

THE IMPACT OF TELEWORK ON INDIVIDUAL INNOVATIVE BEHAVIORS AND THE
MEDIATING EFFECTS OF COLLABORATION:
A DEMANDS-AND-RESOURCES PERSPECTIVE

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ABSTRACT

Despite the rise of telework following the pandemic, many businesses have and are continuing to mandate return-to-office (RTO) policies due to their persistent concerns about the effectiveness of telework. Businesses remain reluctant to acknowledge the potential benefits of telework, even in the face of empirical evidence that suggests improved employee innovative behavior through greater autonomy and flexibility. However, global work trends suggest that telework is here to stay; therefore, identifying why, how, and when telework influences employee innovative behavior is crucial. Drawing on the Job Demands and Resources (JD-R) model, this dissertation adopts a demands-and-resources perspective to understand the impact of telework on individual innovative behavior through the mediating effect of collaboration at individual-level. Based on the JD-R model, the research defines two novel and distinct constructs, namely telework demands and telework resources, and develops and validates measurement scales for these constructs in Study 1. Using the newly developed measurement scales, Study 2 ($n = 389$) empirically examines the impact of telework demands and telework resources on individual innovative behavior via collaboration. The findings reveal that telework demands hinder both collaboration and innovative behavior at the individual level. Telework resources appears as “too-much-of-a-good-thing” and fails to demonstrate a positive impact on collaboration and innovative behavior, including the buffering effect on demands. However, resources become valuable for collaboration and innovative behavior in the presence of high telework intensity. Therefore, both Study 1 and 2 make valuable contributions to theory and research. The study contributes to resolving the debate about the effectiveness of telework by explaining why, how, and when telework influences individual innovative behavior. Further, by incorporating nonwork demands and resources, this investigation extends the JD-R model in the context of telework beyond a traditional co-located work environment. In addition to theoretical

contributions, this research carries important implications for HR managers and line managers in creating a collaborative and innovative work environment through the effective management of work and nonwork telework demands and resources.

Dedication

To the loving memory of my father, who manifested the dream.

To my mother, who relentlessly prayed for my well-being.

To my spouse, Sharif, for continued support and encouragement.

*To my amazing daughter and son, Sabahaat and Aydin, for giving me space and time I needed,
and for waiting with such grace until my PhD journey reached its end.*

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CHAPTER ONE: INTRODUCTION

The recent COVID-19 pandemic has accelerated the prevalence of telework facilitated by information and communication technologies (Kniffin et al., 2021). Telework, defined as “out-of-office work activities [...] supported by information and communication technologies (ICTs) that provide a rich information or communications environment enabling the performance of complex information-processing tasks” (Garrett & Danziger, 2007, p. 30), is expected to be potentially advantageous for teleworkers, organizations, and society (Greer & Payne, 2014). A growing body of research suggests that telework can boost innovative performance of employees by providing autonomy and flexibility (see Coenen & Kok, 2014; Gajendran & Harrison, 2007; Jiang et al., 2023). However, despite the consensus among scholars about the possible positive outcomes of teleworking related to innovation, many high-profile business leaders argued ‘return-to-office’ (RTO) policies suspecting hindered innovation while teleworking (Brandt & Schmoll, 2025; Cascio, 2025). Given this growing debate about telework’s possibilities and problems related to innovation, Kniffin et al. (2021) urged the need for future research to examine the effect of telework on employee productivity, creativity, and innovation.

Indeed, innovation has long been an area of interest for scholars and practitioners since it is a critical source of competitive advantage in the changing business environment (Amarakoon et al., 2018; Anderson et al., 2014; Crossan & Apaydin, 2010). In the business context, innovation is a complex phenomenon (Anderson et al., 2014) that requires intense cognitive, psychological, and physical efforts of individuals and systems to ensure the successful implementation of ideas (Kwon & Kim, 2020). Since getting to innovativeness is challenging (Hubner et al., 2022), organizations are increasingly relying on innovative behavior as a measure of employee performance (Wang et al., 2015). Innovative behavior refers to an employee’s

intentional creation and promotion of new ideas, products, processes, or procedures to the work role, work group, or organization (Yuan & Woodman, 2010). Scholars have noted that individual innovative behavior positively predicts task performance and organizational citizenship behaviors, and negatively relates to counterproductive work behaviors (Harari et al., 2016). Consequently, the innovative behaviors of employees determine an organization's success and survival (Thurlings et al., 2015). Given the importance of individual innovative behavior for organizational sustainability, scholars have called for an examination of the factors that affect innovative behavior (Anderson et al., 2014; Yuan & Woodman, 2010).

Statement of Problem

To date, there have been limited empirical studies examining the influence of telework on employees' innovative behavior. Although there is consensus in research about the positive impact of telework on innovative behavior of employees, a few studies recently pointed out the limitations of telework in terms of innovation. For example, Coenen and Kok (2014) found that telework positively influences innovation by improving the speed and quality of new product development performance. Likewise, telework, can encourage innovative behavior among knowledge workers by strengthening their sense of thriving at work (Jiang et al., 2023). In a recent study, Brandt and Schmoll (2025) found that while working from home positively influences innovative behavior of employees by increasing the freedom to choose where and how work is performed (i.e., space and task-related flexibility), it negatively predicts innovative behavior because of increased freedom to choose when work is performed (i.e., temporal flexibility). In addition, employee innovative behavior can be dependent on voluntary versus involuntary teleworking. While voluntary telework can serve as a job resource that facilitates innovative behavior, involuntary telework can be perceived as a job demand and thus, prevents

innovative behavior (Huo et al., 2022). In a recent study, telework exhibited an inverted U-curve relationship with innovative behavior, where telework initially contributed to enhanced innovative behavior up to a point, beyond which it diminished innovative behavior (Park et al., 2023). Against this mostly positive empirical backdrop, organizations such as Amazon, Apple, Google, JP Morgan, Meta, and Tesla, among others, mandated RTO policies being concerned about declining collaboration, productivity, and innovation during telework (Cascio, 2025; Gibson et al., 2023). As noted by Johnny C. Taylor Jr., president and CEO of the Society for Human Resource Management (Taylor, 2022), “Fully remote work doesn’t cultivate the level of interpersonal relationships that business leaders see as vital to workplace synergy, collaboration and innovation. It can’t replicate the rich, robust, direct two-way, in-person communication that is critical to complex and creative work.” Despite the continuous push and threats from employers, employees are showing resistance to RTO policies by refusing to return to office (Bloom, 2022; Decker et al., 2025; Gibson et al., 2023; Knowles, 2025). Consequently, employers’ and employees’ beliefs and expectations about RTO remain misaligned, which can cause motivational challenges for employees, impacting several related outcomes such as productivity, engagement, attrition, and mental health (Cascio, 2025). Given that this misalignment is partly caused by the belief about the role of telework in promoting innovative performance of employees, it necessitates further research on *why*, *how*, and *when* telework influences the innovative behavior of employees.

One potential reason for these gaps lies in the conceptualization and measurement of telework in prior studies. Most past research has measured telework as a unidimensional construct without developing a scale to measure its multiple dimensions (e.g., Huo et al., 2022; Martínez-Sánchez et al., 2008). Some scholars have compared teleworkers and non-teleworkers

by coding telework status as 0 or 1 to identify if telework impacts individual performance (e.g., Solís, 2016; Vega et al., 2015). Besides, several scholars have used the frequency of telework by asking an average number of hours/days worked per week to measure telework (e.g., Campo et al., 2021; Windeler et al., 2017), and some have used the intensity of telework (i.e., high, moderate, low, zero) (e.g., Nagata et al., 2021). In a systematic review of 40 studies on telework, Athanasiadou and Theriou (2021) urged including different dimensions of telework (e.g., optional versus compulsory telework, perceived experience of control) to understand the impact of telework in different contexts. Consequently, there is still a gap in the literature that *measures telework as a multidimensional construct*, hindering the possibility of resolving the debate around the effectiveness of telework. A construct is multidimensional “when it consists of a number of interrelated attributes or dimensions and exists in multidimensional domains” (Law et al., 1998, p. 741). Some popular examples of multidimensional constructs developed in management literature include job satisfaction, organizational citizenship behavior (OCB), and leader-member exchange (LMX).

Research Objectives

This dissertation fills the gap in our understanding of the impact of telework on employees’ innovative behavior and aids in resolving the debate about the effectiveness of telework by theorizing telework from a *demands-and-resources* perspective. Adopting the Job Demands and Resources (JD-R) model (Demerouti et al., 2001) helps us understand the specific characteristics of telework that may influence individual innovative behavior. Crawford et al. (2010) suggested that the JD-R model is useful because it is parsimonious and concisely explains the relationships between job characteristics and individual outcomes. Based on the JD-R model, past research (e.g., Dediu et al., 2018) has examined the impact of various work demands and

resources on innovative work behavior. However, this was conducted in the context of a traditional co-located workplace instead of teleworking and thus did not include the nonwork demands and resources.

The JD-R model has also been applied in telework research to examine the impact of work-related demands and resources on individual outcomes, such as exhaustion, job engagement, job satisfaction, and career opportunities (e.g., Nakrošienė et al., 2019; Sardeshmukh et al., 2012). While the research on telework has examined work-related demands, telework was originally designed to facilitate individuals meeting their work *and* nonwork demands (Thompson et al., 2022). Thus, conceptualization of *telework demands* is essential to include both work and nonwork demands (e.g., family, home, and personal). Nonwork demands arise beyond work domain, which consist of factors that require physical, cognitive, and emotional effort to deal with (Sanhokwe, 2022).

Similar to nonwork demands, nonwork resources are the factors in nonwork domain that satisfy employee needs and help in coping with the demands (Sanhokwe, 2022). Besides work resources, nonwork resources are critical for work engagement and productivity during telework (Sanhokwe et al., 2022). Voydanoff (2005) argued that nonwork resources (i.e., family resources) are essential to meet work demands. Hence, I propose that *telework resources* should also be conceptualized to incorporate both work and nonwork resources. Given the absence of these constructs in telework research, this dissertation defines telework demands and telework resources as distinct constructs and develop measurement scales for these constructs. Therefore, by extending the JD-R model beyond the traditional co-located workplace and by proposing two new constructs of telework demands and telework resources, *I aim to examine the impact of telework demands and telework resources on individual innovative behavior.*

The knowledge gap about the impact of telework on innovative behavior can be explained by the underlying mechanisms that shape how telework influences employees' innovative behavior. Therefore, *I intend to analyze the factors that mediate the relationship between telework demands, telework resources, and innovative behavior among employees*. One such mediating factor is employee collaboration, which may explain the unclear relationship between telework and innovative behavior. Pre-pandemic telework research suggested that physical dispersion among employees in telework poses challenges for employee collaboration (e.g., Boell et al., 2016; Greer & Payne, 2014). In a recent survey conducted on 5,043 full-time employees, Alexander et al. (2021) found that 43% of participants fear reduced collaboration among individuals and teams while working from home. Despite organizations embracing various technology-based tools for enhancing collaboration, such initiatives tend to carry mixed results. Namely, virtual meetings improve coordination and communication but their frequency can be overwhelming and intrusive (Waizenegger et al., 2020). Consequently, Yang et al. (2022) proposed that a reduction in innovation could occur through the impediment to knowledge transfer due to the loss of collaboration. Such speculation is rational since innovation often depends on the collaboration and integration among employees (Melton & Hartline, 2013; Zach, 2016). Therefore, *I aim to examine the mediating effect of collaboration at individual-level in determining the relationship between telework demands, telework resources, and individual innovative behavior*. Figure 1 illustrates the proposed research model based on the above-mentioned objectives.

Figure 1

Research Questions

I aim to answer several research questions in this dissertation. The overarching research question is:

How do telework demands and telework resources impact individual innovative behaviors of employees?

The specific research sub-questions are:

1. How can we define and measure telework demands and telework resources?
2. How do telework demands and telework resources impact collaboration at individual-level?
3. Does collaboration at individual-level mediate the relationship between (a) telework demands and individual innovative behaviors and (b) telework resources and individual innovative behaviors?

Research Design

Based on the functionalist research paradigm, I intend to adopt a quantitative research design with two separate studies. The goal of the functionalist paradigm is to ensure replication and refinement in theory testing (Shah & Corley, 2006). Thus, quantitative data collection and statistical analysis are appropriate to test the theoretical model examining the influence of telework demands and telework resources on individual innovative behavior. As mentioned earlier, measurement scales for telework demands and telework resources are absent. Therefore, I develop and validate scales for measuring these constructs in Study 1. In Study 2, I test the theoretical model to examine the impact of telework demands and telework resources on individual innovative behavior through the mediation of collaboration. The research design process is detailed in the chapters describing Study 1 and Study 2.

Theoretical Implications

The present dissertation makes important contributions to advancing telework research. First, by conceptualizing telework from a demand-and-resource perspective, the research conceptualizes and defines two distinct constructs: telework demands and telework resources. Second, by developing and validating measurement scales for telework demands and telework resources, the research proposes telework as a multidimensional construct that can be measured through multiple-item scales. Third, the research helps resolve the debate about the impact of telework on innovation by explaining why, how, and when telework influences individual innovative behavior.

The current research also advances the JD-R model in two ways. First, by defining and operationalizing telework demands and telework resources, study 1 extends the JD-R model in the context of telework beyond traditional co-located work environments. Second, by including nonwork demands and resources, this dissertation expands the JD-R model beyond job-related characteristics.

Next, by integrating nonwork demands and resources with job characteristics, this dissertation advances our understanding of the impact of nonwork life on individual innovative behaviors. This research also advances our understanding of the relationship between collaboration and innovation at the individual level in the context of telework. In doing so, the present research integrates literature across diversified fields including telework, collaboration, and innovation. In addition, the present study responds to the call for research to explore the impact of telework on innovation. Thus, the dissertation advances both telework and innovation research domains through an integrative analysis of work and nonwork factors determining innovation at the individual level.

Practical Implications

The current research has several important implications for administrators, managers, and organizations. First, since many organizations are now viewing telework as a viable future for business success (Athanasiadou & Theriou, 2021), understanding the impacts of telework on individual innovation is crucial for business leaders and managers. Particularly, recognizing the telework demands and telework resources is critical for managers since these constructs are likely to enable or hinder individual innovative behavior.

Second, since open innovation is required to ensure faster economic recovery (Chesbrough, 2020), the current research would assist organizations in identifying the factors responsible for fostering or inhibiting innovative behaviors in the context of telework.

Finally, it is clear that “there is no returning to the old normal” (Brem et al., 2021, p. 5). Managers are thinking of maximizing the benefits of both remote and co-located work by designing a hybrid workplace (Kane et al., 2021). Therefore, the current research will assist organizational leaders in designing successful hybrid work strategies, by recognizing the telework demands and resources that promote or hinder innovative behavior.

Social Implications

This dissertation research carries important implications for economy and society as well. First, innovative organizational performance plays a crucial role in an economy's recovery from the financial crises (e.g., great financial crisis of 2008, during and after COVID-19 crisis). Research suggests that the global financial crises negatively impacted organizational innovative performance and innovation inputs such as human capital, research and development investment, and continuous improvement programs (Zouaghi & Sánchez, 2016). Therefore, organizations should continue to implement innovation strategies to remain competitive during the post-

pandemic financial crisis (Sun et al., 2025). Since innovation is the key to economic growth, organizations should stimulate their innovation activities to speed up economic recovery (Disoska et al., 2020).

Second, encouraging innovative behaviors would largely contribute to the betterment of society. “Innovation is not only about the creation of inventions but also about their diffusion to society” (Abi Younes et al., 2020, p. 733). Through innovation, organizations enable economic growth and employment, which, in turn, improve people’s lives (Ahlstrom, 2010). Further, scholars have urged that innovation is not only about inventing and selling invented goods and services but about addressing societal challenges and ensuring benefits to society as well (Den Ouden, 2012). Through meaningful innovation, value is generated at different levels: users, organizations, ecosystems, and society (Den Ouden, 2012). Therefore, the impact of innovation on social development is profound and undeniable.

Definition of Terms

In order to improve clarity of the different concepts and ideas used throughout this dissertation, I define the main concepts here.

Telework

Gajendran and Harrison (2007) define telework as “an alternative work arrangement in which employees, for at least some portion of their work schedule, perform tasks elsewhere that are normally done in a primary or central workplace, using electronic media to interact with others” (p. 1525). This dissertation relies on this definition of telework as well as that provided earlier by Garrett & Danziger (2007).

Telework Demands

Based on Demerouti et al.'s (2001) definition of job demands, I suggest that telework demands are the physical, psychological, social, or organizational aspects of telework that require sustained physical or psychological effort in both work and nonwork domains. These demands are associated with certain physiological and/or psychological costs in both domains.

Telework Resources

Correspondingly, based on Demerouti et al.'s (2001) definition of job resources, I propose that telework resources refer to the physical, psychological, social, or organizational aspects that may help in either reducing the physiological and psychological costs associated with telework demands. These resources may aid in achieving goals or may promote personal growth and development among teleworkers.

Telework Intensity

Gajendran and Harrison (2007) defined telework intensity as the amount of time employees spend working outside of the traditional office. Thus, telework intensity can be defined based on number of hours, or the time employees engage in teleworking (Huo et al., 2024). The longer the employees telework, the higher the intensity of telework. Two types for telework intensity are suggested by Gajendran and Harrison (2007). While employees spending 2.5 or more days per week working remotely are labelled as high-intensity teleworkers, employees working less than 2.5 days per week remotely are identified as low-intensity teleworkers.

Collaboration at Individual-Level

Based on the comprehensive definition of Bedwell et al. (2012), I conceptualize collaboration at individual-level as an emergent process aimed at attaining shared goals through

active participation and reciprocal engagement between two or more employees within the organization.

Individual Innovative Behaviors

Innovative behavior is defined as the intentional proposal and application of novel and improved ideas, processes, practices, and policies aimed at organizational effectiveness, business success, and long-term sustainability (Anderson et al., 2014; Janssen, 2000). At the individual level, innovative behavior encompasses all individual actions directed at the creation and/or application of new ideas, either for new product development or changes in administrative processes targeted to enhance effectiveness and efficiency (West & Farr, 1989).

Dissertation Overview

The structure of this dissertation is as follows. I begin by providing a foundation for the present research. Chapter 2 reviews the existing literature on focal constructs such as telework, telework demands and resources, individual innovative behavior, and collaboration. Chapter 3 describes Study 1, which involved developing and validating measurement scales for telework demands and resources. Next, Chapter 4 includes Study 2, which involved testing the hypothesized research model using the newly developed and validated scales from Study 1. Chapter 5 includes the general discussion, theoretical contributions, practical implications, limitations and future research directions of this research.

CHAPTER TWO: LITERATURE REVIEW

Concept of Telework

The discussion on the topic of telecommuting, or alternatively, telework, caught the attention of academics in the early 1970s when researchers started thinking of alternatives to commuting physically to work due to the energy crisis (Haddon & Brynin, 2005). Nilles (1975) first coined the concept of *telework*, which has now become an inevitable work practice for many organizations. Since its conception, a high degree of discrepancy has been observed in using the concept of telework among researchers (Shin et al., 2000). Because telework was made popular in the public domain, it emerged as a social construct that led to a great deal of variation in construct definition (Haddon & Brynin, 2005).

Telework has been referred to as telecommuting, work-from-home, remote work, virtual work, distributed work, and flexible work, among other labels (Allen et al., 2015; Athanasiadou & Theriou, 2021). In academia and practice, the term *telecommuting* was used for a long time and is now largely known as *telework* (Messenger & Gschwind, 2016). Although these two terms are treated as synonyms, using the term *telework* makes greater sense since the definition includes all types of work that are enabled by ICTs (Messenger & Gschwind, 2016).

Although the term *telework* has been used broadly within the literature, its use has lacked conceptual clarity. Four dimensions have emerged from previous definitions of telework: 1) work location, 2) importance of ICTs, 3) locational time distribution, and 4) contractual relationship between employer and employee (Garrett & Danziger, 2007; Haddon & Brynin, 2005; Sullivan, 2003). However, research including all four dimensions in the analysis of telework is rare (Garrett & Danziger, 2007). Garrett and Danziger (2007) proposed telework as “out-of-office work activities be supported by ICTs that provide a rich information or communications environment enabling the performance of complex information-processing

tasks” (p. 30). The centrality of this definition is the use of ICTs that is asserted by Messenger and Gschwind (2016) as well, where they reviewed the three generations of telework including home work, mobile work, and virtual work, and concluded that recent developments in telework are significantly distinct from previous versions. The diffusion of the Internet and the World Wide Web has enabled employees to connect with coworkers regardless of location and time, which largely changed the meaning of telework and thus, created new research dimensions and opportunities (Messenger & Gschwind, 2016).

Another central feature of telework is remote working that can be performed at any remote location including home or any other place outside of the co-located office (Głuszak & Małkowska, 2022). Indeed, Morgan (2004) listed five telework locations: home-based telework, telecentres (i.e., local workspace away from central location to reduce commuting costs), functional relocation (i.e., anywhere using remote access), telecottages (i.e., local facilities for employees who are not working full-time), and mobile-telework (i.e., employees move, they are not located in one place). Among these, *home-based telework* has become the most prevalent form of telework due to the outbreak of the COVID-19 pandemic (Olló-López et al., 2020; Schulze et al., 2023), which is also popularly known as *work-from-home (WFH)*. The International Labor Organization (ILO) (2020) defined WFH as a working arrangement where employees stay at home to accomplish their job responsibilities by using ICT. This definition of WFH is identical to the concept of home-based telework and thus, recent studies have treated WFH as home-based telework (e.g., Nguyen & Armoogum, 2021; Qu & Yan, 2023). In line with past research (e.g., Chowhan et al., 2021), the term telework is used synonymously to WFH or home-based telework. Although historically, telework started as a solution to the energy crisis, employees do telework either for employee-oriented (i.e., personal or family needs) or employer-

oriented reasons (i.e., when employees work (i.e., employer's operational needs) (Cooke et al., 2014). However, in the current context, business challenges raised from the shutdown related to the COVID-19 pandemic were the driving force for the rising trend in telework (Champagne et al., 2023; Chowhan et al., 2021).

Operationalization of Telework

As discussed previously, earlier investigations have treated telework as a single-item measure. The most common approach to measuring telework found in past research is the use of *extent of telework*. Typically, the extent of telework was measured “by asking respondents to indicate the average number of hours per week they consistently spent away from their office working as a telecommuter” (Golden & Veiga, 2005, p. 306). Golden and Veiga (2005) used this measure of telework to examine the impact of telework on job satisfaction. Following Golden and Veiga (2005), other studies (e.g., Golden et al., 2008; Golden & Eddleston, 2020; Sardeshmukh et al., 2012) applied the same measure to examine the impact of telework on various individual outcomes.

Beside the extent of telework, past research has often used *telework intensity* to measure the impact of telework on various outcomes. Gajendran and Harrison (2007) defined two categories for telework intensity: employees spending 2.5 or more days per week working remotely were labelled as *high-intensity* teleworkers, and employees working 2.5 days per week remotely were identified as *low-intensity* teleworkers. In another study, Nagata et al. (2021) classified telework intensity into four groups: more than or equal to 4 days a week was *high intensity* for telework, 2-3 days per week was *moderate intensity* for telework, once a week to once a month was *low intensity* for telework, and those without teleworking were considered as *no telework*.

A few studies have measured the *intensity of telework adoption* by the percentage of teleworkers in the workforce to assess the impact of telework on organizational performance (e.g., Martínez Sánchez et al., 2007; Martínez-Sánchez et al., 2008). Telework adoption was operationalized using a *dichotomic variable* (i.e., 0 or 1) in studies carried out earlier (Neirotti et al., 2013). These authors also distinguished between home-based and mobile teleworkers using a dichotomic variable and identified the percentage of teleworkers to explore the relationship between a firm's adoption of telework and the firm's technological, organizational, and environmental contexts. While measuring the impact of telework on service innovation, Sarbu (2022) categorized percentage of employees telecommuting into four groups: always, often, sometimes, and rare.

Similarly, several research has compared teleworkers and non-teleworkers by coding *telework status* as 0 or 1 to identify if telework impacts individual outcomes (e.g., Ollo-López et al., 2020; Podolsky et al., 2022; Solís, 2016; Vega et al., 2015). In line with this, Wöhrmann and Ebner (2021) asked “Do you have a telework agreement with your employer?” to assess telework. Other studies have used the *frequency of telework* by asking an average number of hours/days worked per week to measure telework (e.g., Campo et al., 2021; Windeler et al., 2017), which is identical to *extent of telework* measurement. The review of the above studies suggests the absence of multi-item measurement scale for telework. To the best of my knowledge, no scale yet has been developed and validated to measure telework as a multidimensional construct.

Outcomes of Telework

Past studies have revealed a number of advantages of teleworking for individuals, organizations and society (Crandall & Gao, 2005; Martin & MacDonnell, 2012). At the

individual level, these benefits include increased flexibility and autonomy (Nakrošienė et al., 2019; Sardeshmukh et al., 2012; Tremblay & Genin, 2007), increased family time (Gajendran & Harrison, 2007; Hartig et al., 2007; Nakrošienė et al., 2019), reduced commuting time and cost (Maruyama et al., 2009; Nakrošienė et al., 2019; Thompson et al., 2022), lower stress and exhaustion (Delanoeije & Verbruggen, 2020; Fonner & Roloff, 2010), reduced work-life conflict (Gajendran & Harrison, 2007), increased work-family enrichment (McNall et al., 2009), improved productivity (Golden & Veiga, 2008; Kazekami, 2020), increased performance (Blahopoulou et al., 2022; Golden & Veiga, 2008), increased job satisfaction (Gajendran & Harrison, 2007; Vega et al., 2015), and increased happiness and life satisfaction (Kazekami, 2020).

At the organizational level, studies revealed that telework can substantially advance organization performance through improving financial performance, innovation and relational performance, and strategic flexibility (Martínez-Sánchez et al., 2008). Organizations also benefit from increased organizational commitment (Golden, 2006; Golden & Veiga, 2008; Martin & MacDonnell, 2012) and improved employee retention (Gajendran & Harrison, 2007; Martin & MacDonnell, 2012). Various societal benefits of telework are mentioned in research as well including reduced traffic and emissions, continuation of business in the face of disruptive events, and expanded working opportunities for individuals with disabilities (Allen et al., 2015).

However, literature on telework often unveiled the ‘dark side’ of telework through mention of potential disadvantages including increased stress (Song & Gao, 2020; Weinert et al., 2020), increased technostress (Camacho & Barrios, 2022; Suh & Lee, 2017), increased workload and work hours (Kelliher & Anderson, 2010; Nakrošienė et al., 2019; Wang et al., 2021; Wöhrmann & Ebner, 2021), increased work-family conflict (Anderson & Kelliher, 2009; Sarbu,

2018), increased social/professional isolation (Cooper & Kurland, 2002; Golden et al., 2008), poor relationship quality with coworkers (Gajendran & Harrison, 2007), reduced productivity (Boell et al., 2016; Ruth & Chaudhry, 2008), reduced visibility and career development (Maruyama & Tietze, 2012), increased anxiety and poor sleep quality (Afonso et al., 2021), and reduced happiness (Song & Gao, 2020). The above review suggests the presence of paradoxical findings where some studies reported positive outcomes for one aspect, while others reported negative outcomes (e.g., work-family conflict, productivity, stress). Figure 2 shows various positive and negative outcomes of telework found in the literature.

Figure 2

Telework Paradox

Although telework can be potentially advantageous for the teleworkers, the organizations, and society as a whole (Greer & Payne, 2014), the biggest risk associated with telework lies in the fact that telework may not suit everyone (Pyöriä, 2011). As mentioned, while telework is applauded for a wide range of benefits including individual productivity, retention, job satisfaction, commitment, and well-being (e.g., Felstead & Henseke, 2017; Gajendran & Harrison 2007; Martin & MacDonnell, 2012), the limitations of social exclusion, interaction with coworkers, and work intensification are often mentioned in the existing body of knowledge (e.g., Collins et al., 2016; Felstead & Henseke, 2017; Kelliher & Anderson, 2010). Since telework studies produce contradictory outcomes, several scholars have treated telework as a ‘paradox’ where telework is identified as helpful in some studies and, conversely, reported as harmful in others (see Boell et al., 2016; Ruth & Chaudhry, 2008; Taskin & Devos, 2005).

