggests that commute stress is a major reason why individuals choose to telework. Based on the empirical data from this thesis, this appears to be true for consulting engineering firms as well. In addition, theory on business continuity planning previously suggested that teleworking is a strategy to keep businesses running during an emergency. The COVID-19 situation that occurred during this thesis enabled testing this since one of the case firms switched to teleworking. The results show that teleworking is a feasible business continuity plan for consulting engineering firms, however, the effectiveness is dependent on how prepared an organization is for their entire organization to transition to teleworking simultaneously.

Teleworking as a competence

One of the most important findings of this thesis is that teleworking seems to be a competence that can be developed by both individuals and an organization. I posit that this not only applies in consulting engineering firms, but to

organizations in general who telework to some extent. Theory on teleworking generally appears to ignore this aspect, however, the findings from this thesis demonstrate that it can influence the outcomes of teleworking at every single level. The findings only illustrate that negative impacts of teleworking may be mitigated by increased competence in teleworking, however, there could potentially be unknown opportunities to be seized through increased telework competence as well.

7.2 Practical implications

The practical implication of this research is that individuals and organizations in knowledge working industries need to be aware that teleworking is a competence that is underdeveloped. For managers who are in the position of deciding whether their team should telework or not following COVID-19, they should be critical in their information sources since research showing potential negative impacts from teleworking may have overlooked poor teleworking competencies as the primary cause. Moreover, managers need to recognize the untapped potential of teleworking by not only addressing potential negative aspects with best practices (e.g. ensuring employees have adequate home offices), but also by seeking out new and innovative ways of working via teleworking. Teleworking is an evolving practice in society that is ripe for innovation, and organizations would benefit from seizing this opportunity. For individuals who find themselves teleworking for the first time, they need to be aware of the importance of implementing teleworking best practices. These individuals will be exposed to a new set of challenges regarding passive distractions at home, and they need to recognize that will power alone is not enough to mitigate these distractions. Individuals cannot treat teleworking simply as working from home, but they must treat it as a new style of working which they need to improve in.

7.3 Limitations

The findings of this research are subject to a few limitations. The first limitation is that the levels of teleworking are not claimed to be comprehensively covered, which means that there could be more important aspects neglected simply because they were not observed in the empirical data. While the topic covered in each level are highly applicable to the empirical data, it seems plausible that other important areas could exist that would be discoverable by researching a broader range of consulting engineering firms (e.g.

different cultures, different geographical areas, bigger organizations, etc.).

A second limitation is my potential for personal bias as a researcher. I entered into this research with a positive view of teleworking which could have biased the results, even though proactive measures were taken to limit this. Moreover, I previously worked in the consulting engineering industry with all of the participants interviewed. As much as I attempted to remain objective, it is difficult to imagine how this would not influence the results to some extent. For example, a researcher coming from a different background may have asked different questions in the interview process or had different interpretations of the data.

Thirdly, the case firms selected in this research generally consisted of employees who had formed strong relationships through working in a physical office together. Even for the case firm that now operates entirely via teleworking, the employees had previously worked extensively together in an office environment. These close working relationships could potentially have made collaborating via teleworking easier. Thus, a limitation is that the findings may not necessarily apply to a teleworking context where employees have little prior experience working together.

The final limitation is that the sample of this research was consulting engineering firms in Canada. It is plausible that different geographical regions or different cultures could have differents needs or experiences with teleworking.

7.4 Further research

From the findings of this research, I believe that there are three interesting areas for further teleworking research:

- First, similar research may be conducted with a greater variety of consulting engineering firms to determine if the areas focused on in this thesis accurately reflect important aspects of teleworking. Notably, this type of research should include firms from different regions, different cultures, different levels of relationships between employees, and larger firms which were excluded from this thesis.

- The second area involves further testing of the theory introduced about the two potential dimensions of distractions (activeness and controllability), since these dimensions appear to be useful in explaining the impacts of teleworking on productivity. Research could be conducted to quantitatively characterize distractions employees are subject to in

an office and at home, and see how different types of distractions and control measures impact their performance.

- The third area, and perhaps the most interesting, is to expand research on the concept of teleworking as a competence. Based on the COVID-19 situation, there will likely be several opportunities for research to document how organizations improve their teleworking competence. Moreover, this research can assist in amending the existing telework theory base by systematically reviewing the potential impact that teleworking competence could have on their findings. To support further research into this area, a method for measuring the teleworking competence of individuals and organizations also requires development.