Until now, telework research has identified several paradoxes, including the *telecommuting paradox* (Gajendran & Harrison, 2007), the *connectivity paradox* (Leonardi et

al., 2010), the *autonomy paradox* (Mazmanian et al., 2013), and the *telework paradox* (Boell et al., 2016). Gajendran and Harrison (2007) described the telecommuting paradox based on incompatible outcomes for employees. According to these authors, telecommuting increases autonomy and reduces work-family conflict, thus reducing stress and improving performance. However, telecommuting hampers work relationships and career advancement, which further has adverse consequences on work and nonwork domains (Gajendran & Harrison, 2007). Besides, teleworkers experience a connectivity paradox since they use synchronous and data-intensive communication technologies that, on a positive note, create a sense of presence and connectedness (Leonardi et al., 2010). Nevertheless, the expectations of constant connectivity diminish teleworkers' flexibility and autonomy (Leonardi et al., 2010). Likewise, the use of mobile email devices creates an autonomy paradox for employees since it simultaneously enhances autonomy by ensuring working anytime and anywhere, and it diminishes autonomy as employees need to be available everywhere and all the time (Mazmanian et al., 2013). Finally, to better understand the contradictory and paradoxical telework research findings, Boell et al. (2016) conducted a virtual ethnographic study and concluded that the telework paradox emerges from the diverse nature of work performed by teleworkers and their differing perception of task suitability for teleworking. Boell et al. (2016) noted that paradoxical findings in telework research suggest the need to consider alternative approaches for examining these paradoxes systematically.

Theories Used in Telework Research

Although scholars have been debating the challenges and opportunities of teleworking for about 50 years, the progress of scholarly telework research has been relatively slow (Fischer et al., 2021). Telework research is often characterized by the absence of organizational theories

(Zhang et al., 2020), and thus, scholars find it difficult to explain “what happens when people telework” (Bailey & Kurland, 2002, p. 394). Table 1 presents a list of articles that applied various organizational theories in telework research.

Table 1

For example, Felstead and Henseke (2017) used the theory of the knowledge economy, flexible working, and organizational adaptation to explain the growth of remote working. Apart from these few applications of organizational theories, telework research has mostly benefited from theories in sociology and social psychology (Zhang et al., 2020). For instance, social exchange theory (Caillier, 2012), theory of planned behavior (Laumer & Maier, 2021), role conflict theory (Sardeshmukh et al., 2012), and border theory (Smith et al., 2021) have been used to explain telework behavior.

Notably, several scholars have recently applied the JD-R model (Demerouti et al., 2001) to determine the impact of telework on individual outcomes (e.g., Chowhan & Pike, 2022; Nakrošienė et al., 2019; Sardeshmukh et al., 2012). For example, Sardeshmukh et al. (2012) examined the effects of job demands (i.e., time pressure, role ambiguity, and role conflict) and job resources (i.e., job autonomy, feedback, and job support) involved in telework on the exhaustion and engagement of teleworkers. The authors found that the impact of telework on job engagement and exhaustion is partially mediated by job demands and job resources. In a separate study relying on the JD-R model, Nakrošienė et al. (2019) identified various factors as job demands and job resources in telework, which influence various individual and organizational outcomes. These authors highlighted that decreased communication with co-workers, supervisor’s trust and support, and suitability of the working place at home were the most important telework factors affecting various telework outcomes, including productivity,

satisfaction, and career opportunities. Adhering to the JD-R model in a recent study, Chowhan and Pike (2022) found that job demands (i.e., workload, actual hours worked) and job resources (i.e., expectations, support, job security) relate to work-personal life interference, which leads to stress and impacts job satisfaction and employee performance while working from home.

The Job Demands and Resources Model

The JD-R model was introduced by Demerouti et al. (2001) about 25 years ago. Since its inception, the model has been applied to various occupational settings in organizational research, guiding numerous empirical studies (Bakker & Demerouti, 2017). The JD-R model is praised for several benefits, including theoretical flexibility. This theory can be adapted to all working environments in different occupational contexts (Taris & Schaufeli, 2015). Galanakis and Tsitouri (2022) noted that the JD-R model acts as a heuristic framework that offers a flexible yet theoretically grounded approach to understanding jobs and workplaces.

The heart of the JD-R model is constituted by job demands and job resources. According to Demerouti et al. (2001), job demands refer to physical, social, or organizational aspects of the job that require sustained physical and/or mental effort and that are thus associated with certain physiological and psychological costs. On the other hand, job resources refer to physical, social, or organizational aspects of the job that are functional in achieving work goals, reducing job demands, or stimulating personal growth, learning, and development (Demerouti et al., 2001). While some of these demands and resources are common across different occupations, others are unique, making them occupation-specific demands and resources (Bakker et al., 2023).

Figure 3

The central propositions of the JD-R model involve two psychological processes: (1) the health impairment process and (2) the motivation process (Llorens et al., 2006) (see Figure 3). The health impairment process suggests that chronic job demands cause burnout due to depletion of energy resources (Demerouti et al., 2001), which is further responsible for health deterioration (Schaufeli & Bakker, 2004). Conversely, the motivation process occurs due to the availability of job resources that stimulate motivation among employees (Bakker & Demerouti, 2007), which can increase work engagement (Hu et al., 2011) and various other positive work outcomes, including organizational commitment (Hakanen et al., 2008), employee performance (Bakker et al., 2004), and reduction in turnover intention (Bakker et al., 2003). The additive and synergistic effects of job demands and job resources on burnout and engagement are also evident in research (Hu et al., 2011). Most importantly, according to the model, job resources act as buffers against the potential negative effects of job demands on burnout (Bakker et al., 2005; Hu et al., 2011). It is also noteworthy to mention that high demands combined with high job resources can result in a high level of work engagement among employees (Bakker & Demerouti, 2007).

Although the JD-R model initially included demands and resources from the work domain only, the model was further expanded by recognizing the role of various personal resources. The presence of personal resources reduces the negative effects of job demands (i.e., burnout) (Huang et al., 2016) and positively influences individual well-being (Gauche et al., 2017), since they are related to stress resilience (Kuntz et al., 2017). Xanthopoulou et al. (2007) found that personal resources (i.e., organizational-based self-esteem, optimism, self-efficacy) mediate the relationship between job resources and work engagement and exhaustion. In another study, compassion satisfaction, a personal resource, was found to partially moderate the relationship between job demands and job strain (Tremblay & Messervey, 2011). While the role

of personal resources was examined in the past, the role of personal demands is limited, which can play a crucial role in shaping employee engagement and burnout (Bakker & Demerouti, 2017). Further, although a few telework studies relied on the JD-R model to explain the differences in telework outcomes, the role of nonwork (i.e., family, home, personal, social) demands and resources remained largely unexplored. Thus, by proposing telework demands and telework resources as two new and distinct constructs, the current research advances the JD-R model in the context of telework. Using the JD-R model, I define telework demands and telework resources by considering both work and nonwork demands and resources.

Conceptualizing Telework Demands

Although telework is applauded for its potential individual, organizational, and societal benefits, telework poses unique challenges for employees (Greer & Payne, 2014; Schall Jr & Chen, 2022). Both pre-COVID research (e.g., Sardeshmukh et al., 2012; Van Steenbergen et al., 2018) and post-COVID research (e.g., Carillo et al., 2021; Li et al., 2023) indicate that telework causes unique demands for employees by increasing demands and/or altering demands for the employees. Typically, teleworkers experience a surge in nonwork demands (i.e., family, home, childcare demands) in addition to dealing with work demands while they WFH (Duxbury & Halinski, 2014; Ghislieri et al., 2021; Shockley et al., 2021). As mentioned earlier, prior telework research has only examined the impact of various job demands related to telework on individual and organizational outcomes (e.g., Kossek et al., 2006; Wöhrmann & Ebner, 2021). However, an important motivation for employees to engage in telework is the availability of discretion to meet work and nonwork demands simultaneously (Thompson et al., 2022; Troup & Rose, 2012). Thus, focusing solely on work demands while neglecting nonwork demands offers an incomplete understanding of the impact of telework on various individual and organizational outcomes. I

argue that the definition of telework demands must address the demands faced by the teleworkers in both work and nonwork domains that cost them either physically or mentally, or both. Based on the definition of job demands (Demerouti et al., 2001), I define telework demands as below:

Telework demands are the physical, psychological, social, or organizational aspects of telework that require sustained physical or psychological effort in both work and nonwork domains and thus are associated with certain physiological and/or psychological costs in both domains.

Based on the above definition, I suggest that telework demands are a multifaceted construct encompassing four types of telework characteristics: *physical, psychological, social, and organizational*, which create exhaustion and burnout among teleworkers, leading to various negative work and personal outcomes according to the JD-R model (Demerouti et al., 2001; Schaufeli & Bakker, 2004). As such higher level of demands can result in greater negative outcomes. Relying on the assumptions of the JD-R model, I contend that in the presence of high telework demands, employees require high levels of resources to deal with the demands, which leads to physiological and psychological costs (Schaufeli & Taris, 2013). Table 2 presents various physical, psychological, social, and organizational telework demands and their associated costs.

Table 2

Physical Demands of Telework

Telework can be physically demanding for employees when they engage in domestic or household chores while working from home. Several telework studies have indicated that the pandemic-induced telework has increased domestic chores, including childcare and household tasks (e.g., Abdel Hadi et al., 2021; Kossek et al., 2021; Shockley et al., 2021). The pre-COVID telework research also pointed out that teleworkers can contribute more to domestic chores (de

Macêdo et al., 2020; Giovanis, 2018; Sullivan & Lewis, 2001) since they are available at home 24/7 compared to traditional work-from-office, which provides limited time to take care of domestic chores. Consequently, teleworkers not only feel physical fatigue but also report increased psychological exhaustion (Abdel Hadi et al., 2021). Since teleworkers experience higher family interference with work (Solís, 2017), they feel stressed in balancing work and domestic chores, which hinders job performance (Abdel Hadi et al., 2021) and reduces life satisfaction (Kazekami, 2020).

Complementing this, teleworkers report increases in sedentary behavior and decreases in physical activities (Rodríguez-Nogueira et al., 2021). In general, employees do not get natural breaks (e.g., talking to coworkers, walking to meetings) during a workday while working from home (Bilotta et al., 2021). The reduction in commuting to work and working long hours can cause physical inactivity among teleworkers (Ishibashi & Taniguchi, 2022; Šmite et al., 2023). While working from home, employees usually walk to the kitchen or washroom, which means physical activity necessitates additional effort at home (Šmite et al., 2023). Recent telework research suggests that teleworkers report prevalence of musculoskeletal pain (e.g., lower back pain, neck pain) caused by uncomfortable telework environment (e.g., lack of space on desk, lack of enough legroom, uncomfortable room temperature and humidity) (Matsugaki et al., 2021), sedentary lifestyle, poor posture, and increased household chores (Santos et al., 2021). Yoshimoto et al. (2021) reported pain augmentation during telework caused by the decrease in physical activities and an increase in psychological stress. Various other teleworking characteristics (e.g., areas not designed for work, low lighting, non-ergonomic desks and chairs, working hours, active breaks, and sitting time) were found to be associated with the development of musculoskeletal disorders among teleworkers (Cruz-Ausejo et al., 2023).

Psychological Demands of Telework

Research on telework reveals that the presence of various cognitive demands that are reported as stressful for employees. Teleworkers frequently face role ambiguity and role conflict while working from home (Bilotta et al., 2021; Sardeshmukh et al., 2012). Being away from the office, teleworkers do not get adequate information about their job expectations, which consumes additional energy. Role conflict also occurs as teleworkers experience incompatible demands from multiple roles, causing exhaustion (Sardeshmukh et al., 2012). Bilotta et al. (2021) suggested that both role ambiguity and role conflict can lead to reduced job satisfaction, lower commitment, and poor mental health.

On top of this, telework research has frequently highlighted the experience of increased work pressure, or workload, or work overload among teleworkers (e.g., Ingusci et al., 2021; Jamal et al., 2021; Russell et al., 2009; Silva et al., 2022; Wang et al., 2021). Due to increased workload, teleworkers are required to work faster, deliver speedier responses, and accomplish multiple tasks simultaneously, which are traditionally considered job demands (Ingusci et al., 2021). In a qualitative study, Wang et al. (2021) found that teleworkers report an increase in workload, which acts as a demand. This demand can be stressful for teleworkers as it invades their personal lives and undermines their well-being. While working from home, teleworkers typically work for longer hours, which increases the work pressure and work-life conflict (Russell et al., 2009). Apart from workload, Wang et al. (2021) suggested intensive monitoring as a demand for teleworkers since rigorous monitoring while working from home hinders the employees from fulfilling their family responsibilities and thus, lessens their well-being.

Accompanying this, teleworkers experience increased time pressure since they work longer hours and often work under less supervision (Wöhrmann & Ebner, 2021). These authors

treated time pressure as demanding, as such pressure increases psychosomatic health complaints among teleworkers. Past studies have also addressed the demand for work intensification, causing reduced job satisfaction and commitment since teleworkers are required to put greater effort to fulfill their job responsibilities (Bathini & Kandathil, 2019; Kelliher & Anderson, 2010).

Concurrently, research has identified cognitive overload as a demand that leads to reduced well-being and work performance among teleworkers (Schmitt et al., 2021). These authors explained that teleworkers may suffer from cognitive overload because they feel overwhelmed with the increased amount of information that exceeds their cognitive capacities (Schmitt et al., 2021). Teleworkers are also likely to experience techno-overload, a technostress creator that contributes to increased behavioral stress (Ingusci et al., 2021; Molino et al., 2020). Other than overload, research has also examined the impact of other sources of technostress (e.g., invasion of privacy, role ambiguity, work-home conflict) on individual strain and found that these are responsible for lowering job satisfaction and performance, by intensifying teleworker strain (Camacho & Barrios, 2022; Suh & Lee, 2017).

Telework research has frequently mentioned face-to-face communication as a significant challenge for employees (e.g., Gajendran & Harrison, 2007; Galanti et al., 2021; Greer & Payne, 2014; Jamal et al., 2021). Teleworkers lack the benefits of face-to-face communication, including nonverbal cues (Greer & Payne, 2014), which diminishes the richness of in-person communication and social presence (Gajendran & Harrison, 2007). This lack of face-to-face interactions eventually hampers teleworker-supervisor and teleworker-coworker relationship quality (Gajendran & Harrison, 2007) and increases social isolation (Galanti et al., 2021). Along with this, telework leads to decreased feedback due to a lack of face-to-face communication,

which exaggerates exhaustion and lowers engagement among teleworkers (Sardeshmukh et al., 2012).

Importantly, teleworkers face interruptions from home/family that create ground for family-to-work conflict (e.g., Leung & Zhang, 2017; Powell, 2020; Sarbu, 2018; Tietze & Musson, 2003). Particularly, teleworkers with children (Zhang et al., 2020) and female teleworkers (Mustafa & Gold, 2013) usually report greater interruptions from family while working from home as a result of household and caregiving responsibilities. Further, the absence of separate office space at home raises the possibility for interruptions from children and other family members (Gajendran & Harrison, 2007). Such family disruption can be demanding for the teleworkers as conflict between work and family leads to greater stress and burnout (Jeffrey Hill et al., 2008). Furthermore, Kossek et al. (2009) suggested that the expectations of teleworkers' family members change as they often expect constant availability of teleworkers at home. However, although the teleworkers are physically present at home, they may not be mentally available for the children and other family members, which may lead to work-family conflict (Kossek et al., 2009).

Over and above these, telework interferes with personal life and leaves little time and energy for personal and family activities, which can be a source of work-to-life conflict and stress for teleworkers (Abendroth & Reimann, 2018; Maruyama et al., 2009). In line with this, Hilbrecht et al. (2013) reported a loss in leisure time for many teleworkers since they work for longer hours and assume greater family responsibilities. Bilotta et al. (2021) suggested that teleworkers may engage in surface acting (i.e., display fake emotions to hide the real felt emotions) in the presence of spillover between work and nonwork domains, which can lead to increased stress and burnout.

Social and Organizational Demands of Telework

Teleworkers often face increased organizational expectations to be constantly available for work (e.g., Bathini & Kandathil, 2019; Fonner & Roloff, 2012; Kossek et al., 2009). For example, organizations expect teleworkers to be available for work outside of regular working hours (e.g., weekday evenings) and at weekends as well (Gschwind & Vargas, 2019). The constant connectivity by ICTs (e.g., connected by cell phone) has fueled expectations around constant availability of teleworkers (Fonner & Roloff, 2012; Gschwind & Vargas, 2019; Leonardi et al., 2010). Teleworkers usually find it difficult to ‘switch off’ work and move to nonwork activities since the temporal and physical boundaries between work and home become blurred (Mustafa & Gold, 2013), leading to work-family conflict (Abendroth & Reimann, 2018).

Teleworkers also experience reduced visibility due to limited in-person communication with coworkers while working from home (Nakrošienė et al., 2019; Maruyama & Tietze, 2012). Research suggests that reduced opportunities for interaction and networking hamper career development prospects for teleworkers (Maruyama & Tietze, 2012; Richardson & Kelliher, 2015). Further, teleworkers often deal with lower supervisor support and trust as they lack face-to-face interactions (Nakrošienė et al., 2019). Consequently, such negative outcomes related to career advancement are highly rational since teleworkers’ experience of social isolation leads to reduced job performance (Golden et al., 2008).

In sum, the construct of telework demands consists of various physical, psychological, social, and organizational aspects of telework that emerge from work and nonwork domains. These demands appear to be costly for teleworkers due to the potential negative impacts on both domains.

Challenging versus Hindering Telework Demands

Even though job demands are negative because of their association with physical and psychological costs (Demerouti et al., 2001), not all demands are equally harmful (Van den Broeck et al., 2010). Relying on the challenge-hindrance framework by Cavanaugh et al. (2000), several past studies have (e.g., LePine et al., 2004; LePine et al., 2005; Tadić et al., 2015; Van den Broeck et al., 2010) categorized job demands into *job challenges* and *job hindrances*.

Whereas job hindrances are solely responsible for energy drain, job challenges can diminish employee energy and at the same time stimulate them into putting additional effort into their job (Van den Broeck et al., 2010). Challenging job demands are appraised as stressful demands similar to hindering job demands, but challenging demands tend to promote growth and development, which makes them distinct from hindering demands. Characteristically, hindering demands obstruct learning, growth, and goal achievement (Crawford et al., 2010). Some examples of challenging job demands are high workload, difficulty of tasks, time pressure, increased job responsibilities, and cognitive demands (see Crawford et al., 2010; LePine et al., 2005; Podsakoff et al., 2007). In contrast, hindering job demands include role ambiguity, role conflict, role overload, role interference, organizational politics, administrative hassles, inadequate resources, and emotional demands (see Crawford et al., 2010; LePine et al., 2005; Podsakoff et al., 2007).

On one hand, challenging job demands positively relate to stress and burnout (Crawford et al., 2010), but also positively contribute to work engagement (Crawford et al., 2010) and well-being (Tadić et al., 2015). It is also evident that challenging job demands positively relate to motivation, job satisfaction, organizational commitment, and performance and negatively relate to turnover intention and turnover (LePine et al., 2005; Podsakoff et al., 2007). On the other

hand, hindering job demands are found to be negatively related to motivation, job satisfaction, organizational commitment, and performance and positively related to turnover intention, turnover, and withdrawal behavior (LePine et al., 2005; Podsakoff et al., 2007).

Based on the challenge-hindrance framework, therefore, I suggest that not all telework demands are equally draining for teleworkers. While some telework demands may present challenges for teleworkers, stimulating personal growth and gain, and increasing motivation and work engagement, others may act as hindrances to personal growth and achievements, causing diminished motivation and engagement and increased burnout. Combining the JD-R model and the challenge-hindrance framework, I therefore propose distinct conceptual definitions for challenging telework demands and hindering telework demands.

Challenging telework demands are the physical, psychological, social, or organizational aspects of telework that are stressful but promote personal growth, development, and achievement, and thus are associated with benefits in work and nonwork domains.

Hindering telework demands are the physical, psychological, social, or organizational aspects of telework that create obstacles to personal growth, development, and achievement, and thus are associated with costs in work and nonwork domains.

Based on the definitions, challenging telework demands are likely to have greater positive outcomes compared to hindering telework demands, which are more likely to create negative impacts. For example, increased time pressure caused by telework may act as a challenging demand if this creates potential for improved job performance by enhancing efficiency and productivity. Similarly, a teleworker who experiences an increased workload may have the potential for better performance and career advancement opportunities. In contrast, expectations about constant availability may be considered as a hindering demand, as this demand interferes with personal and family life, and employees get less time to concentrate on

nonwork activities. Consequently, teleworkers are likely to experience greater fatigue and lower satisfaction and well-being.

Conceptualizing Telework Resources

Despite criticisms for its demands, telework is also applauded for providing flexibility that helps conserve resources and protect against resource loss (Golden, 2006). Resources are defined as “anything perceived by the individual to help attain his or her goals” (Halbesleben et al., 2014). Based on the conservation of resources (COR) theory by Hobfoll (1989), Golden (2006) argued that individuals endeavor to protect their current resources and acquire new resources to deal with work fatigue related to telework. The practice of telework itself is considered a resource for employees since it provides autonomy and helps balance work and family roles (Metselaar et al., 2023). However, in line with Hobfoll’s (1989) differentiation between resource gain spiral and resource loss spiral, recent telework research indicated loss of resources (e.g., lack of social support, lack of feedback, loss of social interaction) among teleworkers (see Chong et al., 2020; Liu et al., 2021; Rieth & Hagemann, 2021). In this research, I examine whether telework resources positively impact individual innovative behavior via the resource gain spiral with the assumption that employees are likely to gain resources during telework.

Past studies have highlighted the importance of various personal resources (e.g., vigor at work, self-leadership, rumination) in mitigating demands and promoting positive outcomes (see Abdel Hadi et al., 2021; Galanti et al., 2021; Pulido-Martos et al., 2021). However, these studies do not adequately explain whether telework enables resource gain in nonwork domains (i.e., personal, family, or home) beyond the work domain. Bakker and Demerouti (2017) highlighted the significance of personal resources in the JD-R model and proposed that personal resources

can intensify work engagement and buffer the adversities of demands on strain. The role of personal resources in buffering the adverse impacts of job demands has been studied in past research (e.g., Tremblay & Messervey, 2011; Xanthopoulou et al., 2013), which highlights the significance of nonwork resources besides work-related resources. Inclusion of job resources alone does not help in interpreting the holistic impact of telework on individuals and organizations because nonwork resources are critical to meet work demands (Ruppel et al., 2013). Consequently, the definition of telework resources must include resources accumulated by the teleworkers in both work and nonwork domains. Based on the definition of job resources (Demerouti et al., 2001), I define telework resources as follows:

Telework resources refer to the physical, psychological, social, or organizational aspects of telework that may help in either reducing the physiological and psychological costs associated with telework demands in both work and nonwork domains, or may aid in achieving goals in both domains, or may promote personal growth and development among teleworkers.

Based on the above definition, I suggest that telework resources are a multifaceted construct encompassing four types of telework characteristics: *physical, psychological, social, and organizational*, which aid in fostering motivation and minimizing the strain among teleworkers according to the JD-R model (Demerouti et al., 2001; Schaufeli & Bakker, 2004). The telework resources thus lead to various positive personal and organizational outcomes by increasing work engagement and reducing exhaustion, anxiety, and health-related complaints (Bakker & Demerouti, 2017). Relying on the assumptions of the JD-R model, I contend that in the presence of high telework resources, employees can deal with the negative effects of telework demands, which helps them ensure positive outcomes in their work and nonwork domains. Table 3 presents various physical, psychological, social, and organizational resources of telework and their associated benefits to be considered as telework resources.

Table 3

Physical Resources of Telework

Teleworkers can experience several gains in physical resources. Reduction in commuting time is one of them, which is always considered as a potential benefit of telework and a reason for which individuals feel motivated to work from home (e.g., Golden, 2006; Maruyama et al., 2009). By avoiding commuting to work, teleworkers save time (Saragih et al., 2021) and energy (Golden, 2006), which they can reallocate for other activities (i.e., family, leisure) (Thompson et al., 2022). Thus, telework provides the opportunity for conserving resources as teleworkers do not need to commute to work. Indeed, employees can build additional resources based on the time saved from telework (Golden, 2006). For example, research suggests that teleworkers have more time to spend with family members and fulfill family demands (Maruyama et al., 2009; Thompson et al., 2022). Likewise, teleworkers have more time for household work as they do not need to commute to work (Thompson et al., 2022; Tremblay & Genin, 2007). Consequently, teleworkers can meet demands of both work and family roles (Lee & Sirgy, 2019; Troup & Rose, 2012), which improves work-family balance and life satisfaction (Bai et al., 2021) by reducing commuting stress and work-family conflict (Hartig et al., 2007; Kazekami, 2020).

Teleworkers not only save time and energy, but also save expenses related to commuting to work (Mello, 2007; Nakrošienė et al., 2019; Thompson et al., 2022; Tremblay & Genin, 2007). Research suggests that these monetary savings consequently increase telework satisfaction and family satisfaction (Nakrošienė et al., 2019) and further contribute to quality of life (Harpaz, 2002).

On top of that, teleworkers can have more leisure time, which helps them to ensure work-life balance (Hilbrecht et al., 2013; Wheatley, 2012). Also, teleworkers report the availability of time for healthcare and self-care activities, which are associated with health benefits and work-life balance (Caringal-Go et al., 2022; Thompson et al., 2022).

Despite ongoing debate about the extent to which telework reduces interruptions (Boell et al., 2016), teleworkers may still benefit from fewer interruptions and distractions compared to a co-located workplace (Bosua et al., 2017; Delanoeije & Verbruggen, 2020; Fonner & Roloff, 2010; Fonner & Roloff, 2012). Employees usually face interruptions caused by social interactions at the workplace, such as overlong lunches, frequent coffee breaks, gossip, and telephone calls, which are minimized during telework (Wöhrmann & Ebner, 2021). Additionally, teleworkers are less exposed to and have less opportunity to engage in office politics (Fonner & Roloff, 2010; Manochehri & Pinkerton, 2003). Therefore, teleworkers report improved productivity (Bosua et al., 2017; Windeler et al., 2017) and well-being (Anderson et al., 2015).

Psychological Resources of Telework

Teleworkers experience gains in psychological resources as well because they have better concentration at work as they can avoid interruptions and distractions (Mello & Dal Colletto, 2019; Tremblay & Genin, 2007). Teleworkers possess greater boundary control to minimize distractions, which helps mitigate stress and improve satisfaction (Fonner & Roloff, 2010). Further, telework can enhance employee focus and improve control over how to structure daily tasks, which leads to improved job performance (Delanoeije & Verbruggen, 2020).

Despite the presence of the autonomy-control paradox in telework (Putnam et al., 2014; Taskin & Devos, 2005), scholars have frequently referred to resource gain through increased autonomy in terms of place and time (e.g., Gajendran & Harrison, 2007; Maruyama et al., 2009;

O'Neill et al., 2009; Sardeshmukh et al., 2012; Tremblay & Genin, 2007; Wöhrmann & Ebner, 2021). Teleworkers usually have greater control and discretion in conducting job tasks, which increases their work engagement (Sardeshmukh et al., 2012). Such enhanced feelings of discretion result from increased self-reliance using ICTs with lower managerial scrutiny or less direct supervision (Gajendran & Harrison, 2007; O'Neill et al., 2009). With this enhanced autonomy, teleworkers can reduce role stress and work-family conflict and improve job satisfaction and performance (Gajendran & Harrison, 2007; Golden et al., 2006; Vega et al., 2015).

Complementing this, Gajendran and Harrison (2007) argued that teleworkers experience increased boundary flexibility that helps them adjust and coordinate work and family demands, reducing work-family conflict. Teleworkers experience greater boundary permeability (i.e., the degree to which either work or family infringes on the other), which increases the potential for conflict between work and family roles. However, the presence of greater boundary flexibility helps in mitigating the adverse impact of boundary permeability on teleworkers by allowing them to schedule work optimally and creating segmentation to detach work from family (Gajendran & Harrison, 2007). In line with this, Biron et al. (2023) suggested that teleworkers may experience both location and temporal flexibility that help them enact proper boundary management behavior to minimize conflict between work and nonwork.