7.5 Concluding remarks

With teleworking set to become an increasing part of most people's lives following the outcome of COVID-19, people and organizations alike will be seeking knowledge on teleworking. An important aspect to keep in mind is that teleworking is a competence whose potential seems to be unknown at this point in time. Nobody knew about scientific management before Frederick Taylor pioneered it on the factory floor and revolutionized the manufacturing industry. Similarly, teleworking appears to have potential to revolutionize the way people work, however, the best practices and principles still need to be innovated as society collectively improves their teleworking competence.

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Appendix A - Participant agreement form

Do you want to participate in the research project

"Should civil engineering consulting firms pursue remote working as a strategy"?

This letter requests if you would like to participate in a research project whose purpose is to gain more knowledge of remote working in the context of civil engineering consultancy firms. In this letter, we provide you with information about the goals of the project and what participation will entail for you.

Purpose
This research is being conducted in support of a student's master's thesis. Its purpose is to determine if civil engineering consulting firms should pursue remote working as a strategy. It will test theoretical propositions about what strategic elements are important to such firms and what implications there are when introducing remote working, both positive and negative. The research design is a case study of 3-4 civil engineering consulting firms in Canada.

Who is responsible for the research project?
The *Norwegian University of Science and Technology (NTNU)* is responsible for the project. The master's thesis is being prepared by Ryan Murray with supervision from Ola Edvin Vie (of NTNU).

Why are you asked to participate?
You are being asked to participate because you are either a manager or an employee of a civil engineering consulting firm in Canada. Your selection was primarily based on Ryan Murray's familiarity with the local industry. An effort was made to select participants that could provide diverse perspectives.

What does it mean for you to participate?
At each participating firm, one manager and two employees will be interviewed in two rounds. Each interview will last one hour and will be semi-structured (i.e. guiding questions will be asked). The second round will occur about 2-3 weeks after the first and is for clarification purposes and to cover any gaps. I take audio recordings and notes from the interview. The recordings and notes are transcribed, anonymized, and deleted immediately after. What you will be asked depends on if you are a manager or an employee. Below are examples of types of guiding questions that may be asked.

Manager Participation:
You will be asked about what is generally strategically important to your firm (no specific competitive information will be requested). You will be asked about remote working in general, and if and how it is employed at your firm. You will be asked about your opinion of the pros and cons of remote working as it relates to your firm's strategy. You will also be asked about your perception of your firms employees in terms of performance and satisfaction.

Employee Participation:
You will be asked about remote working in general, and if and how it is employed at your firm. You will be asked about how remote working (or lack of) affects your satisfaction and performance. You will also be asked about how you believe remote working affects employees in general in the firm.

It is voluntary
It is entirely voluntary to participate in this project. If you choose to participate, you may withdraw your consent at any time without giving any reason. All information about you will then be

anonymized. It will have no negative consequences for you if you do not want to participate or later choose to resign.

Your privacy – how we store your information
We will only use the information about you for the purposes we have told you about in this letter. We process the information confidentially and in accordance with the Privacy Policy. Your information will only be accessible by the master's thesis student (Ryan Murray) and his supervisor (Ola Edvin Vie).

Audio recordings are transcribed as soon as possible (maximum one month) and deleted thereafter. Audio recordings are stored on a USB key that is locked in a drawer only accessible to Ryan Murray and Ola Edvin Vie. Transcribed versions of the audio recordings are anonymized by replacing personal data with a code (e.g. John = Employee 1). The codes meaning are recorded on a physical sheet that is locked separately from other data.

No participants will be directly identifiable in the master's thesis.

What happens to your information when we end the research project?
The project is scheduled to end June 11, 2020. All data shall be anonymized by the end of the project, and any remnants of personal data (e.g. code sheet) will be destroyed.

Your rights
As long as you can be identified in the data, you are entitled to:

- access to what personal data is registered about you,
- to correct personal data about you,
- deleted personal data about you,
- obtain a copy of your personal data (data portability), and
- to lodge a complaint with the Data Protection Officer or the Data Protection Authority about the processing of your personal data.

What gives us the right to process personal data about you?
We process information about you based on your consent.

On behalf of *Norwegian University of Science and Technology (NTNU)*, the Norwegian Center for Research Data (NSD) has considered that the processing of personal data in this project complies with the privacy regulations.

Where can I find out more?
If you have any questions for the study, or would like to take advantage of your rights, please contact:

- *Norwegian University of Science and Technology* by contacting either Ryan Murray or Ola Edvin whose contact information is provided below.
- Our Data Protection Officer: Ola Edvin Vie at the *Norwegian University of Science and Technology*
- NSD – Norwegian Centre for Research Data AS, by email (personverntjenester@nsd.no) or phone: 55 58 21 17.