Along with this, the home can be an important source of psychological resources for teleworkers if it works as a suitable workplace (e.g., Hartig et al., 2007; Nakrošienė et al., 2019). Home helps to mitigate stressful demands, enable restoration, and provides a form of self-expression (Hartig et al., 2007). Therefore, home can be a valuable resource for teleworkers, given that an appropriate workplace is crucial for employee performance (Nakrošienė et al.,

2019). In sum, working from home can benefit teleworkers by aiding their coping with stress and improving well-being (Hartig et al., 2007).

Social and Organizational Resources of Telework

While telework research has suggested loss of face-to-face interaction and social distance as potential demands (e.g., Gajendran & Harrison, 2007; Galanti et al., 2021), teleworkers can reduce the perception of distance by using appropriate ICTs (i.e., email, voicemail, instant messaging, virtual private networks) (Leonardi et al., 2010). This way, teleworkers feel more connected to others and build social presence despite physical separation (Fonner & Roloff, 2012). The use of ICT provides the opportunity to remain constantly connected with the organization, which can serve as a resource for increased job performance. Some teleworkers may find constant connection demanding, but on the bright side, the flexibility of telework helps them to create distance from their coworkers by disconnecting from ICTs (Leonardi et al., 2010). Consequently, the flexibility and control that employees have during teleworking allow them to build and regulate social resources through ICT connections based on their need for social interactions at work.

Taken together, the construct of telework resources consists of physical, psychological, social, and organizational aspects of telework that arise from both work and nonwork domains, which can be valuable for mitigating stressful demands and ensuring development in both domains.

Innovation at the Individual-Level

As innovation has become the cornerstone for organizational performance and competitive advantage (Campo et al., 2014; Lukes & Stephan, 2017), scholars have highlighted the significance of innovation at the individual level (Li & Hsu, 2016; Scott & Bruce, 1994).

Although there has been limited research on employees' innovative behavior (Li & Hsu, 2016), the term individual innovation is treated as an elusive construct, which has been defined in terms of individual characteristics, traits, behaviors, and products (Kleysen & Street, 2001). Consistent with previous research (e.g., Kleysen & Street, 2001; Scott & Bruce, 1994), individual innovation is conceptualized as an employee behavior in this study. While individual innovation is often closely associated with the term *employee creativity* (Scott & Bruce, 1994), innovation differs from creativity as it emphasizes idea implementation besides idea generation (Anderson et al., 2014; De Jong & Den Hartog, 2010). Hence, individual creativity is considered the foundation for innovative behavior (Amabile, 1988; Mumford et al., 2009).

Individual Innovative Behavior

Innovative behavior is a multidimensional (De Jong & Den Hartog, 2010; Lukes & Stephan, 2017) and a multistage construct (Scott & Bruce, 1994) defined as the deliberate suggestion and application of new and improved ideas, processes, practices, and policies at jobs (Anderson et al., 2014; Janssen, 2000). Drawing on Kanter (1988), Scott and Bruce (1994) outlined three stages of employee innovative behavior, namely idea generation, coalition building, and idea implementation. This multistage process begins with problem recognition and the generation of either novel or adopted ideas by an employee. These ideas may relate to new products, services, work processes, markets, or, in general, identifying solutions to problems (Amabile, 1988; Kanter, 1988). Then, in the next stage, the employee seeks or organizes support from others for the generated ideas. Finally, the individual implements the ideas to turn them into realities by developing a prototype or model (Scott & Bruce, 1994).

While individual innovative behavior is mostly considered as a multistage process, most scholars have developed a one-dimensional measurement scale (De Jong & Den Hartog, 2010).

Therefore, De Jong and Den Hartog (2010) conceptualized four dimensions of innovative work behavior, namely *idea exploration*, *idea generation*, *idea championing*, and *idea implementation*. According to these authors, the innovation process starts with the discovery of an opportunity or a problem that requires a response, which involves idea exploration as finding ways to improve current products, services, or processes. Once there is an opportunity or problem, the individuals generate ideas related to new products, services, or processes to improve performance or solve problems. Next, ideas need to be promoted to build coalitions and gather support from others, which is known as idea championship. Finally, ideas are implemented through considerable efforts and a result-oriented attitude (De Jong & Den Hartog, 2010).

Telework and Individual Innovative Behavior

As mentioned earlier, research examining the impact of telework on individual innovative behavior is scarce (Sarbu, 2022). Recent studies conducted during and after the pandemic primarily examined the frequency of telework on employees' innovative behavior. In an empirical study aimed at examining the impact of telecommuting intensity on innovation in services, Sarbu (2022) found that frequent teleworking is advantageous for remote employees. However, instead of exclusive teleworking (employees who always telework), Sarbu (2022) reported that extensive teleworking (employees who often telework, but not exclusively) is more beneficial for individual-level innovation in services.

In a separate study, Huo et al. (2022) explored the impact of voluntary versus involuntary telecommuting on employee innovative behavior and found that voluntary telecommuting positively relates to employee innovative behavior through the mediation of coworker emotional support. Furthermore, in the presence of a high level of organizational identity, the difference in the impact of voluntary and involuntary telecommuting on coworker emotional support was

amplified. Relying on the JD-R model, Huo et al. (2022) explained that voluntary telecommuting acts as a job resource, which benefits the employees by promoting innovative behavior. On the contrary, involuntary telecommuting works as a job demand, which adversely impacts positive work behaviors.

In a recent doctoral dissertation, Ahlgren (2024) concluded that telework is a *double-edged sword* for employees' innovative behavior. While telework provides autonomy, flexibility, and uninterrupted time for idea generation, it leads to greater isolation, overwork, and fewer opportunities for idea exchange among coworkers. However, innovative work behavior increased with the frequency of telework hours (Ahlgren, 2024). In another recent study, Gibbs et al. (2024) compared WFH and work from office and concluded that while the quantity of ideas remained the same in both settings, the quality of ideas suffered during WFH due to the lack of collaboration opportunities.

Coupled with this, there is evidence of various boundary conditions that determine the innovative behavior of employees. For example, innovative work behavior can be affected in the presence of high isolation and work-home conflict faced by teleworkers (Garlatti Costa et al., 2023). Furthermore, Nwankpa and Roumani (2023) reported a stronger positive relationship between telework and innovation in the presence of knowledge-sharing opportunities. Innovative work behavior was also found to be contingent on leadership styles as suggested by Coun et al. (2021). According to this study, while empowering leadership positively predicted innovative work behavior of teleworking employees through the mediation of work-related flow, directive leadership hindered innovative work behavior (Coun et al., 2021). In a related study, Wang et al. (2025) found a stronger positive effect of telework adoption on firm innovation in nations with low power distance, high indulgence, and short-term orientation. The above empirical findings

indicate the role of various boundary conditions, which may influence innovative behaviors in the telework setting.

Collaboration in the Workplace

Collaboration takes place in a wide range of settings through interaction between two or more people or between organizations (Morris & Miller-Stevens, 2015). Despite collaboration being widely used in various research disciplines, there is little agreement on defining the construct (Hardy et al., 2005), and there is an absence of a comprehensive definition of the construct (Bedwell et al., 2012). While some researchers treated collaboration as a process through which interaction occurs, others referred to collaboration as a structure (Bedwell et al., 2012; Morris & Miller-Stevens, 2017). In organizational behavior research, Gray (1985; 1989) listed the features of collaboration in the organizational context. According to Gray (1985), collaboration involves (1) pooling of resources, (2) by two or more stakeholders, and (3) to solve a set of problems that neither can solve individually. On the other hand, sociological researchers defined collaboration as a relational system that ensures fair and just interaction in a collaborative relationship with concern for the well-being of others (Appley & Winder, 1977). Hence, the conceptualization of collaboration as a construct in multiple disciplines leads to ambiguity. To solve this definitional problem, Bedwell et al. (2012) defined collaboration as “an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal” (p. 130). Alongside this comprehensive definition, these scholars illustrated the key characteristics of collaboration, which are listed below.

1. Collaboration is an evolving process.
2. Collaboration requires two or more social entities.

3. Collaboration is reciprocal.
4. Collaboration requires participation in joint activities.
5. Collaboration is aimed at achieving a shared goal (Bedwell et al., 2012).

In modern business, collaboration is the answer to numerous business problems (Cross et al., 2016). The potential benefits of internal collaboration in businesses are reflected in innovative product development, increased sales, and reduced costs (Hansen, 2009). However, effective collaboration can be challenging since success depends on enduring communication and cooperation (Hardy et al., 2005). Consequently, managers and employees tend to spend 50% or more time on collaborative activities (Cross et al., 2016). Businesses focused on innovation strive to gain and maintain a competitive advantage through collaboration (Lee et al., 2012) since collaboration can result in positive outcomes such as employee well-being (Patel et al., 2012), productivity (Jap, 2001), knowledge creation and sharing (Alshwayat et al., 2021), achievement of collective goals (Lee et al., 2024), and innovation volume and radicalness (Ordanini & Parasuraman, 2011).

Collaboration at Individual-Level

Collaboration is a multilevel construct since it occurs at many levels of analysis (e.g., between individuals, teams, or organizations) (Bedwell et al., 2012; Williams, 2017). However, there is a paucity of research in the area of individual-level collaboration that occurs between two or more employees. To date, research has largely focused on interorganizational collaboration (e.g., Alexiev et al., 2016; Majchrzak et al., 2015) and team collaboration (e.g., Boughzala & De Vreede, 2015; Chiocchio et al., 2011; Gevers et al., 2016). Most theories developed in organizational collaboration are multilevel and, therefore, the application of these multilevel theories to understand individual-level collaboration is not clear (Williams, 2017).

Further, a large number of studies focused on the use of collaboration technology to support virtual teams and distributed work, including group decision support systems, group support systems, electronic meeting systems, groupware, computer-supported cooperative work, and negotiation support systems (Brown et al., 2010). Consequently, the concept of virtual collaboration emerged as a popular variable in the business world (Cheng et al., 2017).

Research suggested that there is an absence of a unified or distinct theory of collaboration that can capture the complex organizational entity like collaboration (Williams, 2017). Although researchers have relied on agency theory, transaction cost theory, resource dependence theory, game theory, and strategic behavior theory, these theories are not adequate to explain collaboration phenomena (Vangen, 2017). Moreover, existing theoretical frameworks in collaboration literature have focused on the governance level of organizations where leadership is required for collaborative implementation, which lacks clarity on the application of these frameworks at the individual level (Williams, 2017). Hence, a clear definition of collaboration at individual-level is currently absent. Based on the comprehensive definition of Bedwell et al. (2012), I, therefore, conceptualize collaboration at individual-level in the following manner:

Collaboration at individual-level is defined as an emergent process aimed at attaining shared goals through active participation and reciprocal engagement between two or more employees within the organization.

This definition relies on a set of assumptions. First, this definition implies the internal nature of collaboration that occurs between employees from the same or distinct teams, departments, units, or functions. Second, such collaboration may occur both in-person and in the virtual work environment.

The Collaborative Performance Framework

Realizing the need for an integrative theoretical framework, Bedwell et al. (2012) developed an overarching framework to describe the process of collaboration in the context of

collaborative performance in an organization. These scholars proposed a theoretical framework to understand the collaboration process based on the ‘input–mediator–output–input’ (IMOI) framework suggested by Ilgen et al. (2005). This collaborative performance framework explains how various collaborative outcomes are achieved through the *collaborative process*, where individuals engage in several collaborative behaviors (see Figure 4).

Figure 4

The *inputs* in the framework include various individual characteristics, which either represent similarities or differences in characteristics and thus play an important role in the collaborative process by affecting the interaction. Here, the term *individual* refers to an entity that can be a single person, a team, or an organization. *Outputs* are generated as results of the collaborative process, the mediating mechanism between inputs and outputs. The *collaborative process* includes various emergent states (e.g., cognition, motivation, affect) and behaviors of entities involved in the process. Bedwell et al. (2012) outlined 6 key collaborative behaviors: “(1) adaptation, (2) extra-role, (3) information processing, (4) leadership, (5) sensemaking, and (6) task execution” (p. 138).

Various contextual characteristics, including task, environmental, temporal, and structural, play central roles in this IMOI framework, through which collaboration is influenced (Bedwell et al., 2012). For example, autonomy, a task characteristic, can affect collaboration since autonomy given to the individuals can influence the level of information exchange (Navimipour & Charband, 2016). Likewise, environmental factors, such as work stressors, may decrease employee collaboration by requiring individuals to invest time and energy in managing

their negative impact (Lin et al., 2015). Therefore, this collaborative performance framework is particularly useful for researchers as it sheds light on the antecedents of collaboration.

Telework and Collaboration

Recent research indicates that telework significantly changes collaboration patterns in the workplace. A large-scale study of Microsoft employees demonstrated that remote work caused the collaboration network of employees to become more siloed and less interconnected (Yang et al., 2022). The authors also found an increase in asynchronous communication and a decrease in synchronous communication. Further, remote employees were found to spend more time in collaboration with their close and familiar contacts and less with distant or casual contacts in the workplace (Yang et al., 2022).

In other research aimed at exploring the impact of remote work on interpersonal collaboration, Lee et al. (2024) reported that telework participation rates were negatively associated with the three types of interpersonal collaboration: horizontal, vertical, and inter-work unit. However, such relationships were moderated by organizational goal clarity, such that in the presence of high goal clarity, the relationship between telework and interpersonal collaboration became more positive (Lee et al., 2024).

In case of telework, employees rely heavily on technological affordances due to the loss of environmental affordances such as meeting rooms, open office layouts, or common places to meet at work (Waizenegger et al., 2020). However, virtual meetings emerged as a double-edged sword for team collaboration. While virtual meetings provided an alternative platform for communication, remote employees often found them overwhelming due to their frequency, length, and style (Waizenegger et al., 2020).

Although teleworkers may experience a loss of collaboration, making certain job resources available can lead to positive outcomes such as increased performance (Müller et al., 2022). These authors specifically mentioned the impact of telework task suitability and telework workplace suitability, which include relevant job resources (e.g., autonomy, social support, performance feedback, undisturbed remote workplace) to buffer the negative impacts of reduced face-to-face interaction or face time.

The above research findings are mostly consistent with pre-pandemic research suggesting the potential for diminished collaboration due to loss of face-to-face interaction (Golden et al., 2008; Windeler et al., 2017), increased isolation (Cooper & Kurland, 2002), blurred work and nonwork boundaries (Greer & Payne, 2014), increased work-family conflict (Solís, 2017), and loss of trust (Golden & Raghuram, 2010). In summary, although telework causes numerous challenges in terms of collaboration, its impact is contingent on several factors at both the individual and organizational levels that either facilitate or hinder remote collaboration, which in turn may promote or deter innovative behavior among employees. These factors may include various demands and resources from both work and nonwork domains of teleworkers, which need to be identified and investigated applying a holistic approach, which I undertook through two studies in this dissertation. The next chapter describes Study 1, where I develop and validate measurement scales for telework demands and telework resources.

CHAPTER THREE: STUDY 1 - DEVELOPMENT AND VALIDATION OF TELEWORK DEMANDS AND TELEWORK RESOURCES SCALES

This dissertation aims to examine the impact of telework demands and telework resources on individual innovative behavior through empirical testing of the hypothesized theoretical model. Therefore, the present research involves two separate studies. In the absence of measurement scales for telework demands and telework resources, I first developed and validated scales to measure these two constructs in Study 1. Then, I tested the hypothesized research model by utilizing the newly developed scales of telework demands and telework resources in Study 2. The goal of the current chapter is to describe Study 1 that aims to develop and validate measurement scales for telework demands and telework resources following the guidelines from past research. The chapter first describes the development of measures followed by the validation of newly developed measures.

Scale Development and Validation

Scales are a collection of items that represent latent constructs used to measure behaviors, attitudes, and hypothetical situations that cannot be captured directly (Boateng et al., 2018; DeVellis, 2012). Developing a scale involves complex statistical analysis and maintenance of several criteria to ensure psychometric soundness (Hinkin, 1995). According to the American Psychological Association (APA), measures should be reliable and valid; thus, they must demonstrate content validity, criterion validity, construct validity, and internal consistency (Hinkin, 1995). Given the significance of a reliable and valid scale development process, I integrated the guidelines provided by various scholars, including Hinkin (2005), Boateng et al. (2018), and Carpenter (2018), for developing and testing the new measures. Figure 5 illustrates the steps of the scale development process followed in the current research. Based on Hinkin

(2005), these steps are categorized into two distinct stages of development and testing of the new measures.

Figure 5

Stage 1: Developing the Measures

The scale development process starts with generation of items which will become part of the scale, which follows a six-step process, as follows: 1) construct definition, 2) item generation through inductive approach, 3) item wording for inductive approach, 4) item generation through deductive approach, 5) item scaling, and 6) content validity assessment (Hinkin, 2005).

Step 1: Construct Definition

The very first step in the scale development process is to define the construct, as a clear construct definition specifies the boundaries of the construct and aids in item generation (Boateng et al., 2018). As described in Chapter 2, definitions of telework demands and telework resources are currently absent. Thus, I defined telework demands and telework resources based on the JD-R model literature and theory. As defined earlier, while telework demands are associated with costs in work and nonwork domains, telework resources help to reduce the costs related to demands. However, not all telework demands are equally exhausting for teleworkers. While some demands hinder personal growth, motivation, and engagement for teleworkers, others stimulate personal growth, motivation, and engagement by presenting challenges. Thus, teleworkers may experience either or both challenging telework demands and hindering telework demands, which I defined in Chapter 2.

Step 2: Item Generation Through Inductive Approach

Method. An inductive approach, which is also known as “classification from below” (Hinkin, 1995), was adopted to generate items for the scales of challenging telework demands, hindering telework demands, and telework resources. A qualitative, inductive approach is a good fit because construct definitions are not readily available in the literature (Hinkin, 2005). This process of item generation is consistent with the methods specified by past scholars (e.g., Boateng et al., 2018; Zhou, 2019).

Data Collection. A total of 25 teleworkers residing in Canada participated in the interview. I used a nonprobabilistic, purposeful sampling approach, a widely used technique in qualitative research (Patton, 2002), applying the following criteria: 1) individuals perform telework (100% work from home or hybrid) and 2) engage in some sort of innovative behaviors as part of their jobs. Employees working from home for at least part of their working time, if not full time, aligns with Cooke et al.’s (2014) definition of teleworkers. The purposeful sampling technique is particularly advantageous because it involves identifying and selecting participants with particular knowledge and experience (Palinkas et al., 2015). I identified a preliminary list of participants from my personal and professional network, and then using snowballing sampling, some interviewees referred to their colleagues who met the criteria. I described the purpose of the interview and provided additional information such as time commitment for the interview and mode of interview (i.e., virtual interview).

The sample size of the interviews met the criteria for the appropriate sample size for qualitative research recommended by Marshall et al. (2013). Although initially I targeted 30 participants, I stopped interviewing once 25 participants were interviewed due to data saturation. Data saturation is vital for effective qualitative research (Morse, 1995), which occurs in the

presence of data redundancy when interviewing new participants does not produce new data (Marshall et al., 2013).

I conducted semi-structured interviews with a set of pre-determined, open-ended questions. However, I allowed the flexibility to explore questions that emerged organically during the conversation with the interviewees. I adopted semi-structured interviews because these can be particularly useful to understand the unique perspective of the participants (Adeoye-Olatunde & Olenik, 2021). The interview protocol was pretested by two teleworkers. The semi-structured interview began with questions pertaining to the participants' perception of advantages and disadvantages related to telework (e.g., How would you describe the benefits of work from home? How would you describe the drawbacks of work from home?). For the convenience of the participants, the term "work from home" was used instead of "telework". I further probed to understand the individual perception about telework demands and resources (e.g., Could you please explain the factors that contribute to the benefits or drawbacks you described?) (See Appendix for interview protocol and consent form). I conducted all interviews via Zoom, and the interviews were audio-recorded and transcribed, each averaging 45 minutes. Finally, the participants completed a brief demographic questionnaire after the interview.

Participants. Among the 25 participants, 19 were high-intensity teleworkers who work remotely for 20 hours or more per week, and the remaining 6 were low-intensity teleworkers who work remotely less than 20 hours per week. Participants varied in terms of telework experience, which was categorized into 1 year or more and less than 3 years (20%), 3 years or more and less than 5 years (76%), and more than 5 years (4%). The nature of telework was voluntary (flexible) for 64% of the participants, and the rest 36% were involuntary (imposed or forced telework). Among 25 interviewees, 15 were men (60%) and 10 were women (40%). The

mean age was 38.36 years, ranging from 27 to 50 years. Participants worked in various industries, including business, finance, natural and applied science, education, sales and services, legislative, health, art and culture, and manufacturing. About 40% of the participants had supervisory roles, while the rest did not. All participants resided in Canada. More than half of the participants had caregiving responsibilities (68%) and the rest did not have any caregiving responsibilities (32%). Finally, the majority of the sample were married or living in a partnership (96%) and the remainder were solo living (4%). The detailed sample profile is presented in Table 4.

Table 4

Data Analysis. I conducted content analysis to generate items for the scales to be developed: challenging telework demands, hindering telework demands, and telework resources. For content analysis, I conducted open coding by closely reading each transcript repeatedly and generating codes directly from the data. Open coding involves the process of breaking down, examining, comparing, conceptualizing, and categorizing data (Strauss & Corbin, 1998). Each code consists of multiple statements mentioned by the participants. These codes were then organized into three broader themes: challenging telework demands, hindering telework demands, and telework resources. Later, the statements from these codes were converted into item statements for scale development and validation (see Step 3).

Step 3: Item Wording for Inductive Approach

The statements coded in the previous step are converted into items representing the constructs: challenging telework demands, hindering telework demands, and telework resources. The guidelines provided by Hinkin (2005) were followed while writing the items. For example,

although the participants described their responses in long and complex sentences, I wrote them in simple and short sentences to improve readability. For the sake of simplicity and to eliminate confusion around the definition of telework, I used the term “work from home” instead of “telework” in the item generation process. Double-barrel items asking for two or more different issues at the same time were edited to ensure that one item addresses only a single issue. The items were read and revised repeatedly to confirm that respondents understand the meaning as intended by the researcher. The resulting pool of 54 items for hindering telework demands, 11 items for challenging telework demands, and 68 items for telework resources is represented in Table 5.

Table 5

Step 4: Item Generation Through Deductive Approach

The deductive approach, also known as “classification from above” (Hinkin, 1995), was conducted through assessment of currently established measurement scales and literature review. The deductive approach of scale development is advantageous as it contributes to the content validity of the scale (Hinkin, 2005). Therefore, I generated items by analyzing extant measurement scales relevant to telework demands and telework resources.

Item Generation from Existing Measures. The review in Chapter 2 indicated that telework demands include both work and nonwork (e.g., family, home, and personal) demands. Therefore, several items were drawn from the following measurement scales and were added to the first set of items generated from interviews.

Job Content Questionnaire, Karasek et al. (1998). Karasek (1985) identified various job characteristics in his classic work on job control and job demands, which were later developed into the Job Content Questionnaire and used to validate the JD-R model. The Psychological Job Demands and Job Insecurity components from the Job Content Questionnaire reflect the work dimension of telework demands. Six items on job demands were therefore adopted in the context of telework:

“I need to work fast due to work from home”

“I need to work hard due to work from home”

“I do not get enough time to finish my job tasks due to work from home”

“I find conflicting demands between my work and home/family when I work from home”

“I feel the job security is low due to work from home”, and

“I find my job as less secured due to recent layoffs in work from home”.

Furthermore, several items from the Skill Discretion, Decision Authority, and Social Support reflect the job resources that are relevant to telework resources. Four items were adopted from the Skill Discretion component:

“Work from home provides me the opportunity to be creative”

“My job requires high level of skill due to work from home”

“I have the opportunity to develop my own abilities due to work from home”, and

“I can perform a variety of tasks/work in my job due to work from home”.

One additional item adopted from the Decision Authority component was: “I can make a lot of decisions on my own at work while working from home”.

The items from the Social Support component include support from supervisor and coworkers. Seven additional items were adopted:

“My supervisor is concerned about my problems in work from home”

“My supervisor pays attention to my feelings and problems during work from home”

“My supervisor is helpful in getting my job done during work from home”

“People I work with are competent in doing their jobs in the context of work from home”

“People I work with take a personal interest in me during work from home”

“I find people I work with are friendly while working from home”, and

“People I work with are helpful in getting the job done in the context of work from home”.

Home Demands Scale. The Home Demands Scale devised by Peeters et al. (2005) consists of three dimensions of home demands, including *quantitative*, *emotional*, and *mental* home demands. One item from quantitative home demands and one item from mental home demands were found to be representative of telework demands:

“I find me busy at home with household works while working from home” and

“I need to do many things simultaneously at home when I work from home”.

Negative Spillover from Family to Work Scale. One item from the Negative Spillover from Family to Work Scale devised by Grzywacz and Marks (2000) was found relevant to nonwork demands. The item added was: “Stress at home makes me irritable during work from home”.

Home Resources Measure. Hakanen et al. (2008) measured home resources by combining items from the Family Support Scale (Peeters & Le Blanc, 2001) and the Positive Spillover from Family to Work Scale (Grzywacz & Marks, 2000). Four items from the Family Support Scale were adopted in the current research that reflects the nonwork resources in the context of telework. The items are as follows:

“My partner/family pay(s) attention to my feelings and problems when I work from home”

“My partner/family appreciate(s) the way I do my job during work from home”

“My partner/family help(s) me with a certain work and nonwork related task during work from home”, and

“My partner/family give(s) me advice on how to handle things at work and home during work from home”.

Three items adopted from Positive Spillover from Family to Work Scale are:

“My home life helps me relax and feel ready for the next day’s work during work from home”

“The love and respect I get at home makes me feel confident about my work during work from home”, and

“I can work hard during work from home since I can provide what is needed to my family”.

Additionally, Hakanen et al. (2008) used one self-developed item to reflect friend support in home resources, which is relevant to nonwork telework resources. The item is: “I get support from my friends when needed during work from home”.

Taken together and reworded, these 29 items helped in generating an additional pool of items, including 5 items for hindering telework demands, 4 items for challenging telework demands, and 20 items for telework resources, listed in Table 6.

Table 6

Furthermore, several items were added based on the literature search conducted in Chapter 2 in addition to the items generated from interviews and existing measurement scales for conceptualizing telework demands and telework resources.

For example, teleworkers are left with fewer resources for family since they need to connect with the organization outside of office hours and weekends (Azpíroz-Dorronsoro et al., 2023). Thus, the following items were added: “It is difficult for me to adapt with the required technologies for work from home” and “I am left with fewer resources to dedicate to family due to the constant connectivity during work from home”.

In addition, Panteli et al. (2022) found that teleworkers are exposed to various security and privacy risks associated with the technology usage for work, which leads to increased tension. Thus, the item “I am concerned about the security and privacy risks related to information technology use in work from home” was added.

Moreover, because of increased physical distance and lack of face-to-face interactions, teleworkers may experience reduced knowledge-sharing opportunities (Hodzic et al., 2023). Therefore, the following item was added: “Work from home hinders the knowledge sharing opportunities among coworkers”. Additionally, teleworkers are expected to plan and structure their workday autonomously, which they may find as demanding (Kubicek et al., 2015). Thus, the following item was added: “I find it demanding to plan my work day autonomously while working from home”.

Furthermore, teleworkers experience strong feelings of mistrust due to the increased monitoring and control by the supervisor, which in turn causes psychological contract breach (Gong & Sims, 2023). The following item was therefore added: “I feel my supervisor does not trust me due to increased monitoring and control during work from home”. Research also

mentioned that blurring of lines between work and personal life leads to potential loss of control among teleworkers (Kakkar et al., 2022). Based on this finding, the following item was added: “I feel loss of control over my professional and personal life due to work from home”.

In addition, teleworkers experience emotional demands to hide negative emotions by only presenting positive emotions during virtual meetings, which leads to increased stress and burnout (Bilotta et al., 2021). Therefore, the following item was added: “I feel pressure to hide negative emotions related to work from home during virtual meetings”. It is also evident that teleworkers need to attend multiple back-to-back meetings without taking sufficient breaks. As a result, they experience increased burnout due to the lack of built-in breaks (Bilotta et al., 2021). The following item was therefore added: “I do not get sufficient breaks because of hectic schedule while working from home”.

Research also suggests that completion of tasks is challenging for teleworkers because they lack in-person interaction with coworkers (Wang et al., 2023). Thus, the following item was added: “I find it difficult to complete my tasks due to a lack of interactions with coworkers during work from home”. In addition, teleworkers often find virtual communication less effective when they communicate with their supervisors (Sahut & Lissillour, 2023). The following item was therefore added: “It is difficult for me to communicate with my supervisor/manager through virtual communication during work from home”.

In a systematic review, Shirmohammadi et al. (2022) reported various stressors that impact the work-life balance of remote workers. These authors found that inadequate tools and limited access to stable internet connections make working from home challenging. Further, teleworkers find it difficult to work from home when they lack a separate office space at home (Shirmohammadi et al., 2022). Also, working from home leads to increased household work,

including cooking, cleaning, and more. The blurred boundaries further cause emotional demands for remote workers since they feel emotionally overwhelmed and need to engage in greater emotional labor (Shirmohammadi et al., 2022). Therefore, the following items were added:

“I find it difficult to work from home due to lack of separate office space at home”

“I find it difficult to work from home due to lack of tools required to work”

“I find it difficult to work from home due to lack of access to stable Internet connection”

“The quantity of household work increased for me due to work from home”

“During work from home, I feel emotionally overwhelmed because of lack of boundaries between work and home”, and

“I need to work hard to hide my true feelings/emotions during work from home”.

In a scoping review, Elbaz et al. (2022) found that teleworkers suffer in terms of sleep quality due to psychological detachment difficulties, which also lead to greater stress. Thus, the following items were added: “I feel lack of psychological detachment from work while working from home” and “I do not get enough sleep because I work from home”. It is also evident that teleworkers experience various physical health-related problems during working from home, which leads to poor job performance and reduced well-being. For example, Fiorini (2023) found that teleworkers report greater musculoskeletal pain due to working longer hours, less exercise, and burnout. Thus, the item “I suffer in musculoskeletal pain in various body parts (e.g., back, neck, shoulder, arm/wrist, hip, knee, ankle/foot) due to work from home” was added. Research also suggested that teleworkers experience computer vision syndrome due to excessive usage of technology (Niu, 2021). Therefore, the item “I experience headache/dizziness/blurriness/irritation/strain due to technology use during work from home” was added.

Further, in a commentary, Bilotta et al. (2021) mentioned ensuring several resources for teleworkers, including social support and feedback. The following three items were added based on Bilotta et al. (2021):

“My supervisor encourages for social interaction among coworkers during work from home”

“My supervisor helps me to meet personal/family/home obligations during work from home”, and

“My supervisor provides sufficient feedback regularly to improve productivity/performance while working from home”.

Besides, Nakrošienė et al. (2019) cited supervisor trust as an important resource for teleworkers to ensure satisfaction with telework and career development. Therefore, the following item was added: “My supervisor trusts me which helps me to perform and grow during work from home”. In addition, being able to work from home during sickness was considered as a resource that increases satisfaction and reduces presenteeism (Nakrošienė et al., 2019). The item added was: “I can continue to work during my sickness because of work from home”.

Taken together, these 26 additional items were added to the previous items generated by the interview and existing measurement scales. Table 7 presents this additional pool of items, including 19 items for hindering telework demands, 2 items for challenging telework demands, and 5 items for telework resources.

Table 7

The combined item pool consisted of a total of 188 items generated from inductive and deductive approaches: 78 items for hindering telework demands, 17 items for challenging telework demands, and 93 items for telework resources.

Step 5: Item Scaling

According to Hinkin (2005), scaling the items is important because it generates adequate variance among respondents for future statistical analyses. I used the Likert scale, the most commonly used in social sciences research (Croasmun & Ostrom, 2011). The Likert scale demonstrates several benefits: it can be easily devised and amended, statistical inference can be made directly from the numerical measurements of the scale, and the scale has good reliability (Li, 2013).

Scholars have debated the effectiveness of the use of the five-point format over using 7-point format. However, Dawes (2008) found that both five-point and seven-point scales can easily be rescaled as they produce the same mean score once they are rescaled. I decided to measure all items using a five-point response scale to maintain uniformity and consistency throughout different construct measures. The five-point scale responses are labeled as follows: 1 = “strongly disagree”, 2 = “disagree”, 3 = “neutral”, 4 = “agree”, and 5 = “strongly agree”.

Step 6: Content Validity Assessment

Ensuring the psychometric quality of the measurement scale is important in social sciences, which can be determined through content validity (Hinkin & Tracey, 1999). Content validity is defined as “whether or not the items sampled for inclusion on the tool adequately represent the domain of content addressed by the instrument” (Waltz et al., 2005, p. 155). Confirming content validity in the scale development process is crucial as this is a requirement for construct validity (Haynes et al., 1995).

Typically, content validity can be established by using a panel of subject matter experts (SMEs) who evaluate the measurement items and rate them based on their relevance and representativeness to the content domain (Almanasreh et al., 2019). Therefore, to assess content validity, a total of 20 SMEs were selected based on their scholarly contributions in the area of telework. The SMEs were sent an email soliciting their participation in an online survey to evaluate the item pool generated in the previous step through inductive and deductive approaches. A survey was built on Qualtrics using the 188 items generated in the previous step to rate how each item represents challenging telework demands, hindering telework demands, and telework resources constructs based on their definitions. The objective of the research and the process of rating (participation in the survey), along with the length of the instrument were described in the initial email.

In response to this email, many of the experts declined due to the length of the instrument and required time commitment while others did not respond. Finally, a total of 7 SMEs participated in the assessment for content validity. However, I was able to consider only 4 SMEs' responses for further statistical analysis due to one outlier that significantly differed from other responses and 2 unfinished responses. Although scholars suggest using a large panel between 8 to 12 SMEs to increase confidence, Polit et al. (2007) mentioned that using 3 experts is the minimal acceptable number for content validation based on Lynn (1986). Indeed, the optimal number of SMEs often depends on the instrument length and availability of the experts (Haynes et al., 1995).

Each participant was sent a follow-up email after their initial response that included a cover letter, the Qualtrics link to complete the survey, the definitions of constructs, and the description of the item generation process (see Appendix). The SMEs rated the degree to which

each of the 78 items was representative of hindering telework demands. Similarly, the SMEs rated 17 items representing challenging telework demands and 93 items representing telework resources. A five-point response scale was used for rating, labeled as: 1 = “not at all representative”, 2 = “somewhat representative”, 3 = “neutral”, 4 = “representative”, and 5 = “highly representative”.

The average relevance rating across the 17 items of challenging telework demands was 3.66 (SD = 0.47), the 78 items of hindering telework demands was 4 (SD = 0.36), and the 93 items of telework resources was 4 (SD = 0.41), meaning that most items were rated as above average (i.e., above the scale mid-point) in terms of relevance to the concepts. I also calculated the Hinkin Tracey correspondence (HTC) index for each item, which is calculated by dividing the average SME definitional correspondence (or relevance) rating by the number of anchors (Colquitt et al., 2019; Hinkin & Tracey, 1999).

$$htc = \text{average definitional correspondence rating} / a$$

Here, a = the number of anchors, which is 5 in the current study.

The corresponding *htc* index for each of the items is presented in Table 8. A *htc* index of 1 demonstrates the agreement among SMEs about the representativeness of the item for a construct. However, none of the items demonstrated *htc* index of 1. According to Colquitt et al. (2019), *htc* index of 0.92 and above indicates “very strong” definitional correspondence, values from 0.89 to 0.91 indicate “strong” definitional correspondence, values from 0.85 to 0.88 indicate “moderate” definitional correspondence, values from 0.60 to 0.84 indicate “weak” definitional correspondence. Only 3 items out of 17 challenging telework demands items had *htc* index equal to 0.85 (none exceeded 0.85). The average *htc* index for challenging telework demands was 0.73 (SD = 0.09). This demonstrates the disagreement among SMEs about whether

the challenging telework demands are relevant to the construct. Therefore, I adopted a lenient approach and retained 7 items of challenging telework demands items with *htc* index of 0.80 and above for the next step of scale development and validation. Next, the average *htc* index for hindering telework demands was 0.77 (SD = 0.07). Thus, 18 out of 78 hindering telework demands were retained, which had *htc* index of 0.85 and above. Last, I adopted a relatively conservative approach to telework resources and retained 25 items with *htc* index of 0.87 and above out of 93 telework resources items. The average *htc* index for telework resources was 0.81 (SD = 0.08). Overall, the *htc* index for these three constructs indicates the presence of disagreement among the SMEs about the relevance of items to the constructs, and I moved to the next step with a shorter version of the scales by dropping the items with a lower *htc* index as indicated in Table 8.

Table 8

Stage 2: Testing the New Measures

Following Hinkin (2005), I aimed to test the new measures with the items retained from the previous stage. After SME-based content validation, I retained 7 items in challenging telework demands, 18 items in hindering telework demands, and 25 items in telework resources. The following steps were followed in this stage, including 1) exploratory factor analysis, 2) confirmatory factor analysis, 3) assessment of reliability, 4) convergent and discriminant validity, and 5) nomological validity.

Step 1: Exploratory Factor Analysis (EFA)

First, I performed an EFA to refine these three scales into a more parsimonious set of items (Hinkin, 1998). The use of EFA during scale development helps in assessing construct

validity. Given that EFA allows grouping a large item set into meaningful subsets that measure different factors, it becomes easier to identify items that either do not measure an intended factor or that concurrently measure more than one factor (Worthington & Whittaker, 2006).

Participants in this study were recruited from Prolific, an online research platform for data collection, using the following criteria: 1) individuals must work remotely, or a combination of sometimes from a central place of work and sometimes remotely, and 2) individuals work and reside in Canada and the USA. The proliferation of online data collection through crowdsourcing platforms such as Prolific became popular in recent years due to convenience and low cost (Peer et al., 2022). Although online data collection platforms have been criticized for data quality regarding reliability and validity (Sheehan, 2018), Prolific was found to provide the highest quality data among the alternatives (e.g., Prolific, MTurk, CloudResearch's MTurk Toolkit, Dynata, and Qualtrics Panels) (Peer et al., 2022).

A total of 250 participants completed an online survey developed in Qualtrics to rate the pool of 50 items (i.e., 7 items in challenging telework demands, 18 items in hindering telework demands, and 25 items in telework resources). Respondents were asked to indicate their agreement with each item on a scale ranging from 1 (strongly disagree) to 5 (strongly agree). The sample size is consistent with the recommendations of Hinkin (2005) that the item-to-response ratios could range between 1:4 to 1:10 for scale development. The item-to-response ratio for the current study is 1:5 (50:250). In addition, this sample size is also consistent with the recommendation that a range of 200-300 responses is appropriate for factor analysis (Comrey, 1988; Guadagnoli & Velicer, 1988).

Among the 250 participants, 200 were high-intensity teleworkers who work remotely for 20 hours or more per week, and the remaining 50 were low-intensity teleworkers who work

remotely less than 20 hours per week. Participants varied in terms of telework experience, which was categorized into less than 1 year (2%), 1 year or more and less than 3 years (40.8%), 3 years or more and less than 5 years (43.6%), and more than 5 years (13.6%). More than half of the participants were female (52.4%), and the rest consisted of male (46.4%) and others (i.e., agender and nonbinary; 1.2%). The mean age was 39.43 years ($SD = 11.72$), ranging from 22 to 77 years. Participants were almost equally distributed in terms of country of residence (47.6% resided in Canada and 52.4% resided in the USA). Participants worked in various industries, including business, finance, natural and applied science, education, sales and services, legislative, health, art and culture, and manufacturing. About 38% of the participants had supervisory roles, while the rest did not.

To assess the factor structure, I conducted an EFA in IBM SPSS 29 using principal component analysis with an orthogonal (varimax) rotation. Principal component analysis is widely used for item reduction, which evaluates a large number of variables using fewer components (Beavers et al., 2013). Moreover, varimax rotation is mentioned as the most common method of rotation to perform EFA (Costello & Osborne, 2005). The total number of factors was fixed to three because the factor analysis consisted of items from three distinct constructs. The EFA resulted in three factors that accounted for 50.37% of the total variance. The results for Kaiser-Meyer-Olkin (KMO) sample adequacy test (0.92) and the Bartlett's Test of Sphericity ($p < 0.001$) were found to be acceptable according to the guidelines by Kaiser (1974) and Hair et al. (2010). Next, I reviewed the factor correlations matrix and found that factors 1 and 2 were correlated (see Table 9). Thus, I performed EFA again using principal component analysis with an oblique (direct oblimin) rotation. While oblique rotations allow the factors to correlate, orthogonal rotations do not (Costello & Osborne, 2005). Similar to orthogonal rotation,

the results KMO sample adequacy test (0.91) and the Bartlett's Test of Sphericity ($p < 0.001$) in oblique rotation were also found to be acceptable.

Table 9

Next, I reviewed the factor loading values for each of the items for both orthogonal and oblique rotations. Factor loading values less than 0.3 were suppressed based on the recommendations by several scholars (e.g., Costello & Osborne, 2005; Field, 2009; Lee et al., 2012). Reviewing the rotated component matrix of orthogonal rotation and pattern matrix of oblique rotation revealed some items with cross-loading that loaded at 0.32 or higher on more than one factor (see boldface factor loadings in Tables 10 and 11). Therefore, combining the results from both orthogonal and oblique rotations, I dropped 2 items from challenging telework demands, 1 item from hindering telework demands, and 6 items from telework resources based on the recommendation of Tabachnick and Fidell (2001).

Tables 10 and 11

Table 12 displays a total of 41 items with their representative factor loadings retained out of 50 items for all three constructs, which included 5 items for challenging telework demands, 17 items for hindering telework demands, and 19 items for telework resources. Although scholars suggested that an item with a factor loading of 0.70 or higher is a good identifier of the factor (Beavers et al., 2013), I decided to retain several items with factor loadings of less than 0.70 to conduct confirmatory factor analysis at the next step. According to Hair et al. (2010), factor loadings should exceed 0.5 and ideally 0.70, which was mostly evident except for a very few items (one in hindering telework demands and one in telework resources) (see boldface factor

loadings in Table 12). As suggested by Beavers et al. (2013), the solution produced by EFA is acceptable if three or four items with factor loadings of 0.7 or greater comprise a factor, which was evident in the current EFA results. Challenging telework demands had 4 items, hindering telework demands had 10 items, and telework resources had 5 items with factor loadings of 0.7 and above.

Table 12

Step 2: Confirmatory Factor Analysis (CFA) – Sample 1

Next, I used CFA to confirm the factor structure identified by EFA and assessed the model fit with the remaining 41 items. CFA is a useful tool for scale validation as it refines the measurement scales, assesses construct validity, and estimates scale reliability (Brown, 2006). Construct validity refers to the extent to which a measure adequately assesses the construct it purports to assess (Nunnally & Bernstein, 1994). Construct validity can be confirmed through its various sub-dimensions, including content validity, unidimensionality, reliability, convergent validity, and discriminant validity (Garver & Mentzer, 1999). In the current study, the CFA model was specified with the prior EFA results to verify the original factor structure, which later created the platform for assessment of reliability and convergent and discriminant validity. In terms of factor structure, a three-factor model is hypothesized to fit the data the best. To conduct CFA, structural equation modeling (SEM) was performed using the same dataset of EFA in AMOS 29 (Arbuckle, 1997).

I compared the three-factor model to two different alternative models. One alternative model combined challenging telework demands and hindering telework demands items, which resulted in a two-factor model. Another combined the items from all three factors, including

challenging telework demands, hindering telework demands, and telework resources. The results revealed that the three-factor model is better than the two-factor and the one-factor models. Additionally, the two-factor model is better than the one-factor model. The model fit indices are reported in Table 13 with the fit statistics for each of the models.

Table 13

The three-factor model fit the data well according to Brown (2006) and Hair et al. (2010), $\chi^2(178) = 243.40$, $p < 0.001$; root mean square error of approximation (RMSEA) = 0.03; comparative fit index (CFI) = 0.98; normed fit index (NFI) = 0.93; goodness of fit index (GFI) = 0.92; relative fit index (RFI) = 0.91; incremental fit index (IFI) = 0.98; the Tucker-Lewis coefficient (TLI) = 0.97; standardized root mean square residual (SRMR) = 0.04. Items with the standardized factor loadings of less than 0.7 were removed based on the recommendation of Hair et al. (2010) and Fornell and Larcker (1981) (see boldfaced values in Table 14). Given these results, the three-factor model was retained with 5 items in challenging telework demands, 10 items in hindering telework demands, and 6 items in telework resources. Figure 6 illustrates the path diagram of the three-factor model with the standardized estimates.

Table 14

Figure 6

Step 3: Reliability, Convergent and Discriminant Validity – Sample 1

Given that high reliability is an important prerequisite for high validity (Raykov & Grayson, 2003), I assessed reliability for each of the study constructs. Reliability refers to the ability of an instrument to measure consistently (Nunnally, 1978). Assessing reliability in the

scale development process is significant as less reliable measures lead to more error in measurement. Reliability can be measured in several ways, among which Cronbach's alpha, a measure of internal consistency of items, is considered the most common reliability measure in organizational science (Bonett & Wright, 2015). However, scholars argued that Cronbach's alpha may fail to capture true reliability as it is the lower bound on true reliability (Peterson & Kim, 2013). Thus, composite reliability, performed during SEM, became popular as it provides estimates of true reliability (Peterson & Kim, 2013). Indeed, SEM is known for its ability to overcome the limitations of Cronbach's alpha (Raykov, 2001). For each construct of the current study, the values of Cronbach's alpha and composite reliability appeared as more than 0.70, the acceptable cut-off level (Hair et al., 2010; Nunnally & Bernstein, 1994). Table 15 demonstrates the Cronbach's alpha and composite reliability for each construct along with validity estimates.

Table 15

Next, to confirm construct validity, I estimated convergent validity and discriminant validity of each construct. Convergent validity is the degree to which a measurement scale correlates with other scales designed to assess a similar construct (Hinkin, 2005). Fornell and Larcker (1981) suggested using the average variance extracted (AVE) to establish convergent validity, "which represents the average amount of variance that a construct explains in its indicators relative to the overall variance of its indicators" (Cheung et al., 2024, p. 751). The AVE values for all three constructs in the current study exceeded the 0.5 threshold suggested by Fornell and Larcker (1981). Additionally, the composite reliability values for all the constructs were greater than the AVE estimates, indicating evidence of convergent validity (see Table 15).

Given that convergent validity was established, next, I assessed the discriminant validity, the degree to which a construct is distinct from other constructs, ensuring that measures of different constructs are not highly correlated (Hinkin, 1998). Although discriminant validity can be estimated in several ways, I adopted the method of comparing AVE with maximum shared variance (MSV) and average shared variance (ASV). According to Hair et al. (2010), a construct possesses discriminant validity if AVE is greater than both MSV and ASV. In the current analysis, the values of AVE for all three constructs were found to be greater than the values of MSV and ASV (see Table 15). Besides, earlier analysis provided additional evidence for discriminant validity through unidimensionality (e.g., no cross-loading indicators) (Anderson & Gerbing, 1988).

Step 4: Confirmatory Factor Analysis (CFA) – Sample 2

Data was collected from a separate sample to conduct another round of CFA with SEM. Participants in this study were recruited from MTurk using the following criteria: 1) individuals must work remotely, or a combination of sometimes from a central place of work and sometimes remotely, and 2) individuals work and reside in Canada and the USA. A total of 250 participants completed an online survey developed in Qualtrics to rate the pool of 21 items combining three scales (i.e., 5 items in challenging telework demands, 10 items in hindering telework demands, and 6 items in telework resources). Respondents were asked to indicate their agreement with each item on a 1 = “strongly disagree” to 5 = “strongly agree” scale.

Among the 250 participants, 162 were high-intensity teleworkers who work remotely for 20 hours or more per week, and the rest 88 were low-intensity teleworkers who work remotely less than 20 hours per week. Participants varied in terms of telework experience, which was categorized into 1 year or more and less than 3 years (15.6%), 3 years or more and less than 5

years (24.4%), and more than 5 years (60%). More than half of the participants were male (75.2%), and the rest consisted of females (24.8%). The mean age was 33.12 years (SD = 11.72), ranging from 22 to 66 years. Participants mostly resided in the USA (81.2%), and the rest (18.8%) resided in Canada. Participants worked in various industries, including business, finance, natural and applied science, education, sales and services, legislative, health, art and culture, and manufacturing. Only 13.2% of the participants had supervisory roles, while the rest did not.

At first, I reviewed the model fit results for the three-factor model that was generated from the previous step's CFA results. All items of challenging telework demands and telework resources had standardized factor loadings of less than 0.70, and the model fit was poor. According to Hair et al. (2010), the standardized factor loadings should be at least 0.50 and preferably, at least 0.70. Thus, a relatively lenient approach was adopted to improve the model fit by removing the items with factor loadings of less than 0.50 based on the recommendation of Hair et al. (2010) (see boldfaced values in Table 16). Two items were removed from challenging telework demands, and one item was removed from telework resources.

Table 16

Results of the three-factor model with the retained 18 items demonstrated a better model fit, $\chi^2(122) = 183.82$, $p < 0.001$; root mean square error of approximation (RMSEA) = 0.04; comparative fit index (CFI) = 0.98; normed fit index (NFI) = 0.94; goodness of fit index (GFI) = 0.93; relative fit index (RFI) = 0.93; incremental fit index (IFI) = 0.98; the Tucker-Lewis coefficient (TLI) = 0.97; standardized root mean square residual (SRMR) = 0.04. The model fit indices are reported in Table 17.

Tables 17 and 18

Table 18 demonstrates Cronbach's alpha, composite reliability, AVE, MSV, and ASV for each construct. Although the values of Cronbach's alpha and composite reliability of hindering telework demands and telework resources were greater than 0.70, challenging telework demands did not meet the threshold for both Cronbach's alpha and composite reliability. Furthermore, the AVE values for challenging telework demands and telework resources did not exceed the 0.5 threshold, and thus, convergent validity was not confirmed for these two constructs. However, the values of AVE for all three constructs were found to be greater than the values of MSV and ASV, demonstrating discriminant validity.

Given the poor reliability and construct validity of challenging telework demands, I performed SEM with the two-factor model of 21 items pool combining the items of challenging telework demands and hindering telework demands. Based on standardized factor loading values, a total of 6 items were removed, including all 5 items of challenging telework demands and 1 item of telework resources (see boldfaced values in Table 19). Results of the two-factor model with the retained 15 items demonstrated a better model fit, $\chi^2(78) = 127.43$, $p < 0.001$; root mean square error of approximation (RMSEA) = 0.05; comparative fit index (CFI) = 0.98; normed fit index (NFI) = 0.95; goodness of fit index (GFI) = 0.94; relative fit index (RFI) = 0.94; incremental fit index (IFI) = 0.98; the Tucker-Lewis coefficient (TLI) = 0.98; standardized root mean square residual (SRMR) = 0.03.

Table 19

Given that the SEM results demonstrated poor factor loadings for items of challenging telework demands, the entire construct was dropped from the study. Thus, based on the two-factor model, 10 items of the hindering telework demands construct were named as simply ‘telework demands’, and the telework resources construct was finalized with 5 items. The final items with standardized factor loadings are presented in Table 20 along with the reliability and validity results. Figure 7 illustrates the path diagram of the two-factor model with the constructs telework demands and telework resources with their standardized estimates.

Table 20

Figure 7

Step 5: Reliability, Convergent and Discriminant Validity – Sample 2

The values of Cronbach’s alpha and composite reliability were found to be greater than the 0.70 threshold, which demonstrated the reliability of the measurement scales (see Table 20). Although convergent validity was confirmed for telework demands (AVE value greater than 0.50), the AVE value for telework resources (0.43) was less than 0.50. However, given that the latent construct explains at least 43% of the indicator variance, the value of AVE for telework resources could be accepted. According to Fornell and Larcker (1981), AVE is a relatively conservative measure of convergent validity and thus, if the AVE value is less than 0.50 but the composite reliability is higher than 0.60, then validity of the construct can be conferred. In addition, discriminant validity was confirmed for both the scales as the values of AVE were greater than those of MSV (see Table 20).

Step 6: Nomological Validity

Cronbach and Meehl (1955) first emphasized the necessity of articulated theory in scale development, which is building the nomological network that must exist to ensure construct validity. The laws of a nomological network include: (a) observable properties to each other, (b) constructs to observables, and (c) constructs to one another. Thus, nomological validity implies the degree to which a construct fits into a theoretically based network of relationships with other constructs through empirical support (Kock et al., 2024). Figure 8 depicts the nomological network of telework demands and telework resources for ensuring construct validation. This nomological network represents the theoretical network of relationships between the focal constructs (i.e., telework demands and telework resources) and other constructs from theory. I draw upon the JD-R model and telework literature to hypothesize relationships and develop the nomological network.

Figure 8

Telework Demands, Telework Resources, Burnout, and Work Engagement. As previously discussed, according to the JD-R model, burnout is the outcome of demands, and work engagement results from utilizing the resources in a job (Demerouti & Bakker, 2011). Engagement refers to a positive, satisfying, work-related state of mind characterized by vigor, dedication, and absorption (Schaufeli & Bakker, 2004). Vigor refers to energy and mental resilience, dedication implies enthusiasm, and absorption is described as full concentration and happy engrossment in work (Schaufeli et al., 2001). In contrast, burnout is a state of emotional exhaustion that results from working under demanding situations (Schaufeli & Greenglass, 2001). Research on the JD-R model has provided abundant empirical support for the arguments

that job demands are positively related to burnout and negatively related to engagement (Bakker et al., 2014; Schaufeli & Bakker, 2004; Van den Broeck et al., 2017). Therefore, I expect that in the presence of telework demands, teleworkers are likely to experience burnout given that demands are energy-depleting and lead to fatigue (Schaufeli & Bakker, 2004). Likewise, while confronting high demands, teleworkers' work engagement gets negatively impacted due to the stress related to coping with the demands. Thus, I hypothesize:

Hypothesis 1: Telework demands are (a) positively related to burnout and (b) negatively related to work engagement.

Further, the JD-R model posits that resources stimulate an employee's motivation to exert effort in fulfilling the job tasks and responsibilities (Llorens et al., 2006). Several studies (e.g., Nahrgang et al., 2011; Schaufeli & Bakker, 2004) have consistently proposed a positive relationship between resources and work engagement and a negative relationship between resources and burnout. Indeed, Sardeshmukh et al. (2012) suggested a relationship of job resources with burnout and job engagement in the context of telework, such that telework reduces important job resources and thus, telework negatively predicts work engagement and positively relates to burnout due to decreased resources. In line with this, I expect that telework resources are likely to reduce burnout and boost work engagement among the teleworkers. Thus, I predict:

Hypothesis 2: Telework resources are (a) negatively related to burnout and (b) positively related to work engagement.

Telework Demands, Telework Resources and Job Satisfaction. Job satisfaction is the extent to which an employee likes or dislikes the job (Spector, 1997). Accordingly, job satisfaction is a strong indicator of how teleworkers feel about the telework demands and

resources. The impact of telework on the job satisfaction of employees has been well studied. For example, Gajendran and Harrison (2007) argued that teleworking can increase employee job satisfaction since they work remotely, which reduces the costs of working by saving time and money related to the work commute. Since teleworkers experience increased autonomy, they report higher job satisfaction (O'Neill et al., 2009). Fonner and Roloff (2010) reported that teleworkers are more likely to be satisfied with their jobs due to fewer work interruptions and less engagement in organizational politics. However, teleworkers may experience increased work-family conflict, which negatively affects job satisfaction. Additionally, teleworkers experience a substantial amount of technostress that leads to diminished job satisfaction (Suh & Lee, 2017). Therefore, it is evident that telework demands are related to lower job satisfaction but telework resources can enhance job satisfaction among teleworkers.

This line of assumption is also consistent with the JD-R model. Several studies (e.g., Han et al., 2020; McVicar, 2016) suggested that while job demands predict lower job satisfaction, job resources significantly increase job satisfaction of employees (see Han et al., 2020; Tims et al., 2013). Taken together, I expect that while telework demands are likely to reduce job satisfaction, telework resources are likely to increase job satisfaction among teleworkers. Thus, I hypothesize:

Hypothesis 3: (a) Telework demands are negatively related to job satisfaction and

(b) telework resources are positively related to job satisfaction.