Sincerely

Ryan Murray
ryanwaltermurray@gmail.com
+47 412 76 498
(Researcher/student)

Ola Edvin Vie
ola.edvin.vie@iot.ntnu.no
+47 735 96 340
(Supervisor)

Consent Statement

I have received and understood information about the project "*Should civil engineering consulting firms pursue remote working as a strategy"* and have been given the opportunity to ask questions. I agree to:

- participate in all semi-structured interviews mentioned

I agree that my information is processed until the project is terminated, approximately on June 15, 2020.

(Signed by project participant, date)

Appendix B - Research permit from NSD

NSD NORSK SENTER FOR FORSKNINGSDATA

NSD's assessment

Project title

Remote working as a strategy for civil consulting engineering firms in Canada

Reference number

369144

Registered

26.01.2020 av Ryan Walter Murray - ryanm@stud.ntnu.no

Data controller (institution responsible for the project)

Norges teknisk-naturvitenskapelige universitet NTNU / Fakultet for økonomi (ØK) / Institutt for industriell økonomi og teknologiledelse

Project leader (academic employee/supervisor or PhD candidate)

Ola Edvin Vie, ola.edvin.vie@ntnu.no, tlf: 73596340

Type of project

Student project, Master's thesis

Contact information, student

Ryan Murray, ryanm@stud.ntnu.no, tlf: 41276498

Project period

15.01.2020 - 02.07.2020

Status

15.06.2020 - Assessed

Assessment (2)

15.06.2020 - Assessed

NSD has assessed the change registered on 13 June 2020.

The research period has been extended until 02 July 2020.

Please note that in case of further extensions, it may be necessary to inform the sample.

NSD will follow up the progress of the project at the new planned end date in order to determine whether the processing of personal data has been concluded.

Good luck with the rest of the project!

Contact person at NSD: Simon Gogl
Data Protection Services for Research: +47 55 58 21 17 (press 1)

28.01.2020 - Assessed

Our assessment is that the processing of personal data in this project will comply with data protection legislation, so long as it is carried out in accordance with what is documented in the Notification Form and attachments, dated 28 January 2020. Everything is in place for the processing to begin.

NOTIFY CHANGES
If you intend to make changes to the processing of personal data in this project it may be necessary to notify NSD. This is done by updating the information registered in the Notification Form. On our website we explain which changes must be notified. Wait until you receive an answer from us before you carry out the changes.

TYPE OF DATA AND DURATION
The project will be processing general categories of personal data until 11 June 2020.

LEGAL BASIS
The project will gain consent from data subjects to process their personal data. We find that consent will meet the necessary requirements under art. 4 (11) and 7, in that it will be a freely given, specific, informed and unambiguous statement or action, which will be documented and can be withdrawn. The legal basis for processing personal data is therefore consent given by the data subject, cf. the General Data Protection Regulation art. 6.1 a).

PRINCIPLES RELATING TO PROCESSING PERSONAL DATA
NSD finds that the planned processing of personal data will be in accordance with the principles under the General Data Protection Regulation regarding:

- lawfulness, fairness and transparency (art. 5.1 a), in that data subjects will receive sufficient information about the processing and will give their consent
- purpose limitation (art. 5.1 b), in that personal data will be collected for specified, explicit and legitimate purposes, and will not be processed for new, incompatible purposes
- data minimisation (art. 5.1 c), in that only personal data which are adequate, relevant and necessary for the purpose of the project will be processed
- storage limitation (art. 5.1 e), in that personal data will not be stored for longer than is necessary to fulfil the project's purpose

THE RIGHTS OF DATA SUBJECTS
Data subjects will have the following rights in this project: transparency (art. 12), information (art. 13), access (art. 15), rectification (art. 16), erasure (art. 17), restriction of processing (art. 18), notification (art. 19), data portability (art. 20). These rights apply so long as the data subject can be identified in the collected data.

NSD finds that the information that will be given to data subjects about the processing of their personal data will meet the legal requirements for form and content, cf. art. 12.1 and art. 13.

We remind you that if a data subject contacts you about their rights, the data controller has a duty to reply within a month.

FOLLOW YOUR INSTITUTION'S GUIDELINES

NSD presupposes that the project will meet the requirements of accuracy (art. 5.1 d), integrity and confidentiality (art. 5.1 f) and security (art. 32) when processing personal data.

To ensure that these requirements are met you must follow your institution's internal guidelines and/or consult with your institution (i.e. the institution responsible for the project).

FOLLOW-UP OF THE PROJECT
NSD will follow up the progress of the project at the planned end date in order to determine whether the processing of personal data has been concluded.

Good luck with the project!

Data Protection Services for Research: +47 55 58 21 17 (press 1)

Appendic C - Interview guides

Interview Guide - Version 1

(Engineers / Technicians)

Used for interviews with: Kramer (Seinfeld Inc.) and Newman (Seinfeld Inc.)