Telework Demands, Telework Resources, and Job Performance. The telework research further demonstrated the relationship between telework and job performance. For instance, Golden et al. (2008) found that teleworkers' job performance was affected due to increased professional isolation resulting from a lack of face-to-face interactions in telework. However, in a meta-analysis, Martin and MacDonnell (2012) confirmed a positive association

between telework and perceived performance. Since teleworkers work longer hours, productivity increases, and thus, teleworkers exhibit greater performance (Gajendran & Harrison, 2007). Further, telework has the potential to increase task and contextual performance because of enhanced autonomy and control (Gajendran et al., 2015; Kossek et al., 2006). While working from home, teleworkers experience fewer distractions of the office and have greater control over managing the interruptions, which contribute to the enhanced job performance (Fonner & Roloff, 2010, 2012). Indeed, Jamal et al. (2021) reported a positive relationship between various job resources and performance in the context of telework. These findings suggest that while telework demands negatively predict job performance, telework resources positively relate to job performance.

The JD-R model also supports these findings since several studies (e.g., Bakker et al., 2004; Bakker & Demerouti, 2018) have identified a negative relationship between job demands and job performance. Besides, the presence of job resources can improve job performance since job resources buffer the negative effects of demands and increase work engagement (Bakker, 2011; Kim, 2017). Correspondingly, I expect that while telework demands are likely to hinder job performance, telework resources are likely to enhance perceived or self-report job performance. Hence, I hypothesize:

Hypothesis 4: (a) Telework demands are negatively related to perceived job performance and (b) telework resources are positively related to perceived job performance.

Methodology for Nomological Validity. The same sample acquired through MTurk in step 4 was used to test the hypothesized nomological net. *Telework demands* were assessed with 10 items finalized in the previous step of scale validation. Items were scored on a 5-point scale,

ranging from 1 (strongly disagree) to 5 (strongly agree). Likewise, *telework resources* were assessed with 5 items finalized in the previous step on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). *Burnout* was measured with five emotional exhaustion items of the Maslach Burnout Inventory–General Survey (MBI-GS; Schaufeli et al., 1996); e.g., “I feel emotionally drained from my work.” Items were scored on a seven-point frequency rating scale ranging from 0 (never) to 6 (always). *Work engagement* was assessed with the 9-item Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2006). The items of the UWES were grouped into three subscales that reflect the underlying dimensions of engagement: *vigor* (three items; e.g., “At my job, I feel strong and vigorous”); *dedication* (three items; e.g., “I am enthusiastic about my job”), and *absorption* (three items; e.g., “I get carried away when I am working”). The engagement items were similarly scored as those of the MBI-GS. Next, *job satisfaction* was measured using the three-item Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale (MOAQ-JSS; Cammann et al., 1983); e.g., “I am satisfied with my current work.” Items were scored on a five-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Finally, *perceived job performance* was assessed with a 9-item task performance questionnaire used by Goodman and Svyantek (1999); e.g., “I fulfill all the requirements of the job.” Response categories ranged from 0 (not at all characteristic) to 6 (very characteristic).

Results of Nomological Validity. Table 21 shows the means, intercorrelations, and the internal consistencies (Cronbach’s alpha) of the scales included in the analysis. As seen from this table, the values of Cronbach’s alpha were all greater than 0.70, the acceptable cut-off level. Several relationships are worth noting. First, telework demands showed an unexpected positive relationship with job performance. Second, telework resources were significantly and negatively

related to burnout. Third, telework resources were significantly and positively related to work engagement, job satisfaction, and job performance. Furthermore, burnout and work engagement demonstrated a theoretically expected negative relationship. In addition, burnout was negatively and significantly related to job satisfaction and job performance, aligning with theoretical expectations. Consistent with theory, work engagement was found to be significantly and positively related to both job satisfaction and job performance. Finally, job satisfaction is positively and significantly related to job performance, which was not an exception.

Table 21

In order to test the hypothesized nomological net, I performed SEM using AMOS 29 (Arbuckle, 1997). The measurement model showed a reasonable fit (Doll et al., 1994; Jöreskog & Sörbom, 1984) to the data, given that some of the model fit indices were below 0.90 but above 0.80. The model fit indices are as follows: $\chi^2(597) = 1089.02$, $p < 0.001$; root mean square error of approximation (RMSEA) = 0.05; comparative fit index (CFI) = 0.91; normed fit index (NFI) = 0.83; goodness of fit index (GFI) = 0.81; relative fit index (RFI) = 0.81; incremental fit index (IFI) = 0.91; the Tucker-Lewis coefficient (TLI) = 0.90; standardized root mean square residual (SRMR) = 0.07.

SEM analysis results showed that the standardized coefficients of the paths from telework demands to all the outcome variables were not significant (telework demands $\rightarrow$ burnout, $\beta = -0.06$, n.s.; telework demands $\rightarrow$ work engagement, $\beta = 0.06$, n.s.; telework demands $\rightarrow$ job satisfaction, $\beta = 0.04$; telework demands $\rightarrow$ job performance, $\beta = 0.07$, n.s.). Thus, Hypotheses 1, 3(a), and 4(a) were not supported (see Table 22). However, telework resources were found to be negatively and significantly related to burnout ($\beta = -0.84$, $p < 0.01$) and positively and

significantly related to work engagement ($\beta = 0.62, p < 0.01$). Thus, Hypothesis 2 was supported. Furthermore, the path coefficient from telework resources to job satisfaction was $\beta = 0.50$ and significant ($p < 0.01$), which demonstrated a positive relationship between telework resources and job satisfaction. Therefore, Hypothesis 3(b) was supported.

Table 22

In addition, telework resources were found to be positively and significantly related to job performance ($\beta = 0.62, p < 0.01$) and thus, Hypothesis 4(b) was supported as well. Finally, the correlation between telework demands and telework resources was $\beta = 0.08$. Together, telework demands and telework resources explain 71% of the variance in burnout, 40% of the variance in work engagement, 26% of the variance in job satisfaction, and 40% of the variance in job performance (see Figure 9). Therefore, although nomological validity for the newly developed construct of telework resources was confirmed, nomological validity for telework demands could not be claimed.

Figure 9

Next, I conducted a post-hoc analysis to explore the potential moderators that could help us to reinterpret the SEM results. A moderator is a variable that influences the relationship between a predictor and an outcome by specifying certain conditions (Arnold, 1982). Telework intensity, which is the frequency or hours of time spent in teleworking, may impact the potential outcomes of telework. In a recent meta-analysis, telework intensity was found to be consistently and positively related to various job outcomes such as job satisfaction, organizational commitment, perceived organizational support, turnover intentions, and supervisor-rated

performance (Gajendran et al., 2024). Although some scholars reported that low to moderate intensity teleworking is optimum (e.g., Huo et al., 2024; Magnier-Watanabe et al., 2025; Nagata et al., 2021), high telework intensity can be particularly advantageous for employees due to high perceived autonomy and control (Donati et al., 2025; Gajendran et al., 2024). Given that the relationships between telework demands and job-related outcomes are likely be shaped by the varying intensities of telework, I tested the moderating effect of telework intensity. The moderation test was performed in IBM SPSS 29 by centering the variables. The results of the moderation tests are presented in Table 23.

Table 23

First, telework intensity played a negative moderating role between telework demands and burnout ($b = -1.384$, $p < 0.01$), suggesting that telework intensity weakens the positive relationship between telework demands and burnout. Therefore, at lower levels of telework intensity, telework demands were more strongly related to burnout. However, as telework intensity increased, this relationship started to weaken (see Figure 10).

Figure 10

Next, telework intensity had a positive and significant moderating effect on the relationship between telework demands and work engagement ($b = 1.602$, $p < 0.01$). Thus, telework intensity weakened the negative relationship between telework demands and work engagement. In other words, at lower levels of telework intensity, the negative impact of telework demands on work engagement was stronger compared to higher levels of telework intensity (see Figure 11).

Figure 11

Similarly, telework intensity played a positive moderating role for the relationships of telework demands to job satisfaction ($b = 0.857$, $p < 0.01$) and job performance ($b = 1.345$, $p < 0.01$). As illustrated in Figures 12 and 13, when telework intensity was low, telework demands exhibited a stronger negative association with job satisfaction and job performance. In contrast, at higher levels of telework intensity, the detrimental effect of telework demands on job satisfaction and job performance was attenuated. Altogether, it was evident that the intensity of telework significantly moderates the influence of telework demands on job-related outcomes. Accordingly, telework intensity was included as a moderating variable in the main research model of Study 2, which would examine the effects of telework demands and resources on employee innovative behavior.

Figures 12 and 13

Study 1 Discussion

The purpose of this quantitative study was to develop and validate measurement scales for two new constructs, telework demands and telework resources. Given that telework was mostly assessed as a single-item measure, there is an absence of a multi-item scale for measuring telework. In particular, most of the scholarship to date measured telework in terms of telework intensity or frequency of telework in hours per week (e.g., Gajendran & Harrison, 2007). Some even used a dichotomic variable of 0 or 1 to measure the adoption of telework (e.g., Neirotti et al., 2013). However, multi-item scales tend to be higher in reliability and predictive validity compared to single-item scales (Diamantopoulos et al., 2012). Specifically, multi-item scales

enable us to ensure reliability and validity when a self-report research method is used (Robinson, 2017). Therefore, I adopted a demand-and-resource approach drawing on the JD-R model (Demerouti et al., 2001) to introduce the constructs of telework demands and telework resources. I followed the guidelines provided by Hinkin (2005) for developing and testing these new measures. In particular, I implemented two distinct stages in Study 1: first, developing the measures, and then testing the measures.

At first, the constructs of telework demands and telework resources were defined by reviewing the present body of literature and the JD-R model (Chapter 2). The definition of telework demands and telework resources was established based on Demerouti et al. (2001)'s definitions for job demands and job resources. Given that telework extends beyond the work domain, nonwork (i.e., family, home, personal) demands and resources play significant roles beside job demands and resources in predicting outcomes related to telework. Therefore, I incorporated both work and nonwork domains and their characteristics while defining telework demands and telework resources.

Given that all demands are not equally harmful (Van den Broeck et al., 2010), I categorized telework demands into challenging demands and hindering demands based on the challenge-hindrance framework (Cavanaugh et al., 2000). While challenging telework demands are likely to promote personal growth and development and are associated with benefits in both work and nonwork domains, hindering telework demands are related to costs in both domains and deter personal growth and development. These definitions are consistent with the conceptualization of job challenges and job hindrances (e.g., LePine et al., 2004; Van den Broeck et al., 2010).

Next, a pool of items was generated inductively through qualitative interviews with 25 teleworkers to develop scales for these three telework constructs: two for demands and one for resources. Interviews were coded into three broad themes: challenging telework demands, hindering telework demands, and telework resources. Item statements were carefully constructed from these codes within these three broad themes. The items were read and revised repeatedly to ensure readability and meaningfulness. Followed by the inductive approach, a deductive method was executed based on existing measurement scales and literature review to generate additional items. Incorporating both inductive and deductive methods for scale development is highly desirable and considered best practices in extant research (Boateng et al., 2018; Hinkin, 2005).

The combined pool of items was then evaluated by a panel of 4 SMEs to confirm content validity. Although using a large panel of 8 to 12 SMEs increases the strength of validity, it was not possible to acquire more than 4 SMEs due to unavailability and nonresponse. The number of SMEs used in this research is, therefore, consistent with Lynn (1986). Based on the definitions of the constructs: challenging telework demands, hindering telework demands, and telework resources, SMEs rated the degree to which each of the items was representative of these three study constructs. Based on *htc* index, the level of agreement among the experts was determined and the decision to retain or remove the items was made. The use of *htc* index for content validation is recommended by scholars (Colquitt et al., 2019; Hinkin & Tracey, 1999) and recent scale development and validation research (e.g., Gajendran et al., 2024; Hu et al., 2025) in organizational behavior have adopted this index.

Once the constructs were developed, I tested the new measures following the guidelines by Hinkin (2005). First, EFA was conducted using principal component analysis with three fixed factors consistent with three distinct constructs of challenging telework demands, hindering

telework demands, and telework resources. EFA is one of the most widely employed techniques for scale validation in social sciences (Izquierdo et al., 2014). Both orthogonal (varimax) and oblique (direct oblimin) rotations were used, the most popular rotation methods used by scholars (Watkins, 2018). Several items were removed based on the factor loading values from all three factors, and the retained items were used next for CFA.

Next, I performed CFA with SEM to confirm the factor structure identified by EFA and assessed the model fit with the retained items from EFA. Two separate samples were used to perform CFA: the first one used the same sample from EFA, and the second one was based on a separate sample. Conducting CFA is highly recommended for construct validation (DiStefano & Hess, 2005) and is considered an essential statistical tool for convergent and discriminant validity (Brown & Moore, 2012).

While the first sample exhibited acceptable levels of reliability and validity, the second sample demonstrated inadequate reliability and validity. The first sample showed a better model fit with the original three-factor model identified in the EFA, based on fit indices, compared to the two-factor and one-factor models in SEM. Several items were removed to improve the model fit during SEM. Both Cronbach's alpha and composite reliability were measured and found under the accepted threshold. Convergent validity was confirmed with the values of AVE, and discriminant validity was confirmed with the AVE, MSV, and ASV recommended by Hair et al. (2010). However, in the case of the second sample, while hindering telework demands and telework resources had mostly acceptable reliability and validity scores, challenging telework demands demonstrated poor Cronbach's alpha, composite reliability, and AVE values. Thus, instead of a three-factor model, I combined the items of hindering and challenging telework demands as one single factor and performed a two-factor model SEM with telework demands

and telework resources. Although the model fit was acceptable after removing several items, the items that belonged to challenging telework demands previously were still demonstrating poor factor loadings. Therefore, I decided to drop all items of challenging telework demands and the entire construct of challenging telework demands during the scale development process. This improved the model fit with satisfactory factor loadings, and reliability and validity were also confirmed. This led to the formation of two distinct constructs only: telework demands (with items from hindering telework demands only) and telework resources. Thus, while I initiated the scale development and validation process with three constructs, I was able to retain two constructs at the end of the process.

Given that reliability and validity of the scales are mandatory preconditions in scale development and validation process (Boateng et al., 2018; Hinkin, 2005), it was not possible to establish challenging telework demands as a construct and measurement scale. Several causes for poor reliability and validity are identified by Hinkin (1995), such as poor item development practices, multidimensionality issues, inadequate sample size, measurement errors, and conceptual and theoretical weaknesses, among others. I suspect that conceptual and theoretical confusion can be one of the causes for poor reliability and validity in the current study. The construct of challenging telework demands was defined by drawing on the definition of challenging job demands by highlighting the significance of challenges in both work and nonwork domains. However, the definition may lack conceptual clarity and raise confusion, given that challenging demands are contingent on individual contexts, as such, the demands perceived as challenging by someone may not be perceived as challenging by others. For example, research has identified workload, job complexity, problem solving, and time urgency as challenging job demands (Albrecht, 2015; Tadić et al., 2015). Depending on the definition and

examples offered in the existing scholarship, I identified the challenging demands in the context of telework and developed the items accordingly. However, these demands may fail to act as challenges for the teleworkers since they have a different context compared to individuals who do not telework.

Related to the above conceptual problem, another cause for poor reliability and validity can be item development issues. The items for challenging telework demands were adopted from the definition and examples of challenging job demands, which were not tested in the context of telework. Teleworkers may experience distinct challenges in the context of remote work, and thus, the items were irrelevant to the construct and failed to adequately represent the construct.

Further, although interviews offered a great deal of information on demands faced by teleworkers, it was difficult to differentiate between challenging and hindering telework demands during the qualitative data analysis stage. Hence, there was a risk that the items were poorly designed, which were likely interpreted as vague or ambiguous by the respondents.

Lastly, although the sample size used in EFA and CFA was adequate based on the recommendations by scholars (Hinkin, 1995), increasing the sample size could generate favorable results for reliability and validity. The item-to-response ratio for the current study was 1:5 (50:250), which could be increased to 1:10 to increase the likelihood of reliability and validity (Hinkin, 1995; Kyriazos, 2018; Kyriazos & Poga-Kyriazou, 2023). However, due to costs and time limitations, a larger sample size could not be obtained, which is a limitation of the current study (see Limitations in Chapter 5).

Once the reliability and validity of two new scales, telework demands and telework resources, were confirmed, I examined the nomological validity for these constructs. A nomological network was built and tested, which was consistent with previous scale

development and validation studies in HRM (e.g., Mariappanadar, 2016; Piwowar-Sulej & Iqbal, 2025). The related constructs to form the nomological network were selected based on the JD-R model and telework research. The nomological network tested how the focal constructs: telework demands and telework resources predict the related outcomes, namely, burnout, work engagement, job satisfaction, and job performance. All hypotheses related to telework resources and their relationships with the outcome variables were supported in the regression analysis. However, support was not found in favor of the relationship between telework demands with the outcome variables. Thus, while nomological validity for telework resources was confirmed, nomological validity for telework demands could not be claimed.

Following such results, I conducted a post-hoc analysis to examine the impact of potential moderators on the relationships between telework demands and outcome variables. Reviewing the telework literature, I included telework intensity as a moderator, and the moderation tests confirmed that telework intensity moderated the relationship between telework demands and outcome variables, including burnout, work engagement, job satisfaction, and job performance. The analysis suggested that with increased telework intensity, the positive relationship between telework demands and burnout became weaker, and the negative relationship between telework demands, work engagement, job satisfaction, and job performance became weaker. Together, these findings implied that teleworking longer hours facilitate curtailing the negative impacts of telework demands on outcome variables. Such findings are consistent with past research, which demonstrated a significant increase in positive outcomes with the rise in telework intensity (e.g., Gajendran et al., 2024; Gajendran & Harrison, 2007; Martin & MacDonnell, 2012).

CHAPTER 4

STUDY 2: IMPACT OF TELEWORK DEMANDS AND RESOURCES ON INDIVIDUAL INNOVATIVE BEHAVIOR

The literature review in Chapter 2 highlights that telework possesses unique characteristics compared to conventional in-office work arrangements because it produces different sets of demands and resources (Chong et al., 2020; Manroop & Petrovski, 2023; Thomas et al., 2024). Consequently, telework has differential impacts on individual innovative behavior and collaboration, leading to debatable and inconsistent outcomes. Resolving the debate, therefore, demands shedding light on relationships between telework and its potential outcomes through the identification of boundary conditions that determine the type of distinct impact telework may have on innovative behavior and collaboration. In addition, a positive relationship between collaboration and innovation at the individual level is expected. However, we have a limited understanding of how and why telework impacts individual innovative behavior through collaboration. Drawing on the JD-R model and current literature, the main purpose of this study is to examine how telework demands and telework resources determine the innovative behavior of remote employees through the mediation of collaboration. Further, I examine the effects of potential moderators, including telework resources and telework intensity, on the mediated relationship to explore the boundary conditions. Below, I present theoretical arguments and advance several hypotheses. Figure 14 illustrates the hypothesized research model to be tested in Study 2.

Figure 14

Telework Demands and Their Impact on Innovative Behavior

As discussed previously, employees interact with a unique work environment while working from home, which imposes various demands on teleworkers (Aoki et al., 2025; Basile & Beauregard, 2016). The JD-R model suggests that high job demands are responsible for resource-drainage and hence, such work demands increase stress and reduce employee motivation and engagement (Bakker & Demerouti, 2007). Through this health impairment process, high job demands lead to various negative work-related outcomes, including reduced job satisfaction (Han et al., 2020), poor job performance (Bakker et al., 2004), employee presenteeism and absenteeism (Deery et al., 2014), and turnover intention (Scanlan & Still, 2019). Job demands are also considered an important antecedent for innovative work behavior in innovation research (e.g., Janssen, 2000; Kwon & Kim, 2020; Messmann et al., 2017).

Given that innovative behaviors are work-related behaviors, job characteristics (i.e., job demands and resources) will exert a significant influence on employees' innovative behavior (Li & Hsu, 2016). Drawing on the JD-R model, Huhtala and Parzefall (2007) conceptualized that job demands negatively relate to employee innovativeness through increased burnout. Indeed, job demands negatively predict innovative behavior among employees (e.g., Dediu et al., 2018; Koroglu & Ozmen, 2022).

In the context of teleworking, individuals face a range of job-related demands, such as workload pressure, professional isolation, task interdependence, and family interference with work (Jamal et al., 2021), as well as additional demands arising from the home environment (Abdel Hadi et al., 2021). Teleworkers spend a substantial amount of time at home, which increases various childcare and household activities and thus, the demands stemming from home or family are crucial for job performance (Abdel Hadi et al., 2021). Therefore, consistent with

the assumptions of the JD-R model and prior empirical research, it is plausible that telework demands would negatively predict innovative behavior among remote employees. Below, I hypothesized:

Hypothesis 1: Telework demands are negatively related to individual innovative behavior.

Telework Resources and Their Impact on Innovative Behavior

According to the JD-R model, job resources aid in lowering psychological and physiological deterioration since they reduce job strain (Demerouti et al., 2001). Thus, job resources intrinsically motivate individuals for learning and growth that further predicts greater work engagement (Bakker & Demerouti, 2007). Prior research found that job resources enhance positive outcomes for individuals at work by weakening negative outcomes (Van Steenbergen et al., 2018). For instance, the availability of high job resources increases productivity (Schaufeli & Taris, 2013) and performance (Karatepe, 2013).

In line with the arguments of the JD-R model, earlier research (e.g., Dediu et al., 2018; Kwon & Kim, 2020) suggested that job resources are critical for promoting innovative behavior among employees. Indeed, several studies have reported a positive relationship between job resources and innovative behavior. For example, autonomy is a job resource that is frequently examined to identify the impact on individual innovative behaviors. The presence of high job autonomy permits employees to think differently and find innovative solutions (Wang & Cheng, 2010). In fact, autonomy enhances the sense of responsibility, and thus provides opportunities for creativity (Garg & Dhar, 2017). Besides, Kwon and Kim (2020) indicated that various organizational, team-level, and individual-level resources can foster individual innovative behaviors. This line of argument is also consistent with the JD-R model since access to resources

enables employees to cope with stressful demands and minimize the energy depletion among employees (Bakker & Demerouti, 2017).

Teleworkers have a greater opportunity to gain resources and protect resources loss since they experience greater autonomy and control (Golden, 2006). These resources further enable teleworkers to engage in creative activities (Boell et al., 2016). However, teleworkers may lose some of the organizational resources that come from the workplace (Liu et al., 2021). Such loss of resources is considered a potential threat to the teleworkers and thus, they attempt to acquire more resources to minimize the adverse effects related to resource loss (Liu et al., 2021). Therefore, nonwork resources such as family and personal resources play a critical role besides work-related resources in the context of telework. Indeed, research suggests that job resources and personal resources are associated with each other and have long-term effects on work engagement and the ability to work (Airila et al., 2014). Therefore, drawing on the JD-R model:

Hypothesis 2: Telework resources are positively related to individual innovative behavior.

Telework Demands and Their Impact on Collaboration

Research on telework suggests a negative relationship between telework and collaboration among employees (e.g., Boell et al., 2016; Giauque et al., 2022). Telework reduces the opportunity for face-to-face interaction (Schall Jr & Chen, 2021), which is often considered a prerequisite for successful employee collaboration (Hill et al., 2009). Since teleworkers lack opportunities for social interactions with coworkers (Mulki et al., 2009; Rice-Bailey, 2014), they experience the feeling of social isolation (Bentley et al., 2016). Such a feeling of social or professional isolation is often considered a demand for teleworkers (Galanti et al., 2021; Jamal et al., 2021) that contributes to diminished work engagement among employees (Bentein et al.,

2017). This line of argument is consistent with the JD-R model since high job demands increase employee disengagement (Demerouti et al., 2001) and reduce employee motivation (Bakker & Demerouti, 2007).

Teleworkers also experience greater family interference in work, which is frequently considered a demand influencing the work outcomes (Delanoeije et al., 2019). Golden (2012) found that teleworkers who experience time and strain-based family-to-work conflict, besides work-to-family conflict, reported greater exhaustion. Such conflict is further responsible for the depletion of personal resources used to cope with anxiety related to interference (Golden, 2012). Research suggests that employees tend to withdraw from work and disengage in the face of high exhaustion (Howard & Cordes, 2010; Thanacoody et al., 2014). Thus, in the face of various demands in the context of telework, remote workers are less likely to collaborate.

The above arguments are furthermore consistent with the collaborative performance framework (Bedwell et al., 2012). As mentioned in the framework, various factors such as task, environmental, temporal, and structural characteristics at work may impede employee collaboration, which resemble telework demands. Such demands may reduce the tendency of collaboration among teleworkers due to their detrimental effects as described in prevailing literature. Consequently, based on the arguments of the JD-R model and the collaborative performance framework, it is likely that collaboration among remote employees would be affected due to increased telework demands. Therefore:

Hypothesis 3: Telework demands are negatively related to collaboration at individual-level.

Telework Resources and Their Impact on Collaboration

As mentioned previously, telework research suggests that remote workers encounter changes in various work and nonwork resources that may have a significant impact on their

work-related outcomes (e.g., Illegems & Verbeke, 2004; Park & Cho, 2020). For instance, increased autonomy and decreased interruptions are mentioned as major benefits of telework that can enhance work engagement among teleworkers (de Vries et al., 2019; Palumbo, 2020). Teleworkers also gain resources because of time savings due to no need for the commute (Tahlyan et al., 2022; Tavares, 2017), increased work-life balance (Maruyama et al., 2009), and improved quality of life (Afonso et al., 2021; Tahlyan et al., 2022), which are reported as significant benefits of telework. Consistent with the assumptions of the JD-R model, these telework resources are likely to play a critical role in enhancing employee motivation and work engagement (Bakker & Demerouti, 2007).

The resources acquired in telework are, therefore, critical for employee collaboration according to the collaborative performance framework (Bedwell et al., 2012), where the success of collaboration depends on shared resources (Jian & Jeffres, 2006). The absence of adequate resources is considered a barrier to effective collaboration (Jamal & Getz, 1995; Noble, 2004; Patel et al., 2012). Resources enable the employees to participate in joint activities to solve a problem or to achieve shared goals, and thus, collaboration is often considered the coordination of resources (Bedwell et al., 2012). Hence, resources acquired during telework are likely to increase collaboration among remote employees. Indeed, telework requires employees to invest resources into communicating and coordinating with coworkers to achieve the common work goals (Chong et al., 2020) since it reduces access to other resources due to a lack of face-to-face interaction between employees (Schall Jr & Chen, 2021).

Therefore, drawing on the JD-R model and the collaborative performance framework, I expect that resources acquired during telework are likely to impact collaboration among teleworkers in a positive manner. As such, telework resources would create a positive context for

employee collaboration since these resources act as important inputs and/or contextual variables within the collaborative performance framework. Therefore, I hypothesized:

Hypothesis 4: Telework resources are positively related to collaboration at individual-level.

Mediating Role of Collaboration

Research on innovation suggests that collaboration is the driver for innovative behaviors (George et al., 2020; Guillén & Kunze, 2019). Collaboration facilitates interaction among individuals, and thus, the exchange of perspectives generates creativity (Jiang et al., 2012). Innovative ideas for products and services are usually produced through sharing distinct ideas among individuals, which fosters creative collaboration (Chua et al., 2012). Indeed, collaboration among individuals across the organization ensures that all employees participate in innovation (Opland et al., 2022). Since collaboration leads to resource integration, it accelerates the potential for continued innovation (Melton & Hartline, 2013). Hattori and Lapidus (2004) argued that collaboration within and outside of organizations increases the potential for breakthrough innovation by building synergy and high-level trust among individuals and business units. Consequently, research on innovation suggests a positive relationship between collaboration and innovation (Levine & Prietula, 2014; Dodgson, 2014). Although the relationship between collaboration and innovation was tested at the organizational level, the relationship between collaboration and innovation at the individual level in the context of telework is yet to be explored. Hence, I hypothesized:

Hypothesis 5: Collaboration is positively related to individual innovative behavior in the context of telework.

In the context of telework, collaboration gets impacted due to physical dispersion among employees (Greer & Payne, 2014; Siebdrat et al., 2009). Teleworkers lack the opportunity for face-to-face interactions, which creates the feeling of professional isolation (Gajendran & Harrison, 2007; Greer & Payne, 2014). Therefore, the innovative behaviors of teleworkers are likely to be hindered due to fewer opportunities for collaboration at individual-level. However, as explained earlier, telework demands are anticipated to thwart the level of collaboration and so the innovative behaviors among teleworkers. In addition, telework resources are anticipated to positively impact collaboration and thus encourage innovative behaviors of teleworkers. This line of argument is also consistent with the collaborative performance framework (Bedwell et al., 2012), based on which it can be ascertained that the collaborative behaviors of teleworkers determine various collaborative outcomes, such as innovative behaviors. Taken together, I postulated the following mediating hypotheses:

Hypothesis 6: Collaboration mediates the relationship between telework demands and individual innovative behavior.

Hypothesis 7: Collaboration mediates the relationship between telework resources and individual innovative behavior.

Moderating Role of Telework Resources

The JD-R model presumes that in the presence of job resources, individuals can reduce the job demands and the associated physiological and psychological costs (Bakker & Demerouti, 2007). By definition, job resources act as buffers since high job resources prevent the occurrence of burnout caused by excessive job demands (Xanthopoulou et al., 2007). The JD-R model also posits that job resources serve as motivational factors by either intrinsically promoting personal learning and growth or extrinsically accelerating work-related goal attainment (Schaufeli &

Bakker, 2004). Consequently, individuals with high job resources are expected to have a high level of job engagement (Yuan & Tetrick, 2015). On the contrary, a lack of job resources prevents individuals from attaining goals that further cause disappointment (Bakker et al., 2003). Job resources moderate the positive relationship between job demands and burnout (Xanthopoulou et al., 2007; Hu et al., 2011), the negative relationship between job demands and work engagement (Hakanen et al., 2005), and the negative relationship between daily hindrance demands and daily work engagement and positive affect at work (Tadić et al., 2015), suggesting that job resources act as a buffer against the adverse impacts of job demands.

As previously hypothesized, the collaborative efforts between teleworkers may be affected if the demands are unmet because unsatisfied demands cause fatigue and disengagement at work according to the JD-R model (Demerouti et al., 2001). Further, collaboration literature emphasizes the importance of resources in collaboration since collaborative efforts require the sharing of resources and adequacy of resources (Kolfshoten et al., 2010; Hinno et al., 2012). Therefore, in the absence of sufficient resources, the negative relationship between telework demands and teleworkers' collaboration is expected to be over-estimated. However, the presence of high telework resources is likely to buffer the negative effects of telework demands on collaboration. This reasoning leads to:

Hypothesis 8: Telework resources moderate the relationship between telework demands and collaboration such that high resources weaken the negative relationship between telework demands and collaboration at individual-level.

Similarly, research on innovative behavior highlights the significance of resources in promoting individual innovation at work through the buffering effect. For example, Hernández et al. (2007) reported a positive relationship between job demands and individual innovation that

emerges in the presence of high job resources. In addition, Messmann et al. (2017) concluded that job resources such as psychological empowerment facilitate innovative work behavior by buffering the negative effects of job demands. Likewise, Dediu et al. (2018) found that negative working conditions get buffered in the presence of resources such as autonomy, which promotes idea implementation. Finally, in a literature review, Kwon and Kim (2020) concluded that job resources exercise buffering effects to lower stress from demands, which positively impact innovative behavior. Based on the reviewed literature, I hypothesized the below:

Hypothesis 9: Telework resources moderate the relationship between telework demands and individual innovative behavior such that high resources weaken the negative relationship between telework demands and individual innovative behavior.

Moderating Role of Telework Intensity

Building on the JD-R model and the collaborative performance framework, I previously hypothesized that while telework demands would hinder collaboration and innovative behavior, telework resources would promote these job outcomes. However, the impact of these demands and resources may be contingent upon the intensity of telework. Consistent with the definition of remote work intensity by Gajendran et al. (2024), telework intensity is determined based on the frequency or hours of time spent in teleworking, which is usually assessed in terms of hours or days per week. Telework intensity increases as employees telework for longer hours (Huo et al., 2024). Prior research examining the impact of telework intensity on individual and job outcomes suggests mixed findings. While some scholars reported that low to moderate intensity teleworking is optimum (e.g., Huo et al., 2024; Nagata et al., 2021; Urien, 2023), others suggested high intensity leads to more positive outcomes (e.g., Gajendran et al., 2024; Gajendran & Harrison, 2007; Martin & MacDonnell, 2012). For instance, Huo et al. (2024) found a

curvilinear relationship between telework intensity and work engagement, where remote employees demonstrate the highest level of work engagement at a moderate level of telework intensity. This finding is consistent with Nagata et al. (2021), who reported that low and moderate telework intensity increases work engagement among teleworkers. Such findings are not surprising given that telework produces several negative outcomes as mentioned in the literature review (e.g., increased isolation, lowered social interactions, escalated work-family conflict, amplified stress). However, the intensity of telework that should be considered as optimum may depend on remote workers' psychological distress as indicated by Matsumoto et al. (2023). According to this study, among remote employees experiencing low psychological stress, a higher level of telework intensity was associated with decreased sleep and productivity. Similarly, Urien (2023) reported that low and moderate telework positively impact employee well-being, in particular with work-life balance, job satisfaction, and self-efficacy.

In contrast, a recent meta-analysis found telework intensity to be consistently and positively associated with various job outcomes such as job satisfaction, organizational commitment, perceived organizational support, turnover intentions, and supervisor-rated performance (Gajendran et al., 2024). Such a finding is consistent with recent research where scholars reported that frequency of telework positively influences self-reported productivity (Labrado-Antolín et al., 2024) and decreases psychological and physical stress among remote workers (Shimura et al., 2021). Given that intensified teleworking leads to improved perception of control, flexibility, and discretion, teleworkers experience greater autonomy (Basile & Beauregard, 2016; Gajendran et al., 2015), which yields positive job outcomes. Indeed, numerous studies highlighted the significance of autonomy as a crucial job resource that buffers the harmful effects of demands at work (e.g., Bakker et al., 2005; Xanthopoulou et al., 2007;

Yucel, 2019). Consequently, although teleworking leads to several negative outcomes, a high level of telework intensity is likely to improve job outcomes such as collaboration and innovative behavior.

Moreover, employees who telework extensively are likely to have greater experience with remote collaboration tools and methods, which is less likely to impede innovative behavior. However, remote employees with low telework intensity tend to switch between remote collaboration and in-person collaboration frequently, which is likely to disrupt effective collaboration. Drawing on the JD-R model, I therefore argue that the negative relationship of telework demands with collaboration is moderated by telework intensity, where such relationships weaken in the presence of high telework intensity. However, high telework intensity strengthens the positive relationship between telework resources and collaboration at individual-level.

Hypothesis 10: Telework intensity moderates the relationship between telework demands and collaboration at individual-level, such that high telework intensity weakens the negative relationship between telework demands and collaboration.

Hypothesis 11: Telework intensity moderates the relationship between telework resources and collaboration at individual-level such that high telework intensity strengthens the positive relationship between telework resources and collaboration.

Given that innovative behavior is contingent on collaboration (e.g., Guillén & Kunze, 2019; Kmiecik, 2021; Levine & Prietula, 2014), I expect telework intensity to have a similar moderating effect on the telework demands and innovative behavior relationship and the telework resources and innovative behavior relationship. Thus, I hypothesize the following:

Hypothesis 12: Telework intensity moderates the relationship between telework demands and individual innovative behavior, such that high telework intensity weakens the negative relationship between telework demands and individual innovative behavior.

Hypothesis 13: Telework intensity moderates the relationship between telework resources and individual innovative behavior, such that high telework intensity strengthens the positive relationship between telework resources and individual innovative behavior.

Moderated Mediation Model

The Role of Telework Intensity

According to the JD-R model's health-impairment process, telework demands are expected to hinder remote employees' ability to engage in collaboration, which is the critical determinant of innovative behavior. Individuals often fail to share knowledge and communicate openly due to reduced collaboration, thereby impeding innovative behavior among employees (e.g., Boger, 2011; Jin & Peng, 2024). However, as hypothesized earlier, the extent to which telework demands negatively impacts collaboration and innovative behavior which depends on telework intensity. At low levels of telework intensity, remote employees lack the ability to collaborate effectively as they need to frequently switch between remote and in-person work arrangements. Such switching is characterized by disruptions and instability that may undermine the innovative behavior among remote employees. In contrast, high telework intensity may allow for stable adaptation of remote collaboration tools, which is expected to buffer the detrimental effects of telework demands on innovative behavior.

Nonetheless, drawing on the motivational process of the JD-R model, I hypothesized previously that telework resources promote remote employees' collaboration, and thus can advance innovative behavior. However, as explained earlier, telework intensity is expected to

moderate the positive relationship between telework resources and collaboration, and also the relationship between telework resources and innovative behavior. At a high level of telework intensity, the positive relationship between telework resources and collaboration is expected to become stronger compared to the low level of telework intensity. Consistent with previous empirical findings (e.g., Carlson et al., 2024; Perry et al., 2023), remote workers tend to report more positive outcomes due to a boost in resources with an increased level of telework intensity. Therefore, high telework intensity is expected to strengthen the positive indirect relationship between telework resources and innovative behavior through collaboration. Accordingly, I hypothesize a moderated mediation model wherein telework demands negatively predict innovative behavior through reduced collaboration, and this indirect effect is amplified under conditions of low telework intensity. Conversely, telework resources positively predict innovative behavior through improved collaboration, and such an indirect effect is reinforced in the presence of high telework intensity.

Hypothesis 14: The indirect effect of telework demands on individual innovative behavior through collaboration at individual-level is moderated by telework intensity, such that the indirect effect is stronger at low levels of telework intensity.

Hypothesis 15: The indirect effect of telework resources on individual innovative behavior through collaboration at individual-level is moderated by telework intensity, such that the indirect effect is stronger at high levels of telework intensity.

Study 2 Methodology

Data Collection Procedure

A total of 435 participants were recruited by Prolific, who participated in a multi-wave survey involving data collection at three different points in time. The eligibility of the

participants was determined using the following criteria: 1) individuals must work remotely, or a combination of sometimes from a central place of work and sometimes remotely, and 2) individuals work and reside in Canada and the USA. The first point of data collection (Time 1) involved measuring the independent variables: telework demands and telework resources, and the demographic and control variables. Participants completed the online survey developed using Qualtrics. The second point of data collection (Time 2) involved assessing the mediating variable, collaboration at individual-level, and the moderating variable, leader-member exchange. In this round, 408 participants completed the survey with a retention rate of 93.8%. Lastly, during the third point of data collection (Time 3), the dependent variable, individual innovative behavior was measured. A total of 389 participants completed the survey with a retention rate of 89.4% from the first round of data collection. Thus, in total 46 participants were eliminated due to non-participation. The sample size meets the requirements of conducting analysis with bias-corrected bootstrapping with 0.8 statistical power according to Fritz and MacKinnon (2007).

Participants

Among the 389 participants, 366 were high-intensity teleworkers who work remotely for 20 hours or more per week, and the rest 23 were low-intensity teleworkers who work remotely less than 20 hours per week. Participants varied in terms of telework experience, which was categorized into less than 1 year (0.8%), 1 year or more and less than 3 years (16.7%), 3 years or more and less than 5 years (29.5%), and 5 years or more (53%). More than half of the participants were female (59.4%), and the rest consisted of male (40.1%) and others (i.e., agender and nonbinary; 0.5%). The mean age was 41.64 years ($SD = 11.41$), ranging from 20 to 75 years. Most of the participants resided in the USA (81.2%) and the rest were from Canada

(18.8%). Participants were from diverse educational backgrounds: 15.2% had completed high school, 20.6% held a diploma or professional certificate, 46.5% possessed a bachelor's degree, 15.9% had obtained a master's degree, and 1.8% either held or were pursuing a doctoral degree. Participants worked in various industries including business, finance, natural and applied science, education, sales and services, health, art and culture, trades and transport, natural resources and agriculture, and occupations in manufacturing and utilities. Regarding occupational roles, 40.6% of participants were employed in managerial positions, while the remaining 59.4% occupied non-managerial roles. In terms of relationship status, 43.2% of participants were married, 20.1% reported being in a partnership, 12.9% were divorced or separated, and 23.9% were single and had never been married. At the time of data collection, 44% of the participants reported having children.

Measurement

Independent Variables. *Telework demands* were assessed with 10 items ($\alpha = 0.952$) finalized in study 1. Items were scored on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Likewise, *telework resources* were assessed with 5 items ($\alpha = 0.888$) finalized in the previous step on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Dependent Variable. *Individual innovative behavior* was assessed with a 9-item ($\alpha = 0.913$) innovative work behavior scale by Janssen (2000) which includes three dimensions of innovation: idea generation (three items; e.g., 'I generate original solutions for problems'), idea promotion (three items; e.g., 'I acquire approval for innovative ideas') and idea realization (three items; 'I evaluate the utility of innovative ideas'). These items were also scored on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Mediating Variable. *Collaboration at individual-level* was measured through a 6-item scale ($\alpha = 0.954$) adapted from Li and Calantone (1998) and Ordanini and Parasuraman (2011). The original scale was modified to reflect the extent to which remote employees are engaged in collaboration in terms of new products, services, or process innovation. A sample item is ‘I actively cooperate with other employees in generating ideas for new products/ services/ processes’. Items were rated on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Moderating Variables. *Telework intensity* was measured on a continuous scale, where the participants entered their hours of telework or remote work per week.

Control Variables. In all analyses, I entered the following age, gender (male, female, others), and LMX as control variables. Research on innovative behavior found gender differences in innovative behavior at the workplace (see Fatemi et al., 2022; Pons et al., 2016). Similarly, age has been frequently studied in relation to innovative behavior (e.g., Guillén & Kunze, 2019; Ng & Feldman, 2013a; 2013b). Findings emerged in past research also suggest that LMX is a significant determinant of employee innovative behavior (e.g., Carnevale et al., 2017; Garg & Dhar, 2017; Wang et al., 2015). Therefore, these variables are included in the study as control variables. LMX was assessed using the 12-item scale ($\alpha = 0.955$) developed by Liden and Maslyn (1998) consisting of four dimensions: affect (three items; e.g., ‘My supervisor is a lot of fun to work with’), loyalty (three items; e.g., ‘My supervisor would come to my defense if I were "attacked" by others’), contribution (three items; e.g., ‘I do not mind working my hardest for my supervisor’), and professional respect (three items; e.g., ‘I admire my supervisor's professional skills’). Similar to other variables, these items were rated on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Common Method Variances

To control the influence of common method variance, I applied both procedural and statistical remedies based on the recommendations by Podsakoff et al. (2003). Regarding the procedural remedies, I included reverse-coded items in the questionnaire survey. Additionally, I used established scales only, explained the procedures to our participants, and guaranteed anonymity. The construct names were also hidden from the respondents. Furthermore, the study variables were separated to collect data at different points in time. As mentioned earlier, Time 1 involved data collection for independent variables, demographic information, and control variables. Data for the mediating variable were collected during Time 2, and dependent variable data were collected during Time 3. With respect to statistical procedures, the correlation matrix procedure and Harman's Single Factor test were conducted, which are elaborated in the analysis section.

Data Analysis

Data was analyzed using IBM SPSS 29 and AMOS 29. After screening the data carefully, it was estimated that about 99% of the observed values were complete, indicating a very small number of missing observations. This small number of missing values was treated using the unconditional mean imputation method, a commonly used method of missing data replacement (Jadhav et al., 2019). The method of mean imputation replaces each missing value in a numeric variable with the overall mean of that variable (Durrant, 2009). Although mean imputation has certain limitations, it can be particularly useful for a small number of missing observations. Next, outliers in the dataset were examined using Cook's distance, a common statistical test based on regression analysis (Walfish, 2006), and no significant outliers were found. Further, the Q-Q plot for standardized residuals demonstrated normality (see Figure 15).

Figure 15

Descriptive Statistics, Reliability, and Validity. Table 24 shows the descriptive statistics, intercorrelations, and the reliability and validity results of the constructs included in the analysis. As seen from this table, the values of both Cronbach's alpha and composite reliability were greater than 0.70, the acceptable cut-off level (Hair et al., 2010). The AVE values for all constructs in the current study exceeded the 0.5 threshold suggested by Fornell and Larcker (1981), demonstrating convergent validity. Next, discriminant validity was confirmed by reviewing the Heterotrait-Monotrait ratio of correlations (HTMT). The HTMT values were less than 0.90 for all the constructs, and thus demonstrated discriminant validity (Henseler et al., 2015). In addition to HTMT, the Fornell-Larcker criterion confirmed discriminant validity as the square root of each construct's AVE was greater than the correlations with other latent constructs (Fornell & Larcker, 1981).

Table 24

Several relationships are worth noting. First, telework demands were negatively and significantly related to both collaboration and individual innovative behavior. Second, unexpectedly, the relationships between telework resources and all other variables were nonsignificant. Third, collaboration was positively and significantly related to individual innovative behavior. Additionally, leader-member exchange demonstrated a positive and significant relationship with both collaboration and individual innovative behavior. Also, it is noteworthy to mention that telework demands were negatively and significantly related to telework resources.

Confirmatory Factor Analysis. Confirmatory factor analysis with telework demands, telework resources, collaboration, and individual innovative behavior showed that this four-factor model fits the data well according to the recommendations by Hair et al. (2010), $\chi^2(399) = 1147$, $p < 0.001$; root mean square error of approximation (RMSEA) = 0.069; comparative fit index (CFI) = 0.921; the Tucker-Lewis coefficient (TLI) = 0.914; standardized root mean square residual (SRMR) = 0.041 (see Table 25). I compared this hypothesized four-factor model with likely alternative models using the chi-squared difference test (Bentler & Bonnett, 1980). For example, because collaboration and individual innovative behavior items deal with new ideas, it is possible to combine the collaboration and individual innovative behavior items in a single factor. Although the three-factor model was significant, the model fit estimates were not better than the four-factor model. Next, I ran a two-factor model by combining the telework demands and telework resources into a single factor. However, the model fit estimates were better for the four-factor model. Finally, the one-factor model was tested by combining all constructs, which led to poor model fit. Therefore, the four-factor model representing the hypothesized structure offered the best fit compared to alternative models.

Table 25

Statistical Remedies for Common Method Variance. To control the common method variance, correlation values between variables were examined, and correlation among all variables was found to be less than 0.90. Thus, common method variance was not present in this research according to the recommendation by Bagozzi et al. (1991). Next, Harman's Single Factor test was conducted on the variables of interest to examine the presence of common method variance. Harman's single-factor analysis is performed after data collection to assess

whether a single factor accounts for the majority of variance in the dataset (Howard et al., 2024). A principal component analysis (PCA) was conducted in which all variables (i.e., telework demands, telework resources, collaboration, and individual innovative behavior) were loaded onto a single latent factor. The single factor explained 29.72 percent of the variance, which is well below the 50% cut-off level suggested by Podsakoff et al. (2003). Thus, no evidence of common method variance was found in the data.

Study 2 Results and Findings

Test of Direct Relationships

The relationships hypothesized in Hypotheses 1 to 5 were tested using regression analysis in SPSS 29. All analyses in the study were conducted with and without control variables. Gender and age were included as control variables in the regression to account for shared variance between the independent variables and control variables. However, analyses with and without control variables yielded similar results, and thus, analyses without control variables are reported unless including control variables yielded different outcomes.

Hypothesis 1 proposed that telework demands are directly related to individual innovative behavior, such that remote employees' innovative behavior is likely to decrease with heightened telework demands. Linear regression analysis indicated a statistically significant and negative relationship between telework demands and individual innovative behavior ($b = -0.148$, $p < 0.01$). Therefore, Hypothesis 1 was supported. In contrast, Hypothesis 2 was not supported as telework resources were not significant predictors of individual innovative behavior ($b = -0.013$, n.s.).

Next, telework demands were found negatively and significantly related to collaboration at individual-level ($b = -0.120$, $p < 0.05$). Thus, Hypothesis 3 was supported. However, telework

resources did not significantly predict collaboration at individual-level ($b = -0.039$, n.s.), which did not support Hypothesis 4.

In addition, evidence in favor of Hypothesis 5 was found as there was a positive and significant direct relationship between collaboration and individual innovative behavior ($b = 0.570$, $p < 0.01$). Table 26 shows analysis of Hypotheses 1 to 5 based on the regression results.

Table 26

Test of Mediating Relationships

I adopted the PROCESS macro in SPSS 29 to test the mediating relationships proposed in Hypotheses 6 and 7. The hypotheses testing implemented PROCESS Model 4 (Hayes, 2012) to assess the mediation effect of collaboration at individual-level on the relationships of telework demands to individual innovative behavior and telework resources to individual innovative behavior. I used 5,000 bootstrap samples with 95% bias-corrected confidence intervals based on the recommendation of Preacher and Hayes (2004). Hypothesis 6 proposed that collaboration mediates the relationship between telework demands and individual innovative behavior. As Table 27 shows, the total effect of telework demands on individual innovative behavior was significant ($b = -0.116$, $p < 0.05$), indicating that higher telework demands are associated with lower innovative behavior. The direct effect remained significant ($b = -0.068$, $p < 0.05$) when collaboration was introduced as a mediator. However, the indirect effect through collaboration was negative and not significant, given that the confidence interval touches zero ($b = -0.049$, 95% CI [-0.098, 0.000]). Taken together, there is no evidence of mediation, and it can be concluded that collaboration does not mediate the relationship between telework demands and individual innovative behavior and Hypothesis 6 was not supported.

Table 27

However, the mediation requirements were not met for the indirect relationship between telework resources and individual innovative behavior via collaboration. Both the indirect effect ($b = -0.002$, 95% CI $[-0.084, 0.076]$; confidence interval includes zero) and direct effect ($b = 0.045$, n.s.) were not significant when collaboration was included as a mediator (see Table 28). Thus, Hypothesis 7 was not supported. The analyses that included control variables produced similar results. Therefore, the reported findings were based on analyses conducted without control variables.

Table 28

Test of Moderated Relationships

Next, I adopted PROCESS Model 1 (Hayes, 2012) to test the moderation hypotheses ranging from Hypotheses 8 to 14. The results of the moderation analyses, along with main and interaction effects, are presented in Table 29. Hypothesis 8 proposed telework resources to moderate the relationship between telework demands and collaboration, such that the negative relation between telework demands and collaboration would become weaker in the presence of high telework resources. However, according to the results of the moderation analysis, telework resources did not moderate the relationship between telework demands and collaboration at individual-level, given that the interaction effect was nonsignificant ($p = 0.456$). Therefore, Hypothesis 8 was not supported.

Table 29

Next, Hypothesis 9 proposed telework resources to moderate the relationship between telework demands and individual innovative behavior, such that the negative relation between telework demands and individual innovative behavior would become weaker in the presence of high telework resources. The results of the moderation analysis demonstrated a marginally significant interaction effect ($p = 0.062$), suggesting the potential moderating effect of telework resources (see Table 29). However, the conditional effect analysis showed that at high levels of telework resources, the negative relationship between telework demands and individual innovative behavior was stronger and more significant ($b = -0.171, p = 0.001$) compared to the mean level of telework resources ($b = -0.122, p = 0.004$) and low levels of telework resources ($b = -0.048, p = 0.400$). This finding was opposite to the assumption made in Hypothesis 9, such that telework resources strengthen the negative relationship between telework demands and individual innovative behavior instead of weakening this relationship. Thus, Hypothesis 9 was not supported.

Hypothesis 10 proposed that telework intensity moderates the relationship between telework demands and collaboration, such that the negative relation between telework demands and collaboration at individual-level would become weaker in the presence of high telework intensity. However, the results of the moderation analysis demonstrated no support in favor of Hypothesis 10. The interaction effect between telework intensity and telework demands was not significant ($b = 0.001, p = 0.868$), indicating that telework intensity did not moderate the relationship between telework demands and collaboration at individual-level. Nevertheless, telework intensity had a significant positive effect on collaboration ($b = 0.024, p < 0.001$), suggesting increased collaboration in the presence of longer hours of teleworking (see Table 29).

Next, the moderation analysis revealed support in favor of Hypothesis 11, proposing that telework intensity moderates the relationship between telework resources and collaboration such that the positive relationship between telework resources and collaboration strengthens in the presence of high telework intensity. The interaction effect between telework intensity and telework resources was statistically significant ($b = 0.019, p = 0.024$), suggesting that the positive influence of telework resources on collaboration increased as telework intensity increased (see Table 29). At low (25 hours) or mean (35.34 hours) levels of telework intensity, telework resources did not significantly impact collaboration. However, at high (45.68 hours) levels of telework intensity, the relationship between telework resources and collaboration became significantly positive ($b = 0.642, p = 0.029$). Thus, Hypothesis 11 was supported as evidence of a moderation effect was found.

In contrast, telework intensity did not moderate the relationship between telework demands and individual innovative behavior (Hypothesis 12) and the relationship between telework resources and individual innovative behavior (Hypothesis 13). Both the interaction effects between telework intensity and telework demands ($b = -0.001, p = 0.903$) and telework intensity and telework resources ($b = 0.009, p = 0.098$) were not significant. Therefore, both Hypotheses 12 and 13 were not supported. However, it is noteworthy to mention that telework intensity positively and significantly influenced individual innovative behavior ($b = 0.014, p < 0.001$).

Test of Moderated Mediation Effects

The PROCESS Model 8 (Hayes, 2012) was adopted to test Hypotheses 14 and 15 proposing the moderating effect of telework intensity on the mediated relationship between telework demands, telework resources, collaboration at individual-level, and individual

innovative behavior. The results of moderated mediation analysis revealed that although the indirect effect of telework demands on individual innovative behavior through collaboration was significant (consistent with Hypothesis 5 result), the indirect effect was not contingent on the level of telework intensity ($b = -0.0009, p = 0.800$) (see Table 30). Telework demands was not a significant predictor of collaboration at individual-level ($b = -0.095, p = 0.092$), however, telework intensity significantly predicted higher levels of collaboration ($b = 0.023, p < 0.001$). The interaction between telework demands and telework intensity was non-significant ($b = 0.0009, p = 0.868$), suggesting that telework intensity did not moderate the relationship between telework demands and collaboration (consistent with Hypothesis 10 result). In addition, the index of moderated mediation was not significant. Therefore, Hypothesis 14 was not supported.

Table 30

In contrast, marginal support was found in favor of Hypothesis 15, proposing that the indirect effect of telework resources on individual innovative behavior via collaboration was moderated by telework intensity. The results revealed that telework intensity was a significant positive predictor of collaboration ($b = 0.026, p < 0.001$) and the interaction effect between telework resources and telework intensity significantly predicted collaboration ($b = 0.018, p = 0.024$) (see Table 31) as well (consistent with Hypothesis 11 result). At high telework intensity, telework resources were positively related to collaboration. However, at low telework intensity, telework resources had little to no effect. Bootstrap analysis demonstrated that the conditional indirect effects of telework resources on individual innovative behavior via collaboration were negative and nonsignificant at low ($b = -0.080, p = 0.051$) and mean levels ($b = -0.004, p = 0.051$) of telework intensity. However, the indirect relationship was positively and marginally

significant ($b = 0.073, p = 0.057$) at a high level of telework intensity. The index of moderated mediation was statistically significant but small, suggesting that the indirect effect of telework resources on individual innovative behavior through collaboration is dependent on higher telework intensity. Given the small effect size of the moderated mediation, Hypothesis 15 was marginally supported.

Table 31

Summary of Findings

A summary of the hypothesis test results is presented in Table 32. Overall, telework demands negatively predicted both collaboration and innovative behavior at individual-level. However, telework resources did not positively influence collaboration and innovative behavior as expected. Collaboration was an important predictor of innovative behavior at individual-level. However, collaboration did not mediate the relationship between telework demands and innovative behavior. Similarly, the relationship between telework resources and innovative behavior was not mediated by collaboration. Telework intensity moderated the relationship between telework resources and collaboration, but not the relationship between telework demands and collaboration. Marginal evidence was found for moderated mediation, suggesting telework intensity moderates the indirect relationship between telework resources and individual innovative behavior through collaboration at high telework intensity.

Table 32

Study 2 Discussion

The purpose of this quantitative study was to test the hypothesized research model aimed to examine the influence of telework demands and telework resources on individual innovative behavior through the mediation of collaboration. While data analyses involving various PROCESS Macro models (Hayes, 2012) demonstrated support for some hypotheses, others were not supported by the analysis of the current study. A significant finding of the study is the negative relationship between telework demands and collaboration and between telework demands and individual innovative behavior. Given that demands are exhausting (Demerouti & Bakker, 2011) and detrimental to individual performance (Bakker et al., 2004), such findings of the current study are consistent with the assumptions of the JD-R model (Demerouti et al., 2001). Such findings are also consistent with the past telework research, which argued that telework limits the employees' capability for successful collaboration (e.g., Waizenegger et al., 2020; Yang et al., 2022). Further, this is in line with the study findings that claimed innovative work behaviors of teleworkers depend on various demands related to telework, such as work-home conflict and social isolation (Garlatti Costa et al., 2023) and the voluntary or involuntary nature of telework (Huo et al., 2023).