Introductory questions

1. Are you a professional engineer or EIT?
2. How long have you worked with your current firm, and what is your title?
3. How long have you worked in the engineering consulting industry?
4. Have you worked for other organizations in the industry, and if so, could you briefly explain?
5. Could you please briefly describe your position with your current firm.
6. Why did you choose to work with this firm?

Definition of Organizational Performance

7. In your opinion, what is the overarching purpose of the firm you work at?
8. How would you describe what it means for your firm to perform?

Model of Organizational Performance

9. How would you describe your contribution towards firm performance? Firm performance can be divided as discussed above.
10. Is there anything that enables you to perform in these areas?
11. Are there any barriers preventing you from contributing more effectively?

Influence of Remote Working on Firm Performance

12. Please describe if and how your firm provides some form of remote working.
13. What are the pros and cons for working in an office vs. remotely for you personally?
14. How does remote working influence your personal performance?
15. How do you believe remote working influences the performance of the firm in general?
16. How has the remote working policy of your firm influenced your decision to join and stay with the firm?
17. How long have you worked with your other coworkers?
18. Are there any other positives or negatives of remote working you would like to mention?

Interview Guide - Version 1

(Supervisors / Managers)

Used for interviews with: Jerry (Seinfeld Inc.), Elaine (Benes Inc.)

Introductory questions

1. Are you a professional engineer?
2. How long have you worked with your current firm, and what is your title?
3. How long have you worked in the engineering consulting industry?
4. What is a typical workday like in your position?
5. Could you please briefly describe your current firm?
6. Why do you think employees choose to work with your firm?

Definition of Organizational Performance

7. In your opinion, what is the overall purpose of the firm (i.e. what does success look like)?
8. How would you describe what it means for your firm to perform?

Model of Organizational Performance

9. In your opinion, how does your engineering consulting firm perform well?
10. In your opinion, what are the most important activities in your firm?
11. In your opinion, what are your firm's most valuable resources (both tangible and intangible)?

Influence of Remote Working on Performance

12. Please describe if and how your firm provides some form of remote working.
13. Why did you choose the remote working policy for your current firm?
14. How does remote working influence overhead costs compared to an office?
15. How does remote working influence your ability to attract and retain talent?
16. In your opinion, how does remote working affect employees?
17. How are the important activities of your firm influenced by remote working?
18. Are there any special measures you take that help make remote working better?
19. Are there any other positives or negatives of remote working you would like to mention?

Interview Guide - Version 2

(Supervisors / Managers)

Used for interviews with: Susan (Benes Inc.)

Introduction

1. How long have you been with your current firm?
2. Could you please tell me about your responsibilities?
3. What does a typical workday look like for you?

Pre-COVID Situation

Please recall for the first half what the situation was like pre-COVID.

4. Could you please describe briefly describe if and how your firm provided some form of remote working?
5. Could you please walk me through your previous stance towards remote working for your team?
6. What is your personal preference towards remote working? What is ideal for you?
7. Traffic and work life balance – how does this influence your decision? Why?
8. Technology – how did this influence your decision? Why?
9. Firm culture and policies – how do these influence your decision? Why?
10. Supervisor trust – how does this influence your decision? Why?
11. Individual needs – how does this influence your decision? Why?
12. Are there any other important factors, positive or negative, you would like to mention about remote working?

COVID Situation

Now we can move onto discussing remote working during the COVID situation.

13. *How well is remote working for your team during this time?*
14. *How has this experience changed your view towards remote working?*
15. *How have all of the factors regarding remote working change as a result of COVID?*
16. *Will this experience change how your team works in the future?*

Interview Guide - Version 3

(Supervisors / Managers / Engineers / Technicians)

Used for interviews with: George (Benes Inc.), Leo (Benes Inc.)

Introduction / General Employee Characterization

1. Are you a professional engineer or EIT?
2. How long have you worked with your current firm, and what is your title?
3. How long have you worked in the engineering consulting industry?
4. Could you please briefly describe your position with your current firm.

Remote working

5. Please describe if and how your firm provides some form of remote working.
6. Could you please describe your personal remote working practices/routines?
7. How have your remote working practices developed over time?
8. What are the pros and cons for working in an office vs. remotely for you personally?
9. How do you find remote working influences your work performance?
10. For managers only: how does remote working impact your managerial duties?
11. How satisfied are you with your remote working practice?
12. If you could chose an ideal remote work routine/practice, what would it be and why?
13. Are there any other positives or negatives of remote working you would like to mention?

Ryan W. Murray

Why competence in teleworking matters

NTNU
Norwegian University of
Science and Technology