In contrast, in the current study, telework resources failed to positively predict collaboration and innovative behavior of employees. Such findings do not support the motivational process argument of the JD-R model, where resources are expected to play a motivational role and promote positive job outcomes (Bakker & Demerouti, 2017). However, resources may not always be advantageous as anticipated in the literature (van Veldhoven et al., 2017). Indeed, resources may sometimes adversely impact on the well-being and performance of individuals (van Veldhoven et al., 2020). Such notion can be explained with the Vitamin model

by Warr (1987), where he noted that after reaching to the optimal level, the increase in job resources can be detrimental for well-being and performance, leading to “toxic effects” instead of beneficial effects. According to the present study, teleworkers reported various resources such as autonomy, flexibility, and time. These resources may have acted as vitamins in our body such that the positive outcomes increase up to the inflection point. Beyond this point, further increase in resources may have failed to create positive impacts. For example, past research treated autonomy as a “too-much-of-a-good-thing” for well-being and performance (e.g., Langfred, 2004; Stiglbauer & Kovacs, 2018). Rudolph and Zacher (2025) recently highlighted the paradox of autonomy in the context of work from home with the Vitamin model (Warr, 1987). The nonlinear relationship of autonomy with various individual and job outcomes was frequently discussed in previously published studies as well (e.g., Clausen et al., 2022; Dettmers & Bredehoeft, 2020). Therefore, resources in the context of telework may serve as “too-much-of-a-good-thing” for the individuals, which failed to positively contribute to collaboration and innovative behavior.

At the same time, telework resources did not buffer the negative effects of telework demands in the current study. This is aligned with earlier scholarly contributions that highlighted the exacerbating negative impact of high resources (e.g., Xu & Payne, 2020). A possible reason for such findings frequently mentioned in prevailing research is that the usefulness of resources depends on their alignment with demands (Hausser et al., 2010; Van der Doef & Maes, 1999). This suggests that if resources do not match the demands, then they fail to effectively buffer the adverse impacts of demands. In the current study, the resources identified by the teleworkers were mostly related to nonwork domain such as personal and family aspects. However, the demands were relevant to job including lack of collaboration opportunities, difficulties in

communication, and feelings of distantness and disconnect from the organization. Therefore, the resources may not successfully buffer the negative effects of demands in the current study due to a possible lack of alignment between demands and resources.

Notably, when demands exceed manageable thresholds, the resources may become ineffective. Particularly, in the context of teleworking, although employees experience greater autonomy and flexibility, boundaries between work and nonwork become blurred, which increases personal demands beside the job demands (Demerouti & Bakker, 2023). Therefore, in absence of appropriate and adequate resources to deal with the demands, teleworkers may not experience positive outcomes even in the presence of resources. Another possible reason identified in research is individual differences in perception of demands and resources (Xu & Payne, 2020). Because individuals differ in their personal contexts, a resource that is helpful for some may be far less effective for others. Thus, the absence of a positive linear relationship between telework resources and outcomes, as well as the lack of a buffering effect can be explained by the Vitamin model and by the mismatches between demands and resources.

Although telework resources did not directly predict the outcomes in the current study, the influence of resources was found to be contingent upon telework intensity. Telework intensity moderated the relationship between telework resources and collaboration such that the positive influence of telework resources on collaboration increased with the rise in telework intensity. While telework resources did not significantly influence collaboration at low or mean level of telework intensity, the relationship became significantly positive at high level of telework intensity. This finding suggests that teleworking for longer hours is required to enjoy the benefits of telework resources in terms of collaboration. This finding related to telework intensity is aligned with previous research that found high telework intensity as advantageous

(e.g., Gajendran et al., 2014; Gajendran et al., 2024; Gajendran & Harrison, 2007). Indeed, the current study found that telework intensity is positively related to both collaboration and innovative behavior at individual-level.

It is also noteworthy to mention that collaboration was found to be positively related to innovative behavior in relation to teleworking in the current study. Although prior empirical work did not examine this relationship in the context of telework, there is a vast literature that argued the significance of collaboration for successful innovation (e.g., Kobarg et al., 2019; Tsai, 2009). However, the current finding is based on the individual-level analysis, which is a unique approach of analysis compared to preceding research focused on either organization-level (Faems et al., 2005; Levine & Prietula, 2014), department-level (Guillén & Kunze, 2019; Lee, 2020), or team-level (Gressgård, 2011; Van der Voet & Steijn, 2021) analysis.

CHAPTER FIVE: DISCUSSION

General Discussion

Many business leaders and managers have repeatedly criticized telework due to lack of collaboration and innovative behavior (e.g., Curtis, 2025; Gibbs et al., 2024; Gibson et al., 2023; Yang et al., 2022). Despite calls for empirical investigations exploring the impact of telework on collaboration and innovation (Kniffin et al., 2021), progress in this direction has been slow. Research has predominantly examined the impact of telework frequency or intensity on various outcome variables (e.g., Campo et al., 2021; Gajendran & Harrison, 2007). This approach did not adequately address the debate about telework effectiveness as the nonwork domain was mostly ignored. Therefore, drawing on the JD-R model, I defined two new constructs: telework demands and telework resources to ensure inclusion of both work and nonwork domains. In Study 1, I defined, developed, and validated measurement scales for telework demands and telework resources. The scales were validated and finalized with 10 items for telework demands and 5 items for telework resources. In Study 2, these newly developed scales were used to examine the impact of telework demands and resources on individual innovative behavior through the mediation of collaboration. Findings confirmed that telework demands hinder both collaboration and innovative behavior at the individual level. Telework resources appeared as “too-much-of-a-good-thing” and were not proven as beneficial. Consequently, the resources failed to demonstrate positive impact on collaboration and innovative behavior including the buffering effect on demands. However, resources became valuable for collaboration and innovative behavior in the presence of high telework intensity. In doing so, both Study 1 and 2 make valuable contributions to theory and research. This discussion chapter explains key theoretical contributions followed

by practical implications. Study limitations, strengths, and future research directions are also outlined.

Theoretical Contributions

Telework research has extensively examined the impact of telework on various individual and organizational outcomes, producing mixed results. As telework investigations continue in the post-pandemic era, the debate persists with conflicting outcomes in favor and against telework. Therefore, drawing on the JD-R model, the current dissertation conducted an empirical investigation exploring the impact of telework on innovative behavior of employees. While the findings of the research did not support all hypotheses, the present dissertation makes important contributions to both theory and practice.

Advancing Telework Research

First, the present study advances telework theory and research by introducing two new constructs: telework demands and telework resources. Although prior scholarly work examined various job demands and resources in the context of telework (e.g., Auton & Sturman, 2024; Beekman et al., 2025; Peiró et al., 2024; Sardeshmukh et al., 2012), studies have failed to capture the nonwork domain besides work domain. As the existing body of knowledge suggests that teleworkers experience several demands in nonwork domains (see Allen et al., 2021; Duxbury & Halinski, 2014; Elbaz et al., 2023), it is essential to include nonwork demands while examining the impact of telework using the JD-R model. Likewise, nonwork resources (i.e., personal resources, family resources) are critical for teleworkers to successfully perform their jobs, mitigate the adverse impacts of job demands, and striking work-nonwork balance (see Carlson et al., 2024; Demerouti & Bakker, 2023; Landolfi et al., 2021). Therefore, I defined telework

demands and telework resources as holistic constructs to capture the characteristics of both work and nonwork domains.

Further, I developed and validated measurement scales for telework demands and telework resources, which revealed telework as a multidimensional construct. To date, telework has been treated as a single-item measure. Telework was measured either with telework intensity, number of telework hours, or telework adoption using a dichotomic scale (e.g., Gajendran & Harrison 2007; Martínez Sánchez et al., 2007). Thus, in absence of a multi-item measurement scale, the current research offers a unique opportunity for scholars to capture all the relevant factors in telework by developing the measurement scales for telework demands and telework resources.

Resolving Debate about Telework Effectiveness

While research on telework provides empirical evidence in favor of innovation, businesses failed to realize the positive role of telework in promoting innovation, which fueled the debate about the effectiveness of telework. The current research helps resolve this debate about telework effectiveness by providing insights into how and why telework influences innovative behavior of employees. Namely, I found that telework demands negatively impact individual innovative behavior. Therefore, the current research provides clarity around the innovation debate of telework by demonstrating that telework is detrimental for innovative behavior when individuals experience high telework demands. Similarly, telework demands are found to be responsible for poor collaboration at individual-level, which demonstrates the significance of telework demands in shaping collaboration and innovation.

Extending the JD-R Model

The current research further advances the JD-R model (Demerouti et al., 2001) by increasing its explanatory power. By defining and operationalizing telework demands and telework resources, the current research extends the JD-R model in the context of telework beyond traditional co-located work environments. As described earlier, to date research has identified job demands and resources in the context of telework, which mostly did not include nonwork-related demands and resources. Recently, Demerouti and Bakker (2023) have urged researchers to consider the complex interplay between work (i.e., job and organizational) and nonwork (i.e., home and personal) demands and resources to better understand the context of remote work. Therefore, integrating work and nonwork demands and resources advances our understanding of the health impairment and motivational processes outlined in the JD-R model. This extended theory suggests teleworkers face several nonwork demands besides work demands, which can negatively impact the individual and organizational outcomes through the health impairment mechanism.

Clarifying the Role of Resources

In addition, this dissertation offers some clarification about the role of resources in the context of telework. Given that telework resources failed to positively predict the study outcomes in the current research, the predictive power of resources became questionable once again as mentioned in previous research (van Veldhoven et al., 2017; Xu & Payne, 2020). Moreover, the findings of current research suggest that resources do not buffer the adverse effects of demands in the context of telework. Although such findings contradict the proposition of job resources in the JD-R model, this offers a novel insight into the role of resources in the context of telework.

The current research thus suggests that resources may not always be beneficial for the teleworkers if they become overwhelming or if they fail to align with demands.

Advancing Collaboration Literature

The current research contributes to advancing collaboration research at individual-level. While research has predominantly focused on team collaboration and organizational-level collaboration (Faems et al., 2005; Gressgård, 2011; Van der Voet & Steijn, 2021), individual-level collaboration has remained a less explored area of research. Thus, the present dissertation addresses this research gap by defining and including collaboration as a mediating variable. By incorporating collaboration into the model, the study explains the underlying mechanism through which telework influences employee innovative behavior, highlighting that successful innovation is conditional to collaboration among individuals.

Advancing Innovative Behavior Literature

The present dissertation makes an important contribution to the innovative behavior literature by responding to the call for research by Kniffin et al. (2021) to explore the impact of telework on innovation. The analysis of the current research confirmed that innovative behavior of teleworkers is dependent on telework demands. Indeed, innovative behavior is hindered in the presence of high telework demands. In addition, telework resources do not help in lowering the negative impacts caused by the demands. However, telework intensity plays a critical role in determining the benefits of resources such that resources tend to have beneficial effects only when employees telework for longer hours. Taken together, it seems reasonable to conclude that innovative behavior in the context of telework depends on telework demands and telework intensity. Although these findings do not provide insights into organizational-level innovation, they offer better understanding of innovation at individual-level. In particular, these findings are

useful to comprehend the factors contributing to employee innovative behavior in the context of telework.

Practical Implications

Innovation is an essential driving force for productivity and growth that builds the foundation for sustainable competitive advantages for businesses (Crespi & Zuniga, 2012). Organizational competitiveness depends on innovativeness to survive in the global economic crisis (Barba-Aragón & Jiménez-Jiménez, 2020). Although telework continues beyond the pandemic, the debate around the effectiveness of telework lingers and organizations are mandating return-to-office due to concerns about collaboration, productivity, and innovation (Curtis, 2025; Gibson et al., 2023). Therefore, the results of this dissertation can be helpful for HR managers and line managers in creating a collaborative and innovative work environment in the context of telework.

Fostering Innovative Behavior among Teleworkers

Employee innovative behavior is the key determinant of organizational performance (Jiang et al., 2023), and thus, organizations should encourage employees to demonstrate innovative behaviors (Agarwal, 2014). However, as the current research explored, innovative behaviors of employees are contingent on telework demands such as innovative behavior lowers in the presence of high telework demands. Therefore, both HR managers and line managers should focus on interventions that can control this detrimental impact of telework on innovative behavior. In particular, it is important for managers to identify telework specific demands and resources followed by interventions for effective demand and resource management, which are explained in the following sections.

Fostering Collaboration among Teleworkers

The current dissertation also discovered that telework demands inhibit collaboration among teleworkers, which further leads to deterioration of innovative behavior. Since collaboration at the individual-level is the key to innovation (Santos-Vijande et al., 2016; Wang et al., 2023), managers should take actions that facilitate collaboration by lowering telework demands. In particular, employees experience difficulties in terms of communication and maintenance of relationships, which may affect collaborative capabilities and team dynamics. Lack of face-to-face interactions in telework often impedes effective communication, which consequently deters collaboration (Greer & Payne, 2014). Therefore, recognition of various demands experienced by employees in telework, and taking related actions to control the adverse impact of demands and promoting collaboration is critical for innovation performance. The following sections elaborate on implications related to telework demands and resources.

Recognizing Telework Demands and Resources

The results of the current study show that teleworkers experience several demands and resources while working remotely. As discussed earlier, past research on demands and resources suggest that while demands are detrimental for employee performance and well-being, resources buffer the adverse effects of demands (Bakker et al., 2023; Bakker & Demerouti, 2017). Therefore, both the HR managers and line managers should focus on identifying the demands and resources that individuals experience during telework by using the newly developed measurement scales for telework demands and telework resources in this dissertation. Once managers assess the demands and resources, they should initiate various strategic and structural measures to improve the working conditions and ensure a better quality of life of the employees (Bakker & Demerouti, 2018).

Demand Management for Teleworkers

Given that demands negatively impact collaboration and innovative behavior, it is crucial for the managers to take initiatives to curtail the negative impacts of telework demands. Below are few suggestions that the managers may consider helping the employees with better demand management.

Job Redesign. Job redesign interventions can reduce the demands in jobs by significantly improving communication and adaptability (Knight & Parker, 2021). Thus, it may be useful for teleworkers if managers can amend some of the components of the job to improve communication and collaboration. For example, changing workflows and methods can contribute to improved communication among teleworkers as poor workflow hinders communication (Cain & Haque, 2008). Further, the virtual work environment is distinct from traditional work design, which highlights the significance of job characteristics in virtual job design (Gibson et al., 2011). Therefore, managers should identify job characteristics responsible for poor collaboration and take actions to alter these characteristics for improved collaboration.

Job Crafting. The bottom-up job redesign approach, job crafting, is gaining popularity due to its immense benefits (see Wang et al., 2016). In particular, job crafting interventions can improve communication among employees (Thomas et al., 2020). Given that job crafting involves proactive actions by employees to make alterations in job roles including cognitive and relational work domains and seeking resources in jobs (Bruning & Campion, 2018), it is likely that job crafting initiatives will improve both communication and collaboration.

Team Building. Past research highlighted the significance of team building interventions as they positively influence team functioning and performance (Klein et al., 2009). As current research suggests lack of team building opportunity as one of the telework demands, the

managers should design virtual or online-based team building interventions in the context of telework. Such interventions will contribute to improving the relationship management demand of teleworkers as well since team building interventions include the components of interpersonal relationships (Salas et al., 1999; Schein, 1999).

Training. In addition, the managers must emphasize training interventions for improving communication, collaboration, teamwork, and relationship management in the context of telework. Given that telework requires work in a virtual environment, traditional training designs may not be effective for teleworkers. Training programs should be carefully designed and developed based on training need assessment when it comes to telework environment. A wide range of topics including the effective management of telework demands should be considered in consultation with the line managers and employees.

Resources Management for Teleworkers

The current research identified several telework resources including flexibility and availability of time and energy, which are crucial for teleworkers to buffer the negative impacts of demands. However, the current research did not find support for the positive and buffering role of resources. As mentioned in previous studies, resources may not always demonstrate beneficial effects (e.g., van Veldhoven et al., 2017), especially when the resources do not match demands (Demerouti & Bakker, 2023). Furthermore, when demands are beyond the manageable thresholds, the abundance of resources fails to buffer the adverse impacts of demand (Demerouti & Bakker, 2023). Therefore, it is crucial that managers are able to recognize useful resources to mitigate the negative effects of demand in the context of telework. A very effective intervention in this regard can be to include employees in the process of identifying the meaningful resources based on open conversation. Often conducting one-to-one interviews with teleworkers with

accompanying questionnaire surveys will help managers identify the exact resources necessary for employees.

In addition, the findings of current research suggest that telework intensity plays a moderating role in determining the relationship between telework resources and collaboration. More specifically, telework resources fail to positively predict collaboration when telework intensity is low, meaning when employees telework for fewer hours. However, telework resources leads to increased collaboration when telework intensity is high since teleworking for longer hours boosts up useful resources for employees. Therefore, managers should *determine the optimum hours of telework beneficial for employees based on availability of resources* in terms of collaboration while designing hybrid work arrangement.

Strengths, Limitations, and Future Research Directions

Study 1 – Strengths

Study 1 employed a rigorous, multi-stage scale development and validation process, integrating both qualitative and quantitative approaches. This comprehensive methodology strengthens the credibility of the telework demands and telework resources measures.

First, the study followed standard procedures for content validity, involving SMEs to evaluate item relevance. Although the SME panel was small, the number of experts met the minimum recommended threshold for content validation (Lynn, 1986), thereby supporting the adequacy of the content validation process.

Second, the study used separate samples for EFA and CFA, which is considered best practice in scale development. The sample sizes for both EFA and CFA were 250 each, which were consistent with the item-to-response ratio of 1:5, according to the recommendations by Cattell (1978) and Gorsuch (1983). In addition, the factor analytic results were robust. For

example, item factor loading values exceeded the recommended threshold of 0.50 (Costello & Osborne, 2005). The communalities were also sufficiently high, suggesting stable factor solutions even with moderate sample sizes (MacCallum et al., 1999).

Third, the CFA results demonstrated acceptable model fit indices, which supported the structural validity of the retained constructs. Prior research indicated that sample size requirements for CFA depend on model complexity rather than absolute size, and a sample of approximately 200 is often sufficient to obtain proper solutions with acceptable fit (Jackson et al., 2013; Koran, 2020).

Finally, the study examined nomological validity by adapting the newly developed scales within a theoretically grounded network of outcomes. This step enhanced the theoretical relevance of the measures and aligned the scale development process with established frameworks such as the JD-R model.

Study 1 – Limitations and Future Research Directions

Study 1 is subject to several limitations despite its strengths. First, as mentioned earlier, the sample size used for content validation was relatively small. Although 20 SMEs were invited, only four participated due to instrument length, nonresponse, and availability constraints. While prior research suggests that a minimum of three experts is acceptable (Lynn, 1986), a larger panel could have generated richer feedback (Rubio et al., 2003). At the same time, expanding the panel may increase disagreement among experts and (Polit & Beck, 2006), and Lynn (1986) cautioned against exceeding ten experts. Nevertheless, the limited number of SMEs remains a constraint.

Next, although the sample sizes for EFA and CFA are defensible based on methodological recommendations, larger samples are generally desirable to reduce measurement

error and enhance stability. Time and monetary constraints prevented the collection of larger samples. The challenging telework demands construct demonstrated poor reliability and construct validity, which could be a consequence of the smaller sample size. Given that reliability and validity are essential for scale validation, I removed the entire construct of challenging telework demands, which could be reexamined for validation by collecting a larger sample. Future research could use Monte Carlo simulations to estimate optimal sample size and statistical power (Jackson, 2001).

Similarly, the sample size for nomological validity testing ($n = 250$) was not determined using formal power analysis (i.e., Monte Carlo method). This limitation may partly explain why telework demands failed to predict outcome variables within the nomological network. Future studies should employ power estimation techniques, such as Monte Carlo methods, to determine adequate sample sizes for testing theoretical relationships in nomological network.

Next, a cross-sectional research design was adopted for nomological validity, which prevented determining the causal relationship between the examined variables (Taris et al., 2021). Some research on the JD-R model adopted longitudinal designs to examine the impact of job demands and resources on outcome variables such as burnout and work engagement (Hu et al., 2017) and job satisfaction (Han et al., 2020). Thus, a longitudinal design with time-lagged data collection could be used in future research to determine the impact of telework demands and telework resources on individual and organizational outcomes.

Another limitation that is noteworthy to mention is the use of self-report data for nomological validity, which increased the possibility for common method biases. In particular, past research suggested (and collected) data on job performance from the supervisor and/or coworkers of the employees (e.g., Bakker et al., 2004; Katou et al., 2022). Therefore, future

research should consider collection of multiple sources data from coworkers, team members, and supervisors besides employees to assess job performance.

During the process of scale development, the measurement scale of telework demands mostly captured the items related to job and workplace, and the items of telework resources reflected only nonwork domain. This created misalignment between the demands and resources for teleworkers (explained in Discussion of Study 2). Future research should consider defining telework demands separately for work and nonwork domains as such there should be two distinct constructs for work demands and nonwork demands. Similarly, telework resources could be differentiated as work resources and nonwork resources to capture the aspects from both domains separately. This way the measurement scales for telework demands and telework resources will be able to address the nuance of both domains in an effective manner.

Finally, the items generated for challenging telework demands failed to establish it as a construct and a valid measurement scale. As mentioned in the discussion section, several factors might have contributed to such an outcome. One reason could be the lack of clarity in the definition of challenging telework demands, which was developed based on the definition of challenging stressors in job. Given that the context of telework is unique and it imposes distinct challenges and opportunities for employees, the definition may lack relevance and needs to be developed based on an exploratory approach (e.g., interviewing teleworkers to define and describe challenging telework demands). Participants in the current study might have found the items related to challenging telework demands irrelevant to telework, which led to poor reliability and validity. Future research should consider conducting exploratory-inductive research to differentiate between challenging and hindering demands in the setting of telework.

Study 2 – Strengths

Study 2 demonstrates several methodological and theoretical strengths. First, the study determined the adequate sample size for the moderated mediation model based on statistical power and anticipated effect sizes, which strengthened the rigor and credibility of the data analysis. This power-based approach provided a robust foundation for hypothesis testing and enhanced confidence in the observed effects.

Second, the study adopted a multi-wave survey design with temporal separation of data collection, which helped mitigate concerns related to common method bias. Temporal separation is widely recognized as an effective procedural remedy for reducing common method variance in self-report research designs.

Third, this dissertation focused on individual-level analysis because individual-level analysis provides more personalized insights that help us to understand employee attitude, motivation, and behavior. Indeed, individual-level analysis is a popular research practice in HRM and organizational behavior. Prior scholarly work examining the impact of telework (e.g., Allen et al., 2015; Bailey & Kurland, 2002; Gajendran & Harrison, 2007) and evaluation of innovative behavior (e.g., Ng & Lucianetti, 2016; Yuan & Woodman, 2010) used individual-level analysis, which justifies the level of measurement in the current study and is aligned with the level of theory as well. Costa et al. (2013) highly asserted the importance of aligning the level of measurement with the level of theory. In current research, the individual-level measurement of innovative behavior perfectly aligns with the theory of individual innovation at workplace (Scott & Bruce, 1994).

Finally, the inclusion of telework intensity as a moderator represents a theoretically meaningful contribution, allowing the study to capture heterogeneity in telework experiences and

to examine boundary conditions under which telework demands and telework resources influence collaboration and innovative behavior.

Study 2 – Limitations and Future Research Directions

Despite the above-mentioned strengths, Study 2 has several limitations that point to opportunities for future research. First, the study relied exclusively on self-report data from teleworkers, which raises concerns about potential common method bias and excludes multilevel analysis. However, as described in the Method section of Study 2, various actions are taken to control common method variances. Prior research has addressed this limitation by collecting innovative behavior ratings from supervisors (e.g., Shin et al., 2017; Wang et al., 2015). Future studies should consider collecting data from supervisors or coworkers to reduce bias and enhance measurement validity.

Next, although the individual-level focus is theoretically justified, innovation and collaboration are inherently social and multilevel phenomena that often evolve within teams and organizational units. Prior research has examined innovative behavior at the team level (e.g., Gressgård, 2011; Van der Voet & Steijn, 2021) and organizational level (e.g., Faems et al., 2005; Hernandez-Espallardo et al., 2018). Additionally, Bakker and Demerouti (2018) proposed to conduct multilevel analysis to uncover the real impact of job demands and resources, which suggests the similar implications for telework demands and resources. Accordingly, future research should employ multilevel designs to better capture the impact of telework demands and resources on collaboration and innovation.

Although telework intensity was examined as a moderator, other theoretically relevant moderators were not included. Prior research suggests various individual, team, job, and organizational factors that may shape employees' innovative behavior. For example, Scott and

Bruce (1994) identified several determinants of innovative behavior including leader role expectations, team-member exchange, individual's intuitive problem-solving style, and systematic problem-solving style, which may influence the impact of teleworking on employees' innovative behavior. Further, scholars have examined employees' personality traits such as conscientiousness and openness (Woods et al., 2018), proactive personality (Fan et al., 2022; Mubarak et al., 2021), and creative self-efficacy (Hsu et al., 2011; Teng et al., 2020) in relation to innovative behavior. Job characteristics (e.g., autonomy, task identity, skill variety, task interdependence) were also found to be significant predictors for innovative behavior for employees (Cangialosi et al., 2023; Černe et al., 2017). Several studies also highlighted the significance of organizational characteristics such as innovation climate (Hsu & Chen, 2017; Yu et al., 2013), organizational structure (Dedahanov et al., 2017; Rhee et al., 2017), leadership styles and organizational culture (Khan et al., 2020; Zheng et al., 2019) in determining employee innovative behavior. Therefore, future studies should incorporate a broader set of moderators to fully explain when and for whom telework demands and resources foster innovation through collaboration.

Next, while the research model is grounded in theory, the research design does not permit causal inference. The cross-sectional nature of data collection limits the ability to ensure temporal precedence, which further restricts causal inference. Therefore, the findings should be interpreted as associative rather than causal. Future research should adopt longitudinal or experimental designs to test causal inferences among the study variables.

Finally, given that telework demands and telework resources are newly developed constructs and measurement scales, they need to be tested to identify the relationship with various individual, team, and organizational variables. Future research should examine the

impact of telework demands and resources on various outcome variables both at individual-level and multi-level (e.g., team or employee-supervisor dyad). Given that multilevel constructs provide better understanding of the attitudinal and behavioral phenomena, Bakker and Demerouti (2017) suggested to integrate multiple levels in research using the JD-R model. For instance, telework demands and resources can be measured at a team-level to examine the impact on individual outcomes, or individual demands and resources can predict the team-level and organizational-level outcomes. There is also an opportunity for future research to validate the scales in different occupations and industries to generalize the outcomes of telework demands and resources. Future research should also examine the impact of telework demands and resources in diverse personal context to generate meaningful insights for understanding the role of nonwork domain. For example, empirical research including both different-sex and same-sex couples can provide insights into how gender dynamics and social expectations influence telework experiences. Likewise, comparing dual-career couples with those where one partner remains at home will help to explore variations in role distribution and resource allocation, which will allow for a more comprehensive understanding of how telework shapes various personal and work outcomes.

Conclusion

The aim of this dissertation research was to empirically examine the impact of telework on innovative behavior of employees, mediated by collaboration. To accomplish this, I drew on the JD-R model and theorized two constructs of telework demands and telework resources. Further, measurement scales were developed and validated for these constructs, and they were included in the main research model for empirical investigation. Results of these studies demonstrated that innovative behavior of teleworkers is dependent on telework demands and

telework intensity. While telework demands are responsible for poor innovative behavior among employees, the beneficial effect of telework resources are dependent on high telework intensity. Thus, this dissertation made several important contributions to theory and literature by conceptualizing and developing the constructs of telework demands and resources, extending the JD-R model in terms of telework, and advancing both collaboration and innovation research. It is my hope that this research will generate additional discussion and research attention among scholars in future to advance the studies to resolve the debate about telework effectiveness. Extensive scholarly work remains to be done in explaining the role of telework demands and resources in shaping outcomes across individual, team, and organizational levels. Nevertheless, findings from the present research underscores the significance of recognizing the value of telework demands and resources and generating interventions for successful management of demands and resources. These actions are particularly imperative for organizations to foster meaningful collaboration and facilitate innovative employee behavior.

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Table 1

A Sample of Telework Articles Applied Organizational Theories and Their Key Contributions

Author, publication year	Theory used	Key contribution(s)
Tomaskovic-Devey and Risman (1993)	Contingency theory	Telework innovation is dependent on organizational constraints such as bureaucratization, size of the workforce, and organizational slack.
Shin et al. (1997)	Innovation theories, theories of organizational effectiveness	These researchers developed a telework adoption/diffusion model based on four stages of innovation: initiation, adoption, implementation, and institutionalization which explains the adoption of telework by organizations to increase organizational effectiveness.
Hunton and Harmon (2004)	Expectancy theory (Vroom, 1964)	These researchers developed the Telework Behavior Model (TBM) where employees make personal choices depending on various individual motivational factors and following organizational telework policy
Kossek et al. (2009)	Job design theory (Hackman & Oldham, 1980)	These authors argued that telework does not always enable work-family balance if the workload is high, technological infrastructure is inadequate, and family members are not supportive.
Felstead and Henseke (2017)	Theory of knowledge economy, flexible working, and organizational adaptation	The growth of remote work can be explained by the movement to the knowledge economy, the growth in flexible employment, and organizational responses to the changing demographic. The authors found that while remote working is associated with higher organizational commitment, job satisfaction, and job-related well-being, these benefits come at the cost of work intensification and a greater inability to switch off.

Table 2*A List of Demands Reported in Telework Literature*

Demand(s)	Demand Dimension	Source(s)	Associated costs	Author(s) and year
Time pressure	Psychological	Job	Exhaustion, poor job performance	Wöhrmann and Ebner (2021)
Expectation for constant availability	Organizational	Job	Work-family conflict	Bathini and Kandathil (2019); Fonner and Roloff (2012); Gschwind and Vargas (2019); Kossek et al. (2009)
Work pressure/workload/work overload	Physical, psychological	Job	Stress, work-family conflict, reduced well-being, poor performance	Jamal et al. (2021); Ingusci et al. (2021); Russell et al. (2009); Junça Silva et al. (2022); Wang et al. (2021)
Role ambiguity	Psychological	Job	Exhaustion	Bilotta et al. (2021); Sardeshmukh et al. (2012)
Role conflict	Psychological	Job	Exhaustion	Bilotta et al. (2021); Sardeshmukh et al. (2012)
Intensive monitoring	Psychological	Job	Work-family conflict, reduced well-being	Wang et al. (2021)
Work intensification (extensive efforts, work longer hours)	Physical, psychological	Job	Exhaustion, poor job performance, low job satisfaction, less	Abdel Hadi et al. (2021); Bathini and Kandathil (2019); Kelliher and Anderson (2010)

			organizational commitment	
Childcare responsibilities	Physical, psychological	Home	Exhaustion, poor job performance	Abdel Hadi et al. (2021)
Household works	Physical	Home	Exhaustion, poor job performance	Abdel Hadi et al. (2021)
Lack of face-to-face communication	Psychological, social	Job	Social isolation, poor relationship with supervisor and coworker, less career opportunities, low telework satisfaction	Gajendran and Harrison (2007); Galanti et al. (2021); Greer and Payne (2014); Jamal et al. (2021); Nakrošienė et al. (2019)
Reduced visibility	Organizational	Job	Poor career opportunities	Nakrošienė et al. (2019)
Interruptions from home/family	Psychological	Home	Work-family conflict, low productivity, less satisfaction	Leung and Zhang (2017); Powell (2020); Sarbu (2018); Tietze and Musson (2003); Zhang et al. (2020)
Supervisor support and trust	Social, organizational	Job	Less career opportunities, low telework satisfaction	Nakrošienė et al. (2019)
Interferences with personal and family activities	Psychological, social	Job	Work-family conflict, poor family relationship	Abendroth and Reimann (2018); Maruyama et al. (2009)
Constant connection through ICT	Social, organizational	Job	Stress	Fonner and Roloff (2012)
Techno-overload	Psychological	Job	Stress	Ingusci et al. (2021); Molino et al. (2020)

Cognitive overload	Psychological	Job	Poor work performance, reduced well-being	Schmitt et al. (2021)
Technostressors (overload, invasion of privacy, ambiguity, conflict)	Psychological	Job	Strain, low telework satisfaction, poor job performance	Camacho and Barrios (2022); Suh and Lee (2017)
Surface-acting, lack of built-in-breaks	Psychological, physical	Job	Stress	Bilotta et al. (2021)
Less physical activities/high sedentary time	Physical	Job	Stress, poor physical health	Bilotta et al. (2021); Ishibashi and Taniguchi (2022); Rodríguez-Nogueira et al. (2021); Šmite et al. (2023)
Family member's expectations about availability	Psychological	Home	Work-family conflict	Kossek et al. (2009)

Table 3*A List of Resources Reported in Telework Literature*

Resource(s)	Resource Dimension	Source(s)	Associated benefits	Author(s) and year
Autonomy (greater control and flexibility on time and tasks)	Psychological	Job	Work engagement, reduction of exhaustion/role stress, reduction of time pressure, improved productivity and telework satisfaction, reduced turnover intention	Gajendran and Harrison (2007); Galanti et al. (2021); Jamal et al. (2021); Maruyama et al. (2009); Nakrošienė et al. (2019); O'Neill et al. (2009); Sardeshmukh et al. (2012); Tremblay and Genin (2007); Wöhrmann and Ebner (2021)
Time and energy saving due to no need to commute	Physical, psychological	Job	Restoration of resources, reduction of stress	Biron and Van Veldhoven (2016); Golden (2006); Hartig et al. (2007); Maruyama et al. (2009); Saragih et al. (2022); Thompson et al. (2022)
More time for family	Physical, psychological	Job	Reduction of parental demands, less absenteeism, work-family balance	Gajendran and Harrison (2007); Hartig et al. (2007); Nakrošienė et al. (2019); Saragih et al. (2022); Thompson et al. (2022)
More time for household work	Physical	Job	Work-family balance	Thompson et al. (2022); Tremblay and Genin (2007)

Less interruption/distraction from coworkers	Physical, psychological	Job	Productivity, coping with workload	Fonner and Roloff (2010); Fonner and Roloff (2012); Nakrošienė et al. (2019); Tremblay and Genin (2007)
Increased concentration	Psychological	Job	Productivity	Tremblay and Genin (2007)
Suitability of workplace at home	Physical, psychological	Home	Productivity, improved health	Hartig et al. (2007); Nakrošienė et al. (2019)
Less engagement in organizational politics	Psychological, social, organizational	Job	Job satisfaction	Fonner and Roloff (2010)
Saving travel expenses	Physical	Job	Telework satisfaction	Nakrošienė et al. (2019); Thompson et al. (2022); Tremblay and Genin (2007)
Boundary flexibility	Psychological	Job, home	Work-family balance	Gajendran and Harrison (2007)
More leisure time	Physical, psychological, social	Job	Work-life balance	Hilbrecht et al. (2013); Wheatley (2012)
Time for personal health care/self-care practices	Physical, psychological	Job	Health benefits, work-life balance	Caringal-Go et al. (2022); Thompson et al. (2022)
Constant connection through ICT	Psychological, social, organizational	Job	Social presence, organizational identification	Fonner and Roloff (2012); Leonardi et al. (2010)
Social support (managers), autonomy, feedback	Social, psychological	Job	Work-life balance, reduced stress, reduced isolation, improved engagement and performance	Bilotta et al. (2021)

Table 4*Demographic Profile of the Interview Participants*

Participants	Gender	Age	Supervisory Role	Telework hours per week	Telework experience (years)	Industry
1	Male	42	No	45	3	Business, finance, and administration
2	Female	45	Yes	30	3	Business, finance, and administration
3	Female	36	Yes	8	3	Business, finance, and administration
4	Female	31	No	37.5	3	Business, finance, and administration
5	Male	33	No	20	3	Health
6	Male	44	No	30	3	Business, finance, and administration
7	Female	33	Yes	40	2.5	Business, finance, and administration
8	Male	38	Yes	40	3	Natural and applied science
9	Male	38	No	16	3	Business, finance, and administration
10	Male	50	Yes	16	3	Sales and service
11	Male	28	Yes	37.5	1	Business, finance, and administration
12	Female	41	No	8	3	Sales and service
13	Male	40	No	40	3	Natural and applied science
14	Female	40	Yes	32	3	Natural and applied science
15	Male	43	No	32	1	Natural and applied science
16	Female	39	No	37.5	3.5	Education
17	Male	42	No	30	5	Business, finance, and administration
18	Male	27	No	22.5	1.2	Natural and applied science
19	Male	39	Yes	40	3	Natural and applied science

20	Male	40	No	30	3	Natural and applied science
21	Male	42	No	40	2	Manufacturing
22	Male	42	No	40	3	Health
23	Female	28	No	16	3.5	Business, finance, and administration
24	Female	32	Yes	16	3	Business, finance, and administration
25	Female	46	Yes	33	3	Business, finance, and administration

Table 5*Item Pool Generated from Interviews*

Item No.	Item Statements
Hindering Telework Demands	
1	I have more conflicts with my family members because of work from home.
2	I lack relationship building opportunity with coworkers/management due to work from home.
3	I have less team building opportunities due to work from home.
4	I have formal (professional) relationships with my coworkers due to work from home.
5	I get less support from my supervisor due to work from home.
6	I feel distant and disconnected from my organization due to work from home.
7	I do not get prompt responses about work-related questions from my coworkers/supervisor due to work from home.
8	Work from home limits the level of collaboration.
9	It is difficult to focus in work due to distractions at home during work from home.
10	I feel lack of career development/growth opportunities while working from home.
11	Miscommunication/communication gap is more likely to occur during work from home.
12	I feel lack of communication among team members when we work from home.
13	I find lack of transparency in communication when we work from home.
14	There is lack of recognition for people who work hard and perform well while working from home.
15	There is no discipline/consequences for poor performers in the context of work from home.
16	It is difficult for me to separate work and home life while working from home.
17	I experience lack of access to organizational resources due to work from home.
18	I work by my own during work from home which affects my learning process/performance.
19	I feel socially anxious to interact/collaborate with others since I work from home.
20	Due to work from home, I miss the social meetings and wellness events at work.
21	I feel the lack of work-related learning opportunities during work from home.
22	Work from home lacks the transition time that creates separation between work and home.
23	I do not have access to professional and support networks due to work from home.
24	I find it unhealthy to work from home due to sedentary positions at work.
25	I find bureaucracy and red tapes in work projects during work from home.
26	I think the work projects progress slowly when we work from home.
27	I find it difficult to meet/network with people while working from home.
28	I feel lack of collaborative opportunity at work to brainstorm in work from home.

- 29 I feel lack of collaborative opportunity at work to come up with new/innovative solutions in work from home.
- 30 I lack the opportunity for informal communication and social chats with my coworkers/supervisors due to work from home.
- 31 I feel I never go offline because I work from home.
- 32 The quality of interactions with coworkers has decreased because of work from home.
- 33 I miss the in-person interactions with my coworkers due to work from home.
- 34 I find the virtual meetings to be less participative and engaged when we work from home.
- 35 I cannot share and/or understand emotions in communication/collaboration while working from home.
- 36 I have a distanced relationship with my manager/supervisor/coworkers due to work from home.
- 37 I feel lack of engagement with my organization when I work from home.
- 38 The communication process is tiring and energy consuming during work from home.
- 39 I feel isolated/confined at home because I work from home.
- 40 Resolving a problem takes time due to formal and virtual communication during work from home.
- 41 I feel lack of opportunity to resolve conflict among team members while working from home.
- 42 I find it difficult to start my work day when I work from home.
- 43 I am demotivated and discouraged during work from home.
- 44 It is difficult to get feedback and directions from other people when we work from home.
- 45 It is difficult to describe my thoughts through virtual communication in work from home.
- 46 Work from home lacks the opportunity to understand nonverbal cues (e.g., facial expressions, body language, eye contact) in communication.
- 47 My expenses/costs increased since I purchased the required equipment/tools to work from home.
- 48 I find expectation gaps with my supervisor/manager while working from home.
- 49 Due to work from home, I feel lack of sense of belongingness to my organization.
- 50 I feel less comfortable to ask questions to my coworkers/managers due to work from home.
- 51 I find technology glitches as disruptive for communication and collaboration in work from home.
- 52 I feel lack of spontaneity/authenticity in communication with coworkers while working from home.
- 53 The quality of my work has reduced due to work from home.
- 54 Work from home lacks the natural organic environment for creativity.

Challenging Telework Demands

- 1 I feel overloaded because of a lot of emails/virtual meetings while working from home.
- 2 I am required to work longer hours while working from home.
- 3 It is difficult for me to disconnect from work due to work from home.
- 4 I am always anxious to promptly respond to work emails during work from home.
- 5 I feel there are unwritten norms and expectations about increasing productivity and performance because I work from home.
- 6 I feel an increase in expectations from family members about accommodating their needs because I work from home.
- 7 The workload increased in work from home due to formal work processes.
- 8 I feel I am busier because I work from home.
- 9 I need to go above and beyond to increase visibility of my work during work from home.
- 10 Work from home increases the expectations from coworkers/supervisors for immediate responses.
- 11 I need to put a lot of intentional effort to create connection in my workplace due to work from home.

Telework Resources

- 1 I can work longer hours and more work when I work from home.
- 2 I have the flexibility to stretch out work throughout the day during work from home.
- 3 I have more energy to put extra effort in my work because I work from home.
- 4 Work from home provides me with greater flexibility to collaborate with overseas teams/international coworkers.
- 5 Work from home provides me with the flexibility/opportunity to handle emergency situations at home.
- 6 Work from home saves my commuting time to work.
- 7 I have more time to spend with my family/friends due to work from home.
- 8 Work from home provides the flexibility/freedom to adjust personal/family responsibilities with work.
- 9 I can organize both my professional and personal works better due to work from home.
- 10 Work from home saves the dress-up and get ready time for work.
- 11 I have sufficient time to ensure quality work due to work from home.
- 12 I have autonomy on how to do my work during work from home.
- 13 Work from home saves money because I do not need to dress-up/make-up.
- 14 Work from home saves money because I do not need to commute.
- 15 Work from home saves money because I do not need to purchase lunch/coffee.
- 16 Work from home saves money because I do not need to put children in daycare.
- 17 I contribute to sustainability while working from home by reducing carbon footprint through no commute to work.

- 18 I have greater flexibility to plan/perform after hour personal/family works during work from home.
- 19 I experience less work-related distractions during work from home.
- 20 I can have greater focus/concentration in work while working from home.
- 21 I have more control over my work and nonwork time due to work from home.
- 22 I can work from anywhere because I can choose my work location during work from home.
- 23 I have greater opportunity for self-discipline due to work from home.
- 24 I have time to prepare healthy meals while working from home.
- 25 I can go for walk/do exercise/yoga when I work from home.
- 26 I can better support/contribute to my family/parents/children while working from home.
- 27 Work from home provides with the opportunity to share household chores equally with the spouse/partner/other members in family.
- 28 I can complete my tasks at work with minimum guidance and interactions due to work from home.
- 29 I have more time to complete/finish my job and personal tasks due to work from home.
- 30 I can work in a comfortable environment/attire/clothing when I work from home.
- 31 I can take care of my parents/children/pets when I work from home.
- 32 I am more proficient in using information technology due to work from home.
- 33 I can have asynchronous collaboration due to information technology usage while working from home.
- 34 I can work and collaborate efficiently due to information technology usage while working from home.
- 35 I feel motivated to work more when I work from home.
- 36 I find greater engagement among coworkers due to work from home.
- 37 I am more structured in my work and personal schedules due to work from home.
- 38 I am happier both at work and personal/family life because I work from home.
- 39 I can access to people at dispersed geographic locations for networking while working from home.
- 40 I have the flexibility to plan after-hour (night) office works due to work from home.
- 41 I can sleep more/better because I work from home.
- 42 I enjoy an improved relationship with my family/children/friends due to work from home.
- 43 Work from home provides me the flexibility to start and end my work day based on my needs/preferences.
- 44 I have more time and opportunities for self-care due to work from home.
- 45 I have more leisure time because I work from home.
- 46 I can have my lunch/snack/coffee based on my preferred time when I work from home.
- 47 I can learn new things for my career development since I do not need to commute when I work from home.

- 48 I have the flexibility to take breaks whenever I need while working from home.
- 49 I feel more productive because nobody is monitoring or controlling me during work from home.
- 50 I have better emotional regulation at work and personal life while working from home.
- 51 I have the opportunity to practice mindfulness when I work from home.
- 52 I can stay away from office politics while working from home.
- 53 I can better reflect on my ideas for creative solutions when I work from home.
- 54 I have flexibility to enjoy my life more due to work from home.
- 55 Work from home reduces the stress related to childcare/parent care/pet care as I can stay home provide care.
- 56 I have the autonomy to manage my own time and life due to work from home.
- 57 I have more mental capacity to concentrate at work because I am less stressed during work from home.
- 58 I have opportunity for multitasking when I work from home.
- 59 I feel less tired and relaxed when I work from home.
- 60 I have more time and energy to do other stuffs (personal/family/household/social work) at the end of work day when I work from home.
- 61 I can take a part-time job/work beside my first job when I work from home.
- 62 I can maintain family/other relationship commitments easily when I work from home.
- 63 I do not need to worry about safe driving/taking public transit to commute to work when I work from home.
- 64 I can maintain confidentiality at work when I work from home.
- 65 I feel highly engaged with my work when I work from home.
- 66 I have greater control over the work environment when I work from home.
- 67 I experience less microaggressions/bullying/abusive behavior at workplace due to work from home.
- 68 I feel greater psychological safety at work because of working from home.
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Table 6*Item Pool Generated from Existing Measurement Scales*

Item No.	Item Statements	Source
Hindering Telework Demands		
1	I find conflicting demands between my work and home/family when I work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
2	I feel the job security is low due to work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
3	I find my job as less secured due to recent layoffs in work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
4	I find me busy at home with household work while working from home.	Existing measure: Home Demands Scale Peeters et al. (2005)
5	Stress at home makes me irritable during work from home.	Existing measure: Negative Spillover from Family to Work, Grzywacz and Marks (2000)
Challenging Telework Demands		
1	I need to work fast due to work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
2	I need to work hard/put a lot effort due to work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
3	I do not get enough time to finish my job tasks due to work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
4	I need to do many things simultaneously at home when I work from home.	Existing measure: Home Demands Scale Peeters et al. (2005)
Telework Resources		
1	Work from home provides me the opportunity to be creative.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
2	My job requires high level of skill due to work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)

3	I have the opportunity to develop my own abilities due to work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
4	I can perform a variety of tasks/work in my job due to work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
5	I can make a lot of decisions on my own at work while working from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
6	My supervisor is concerned about my problems in work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
7	My supervisor pays attention to my feelings and problems during work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
8	My supervisor is helpful in getting my job done during work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
9	People I work with are competent in doing their jobs in the context of work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
10	People I work with take a personal interest (e.g., understand emotions, problems, and well-being) in me during work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
11	I find people I work with are friendly while working from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
12	People I work with are helpful in getting the job done in the context of work from home.	Existing measure: Job Content Questionnaire Karasek et al. (1998)
13	My partner/family pays attention to my feelings and problems when I work from home.	Existing measure: Family Support Scale (Peeters & Le Blanc, 2001)
14	My partner/family appreciates the way I do my job during work from home.	Existing measure: Family Support Scale (Peeters & Le Blanc, 2001)
15	My partner/family helps me with a certain work and nonwork related task during work from home.	Existing measure: Family Support Scale (Peeters & Le Blanc, 2001)
16	My partner/family gives me advice on how to handle things at work and home during work from home.	Existing measure: Family Support Scale (Peeters & Le Blanc, 2001)

17	My home life helps me relax and feel ready for the next day's work during work from home.	Existing measure: Positive Spillover from Family to Work Scale (Grzywacz & Marks, 2000)
18	The love and respect I get at home makes me feel confident about my work during work from home.	Existing measure: Positive Spillover from Family to Work Scale (Grzywacz & Marks, 2000)
19	I can work hard during work from home since I can provide what is needed to my family.	Existing measure: Positive Spillover from Family to Work Scale (Grzywacz & Marks, 2000)
20	I get support from my friends when needed during work from home.	Existing measure: Home Resources (Hakanen et al., 2008)

Table 7*Item Pool Generated from Literature Review*

Item No.	Item Statements	Sub-dimension	Source
Hindering Telework Demands			
1	I feel pressure to hide negative emotions related to work from home during virtual meetings.	Emotional demands	Literature review
2	I do not get sufficient breaks because of hectic schedule while working from home.	Lack of breaks	Literature review
3	I find it difficult to work from home due to lack of separate office space at home.	Lack of separate office space	Literature review
4	I find it difficult to work from home due to lack of tools/equipment required to work.	Lack of tools/equipment	Literature review
5	I find it difficult to work from home due to lack of stable Internet connection.	Lack of Internet connection	Literature review
6	The quantity of household work increased for me due to work from home.	Household chores	Literature review
7	During work from home, I feel emotionally overwhelmed because of lack of boundaries between work and home.	Emotional demands	Literature review
8	I need to work hard to hide my true feelings/emotions during work from home.	Emotional demands	Literature review
9	I feel a lack of psychological detachment from work while working from home.	Psychological detachment	Literature review
10	I am left with fewer resources to dedicate to family/personal life due to the constant connectivity during work from home.	Lack of resources	Literature review
11	Work from home hinders the knowledge sharing opportunities among coworkers.	Knowledge sharing	Literature review
12	I find it difficult to complete my tasks due to lack of interactions with coworkers during work from home.	Communication difficulties	Literature review
13	I suffer in musculoskeletal pain in various body parts (e.g., back, neck, shoulder, arm/wrist, hip, knee, ankle/foot) due to work from home.	Physical health	Literature review
14	I am concerned about the security and privacy risks related to information technology use in work from home.	Security and privacy risks	Literature review
15	I experience headache/dizziness/blurriness/irritation/eye strain due to technology use during work from home.	Physical health	Literature review

16	I feel my supervisor does not trust me due to increased monitoring and control during work from home.	Supervisor's trust	Literature review
17	I feel loss of control over my professional and personal life due to work from home.	Loss of control	Literature review
18	It is difficult for me to communicate with my supervisor/manager through virtual communication during work from home.	Communication difficulties	Literature review
19	I do not get enough sleep because I work from home.	Physical health	Literature review

Challenging Telework Demands

1	It is difficult for me to adapt with the required technologies for work from home.	Technology adaptation	Literature review
2	I find it demanding to plan my workday autonomously while working from home.	Autonomy	Literature review

Telework Resources

1	My supervisor trusts me, which helps me to perform and grow during work from home.	Supervisor support	Literature review
2	I can continue to work during my sickness because of work from home.	Work continuation	Literature review
3	My supervisor encourages social interaction among coworkers during work from home.	Supervisor support	Literature review
4	My supervisor helps me to meet personal/family/home obligations during work from home.	Supervisor support	Literature review
5	My supervisor provides sufficient feedback regularly to improve productivity/performance while working from home.	Supervisor support	Literature review

Table 8*Item Statements with Corresponding htc Index*

Item Statements		Average rating	htc index	Decision
Hindering Telework Demands				
1	I have more conflicts with my family members because of work from home.	3.75	0.75	Drop
2	I lack relationship building opportunity with coworkers/management due to work from home.	4.50	0.90	Retain
3	I have less team building opportunities due to work from home.	4.50	0.90	Retain
4	I have formal (professional) relationships with my coworkers due to work from home.	3.00	0.60	Drop
5	I get less support from my supervisor due to work from home.	4.25	0.85	Retain
6	I feel distant and disconnected from my organization due to work from home.	4.25	0.85	Retain
7	I do not get prompt responses about work-related questions from my coworkers/supervisor due to work from home.	4.25	0.85	Retain
8	Work from home limits the level of collaboration.	4.50	0.90	Retain
9	It is difficult to focus in work due to distractions at home during work from home.	4.00	0.80	Drop
10	I feel lack of career development/growth opportunities while working from home.	4.25	0.85	Retain
11	Miscommunication/communication gap is more likely to occur during work from home.	4.50	0.90	Retain
12	I feel lack of communication among team members when we work from home.	4.25	0.85	Retain
13	I find lack of transparency in communication when we work from home.	4.25	0.85	Retain
14	There is lack of recognition for people who work hard and perform well while working from home.	3.75	0.75	Drop
15	There is no discipline/consequences for poor performers in the context of work from home.	3.00	0.60	Drop
16	It is difficult for me to separate work and home life while working from home.	4.00	0.80	Drop
17	I experience lack of access to organizational resources due to work from home.	4.00	0.80	Drop
18	I work by my own during work from home which affects my learning process/performance.	3.25	0.65	Drop
19	I feel socially anxious to interact/collaborate with others since I work from home.	3.75	0.75	Drop

20	Due to work from home, I miss the social meetings and wellness events at work.	3.50	0.70	Drop
21	I feel the lack of work-related learning opportunities during work from home.	4.00	0.80	Drop
22	Work from home lacks the transition time that creates separation between work and home.	4.00	0.80	Drop
23	I do not have access to professional and support networks due to work from home.	4.00	0.80	Drop
24	I find it unhealthy to work from home due to sedentary positions at work.	4.25	0.85	Retain
25	I find bureaucracy and red tapes in work projects during work from home.	4.00	0.80	Drop
26	I think the work projects progress slowly when we work from home.	3.75	0.75	Drop
27	I find it difficult to meet/network with people while working from home.	4.50	0.90	Retain
28	I feel lack of collaborative opportunity at work to brainstorm in work from home.	4.25	0.85	Retain
29	I feel lack of collaborative opportunity at work to come up with new/innovative solutions in work from home.	4.25	0.85	Retain
30	I lack the opportunity for informal communication and social chats with my coworkers/supervisors due to work from home.	3.75	0.75	Drop
31	I feel I never go offline because I work from home.	3.50	0.70	Drop
32	The quality of interactions with coworkers has decreased because of work from home.	3.75	0.75	Drop
33	I miss the in-person interactions with my coworkers due to work from home.	4.00	0.80	Drop
34	I find the virtual meetings to be less participative and engaged when we work from home.	4.25	0.85	Retain
35	I cannot share and/or understand emotions in communication/collaboration while working from home.	4.25	0.85	Retain
36	I have a distanced relationship with my manager/supervisor/coworkers due to work from home.	4.25	0.85	Retain
37	I feel lack of engagement with my organization when I work from home.	4.00	0.80	Drop
38	The communication process is tiring and energy consuming during work from home.	3.75	0.75	Drop
39	I feel isolated/confined at home because I work from home.	3.75	0.75	Drop
40	Resolving a problem takes time due to formal and virtual communication during work from home.	3.75	0.75	Drop

41	I feel lack of opportunity to resolve conflicts among team members while working from home.	3.75	0.75	Drop
42	I find it difficult to start my workday when I work from home.	3.50	0.70	Drop
43	I am demotivated and discouraged during work from home.	3.50	0.70	Drop
44	It is difficult to get feedback and directions from other people when we work from home.	3.75	0.75	Drop
45	It is difficult to describe my thoughts through virtual communication in work from home.	3.75	0.75	Drop
46	Work from home lacks the opportunity to understand nonverbal cues (e.g., facial expressions, body language, eye contact) in communication.	4.25	0.85	Retain
47	My expenses/costs increased since I purchased the required equipment/tools to work from home.	3.25	0.65	Drop
48	I find expectation gaps with my supervisor/manager while working from home.	4.00	0.80	Drop
49	Due to work from home, I feel a lack of sense of belongingness to my organization.	4.00	0.80	Drop
50	I feel less comfortable asking questions to my coworkers/managers due to work from home.	4.00	0.80	Drop
51	I find technology glitches as disruptive for communication and collaboration in work from home.	4.00	0.80	Drop
52	I feel lack of spontaneity/authenticity in communication with coworkers while working from home.	3.75	0.75	Drop
53	The quality of my work has reduced due to work from home.	3.25	0.65	Drop
54	Work from home lacks the natural organic environment for creativity.	3.00	0.60	Drop
55	I find conflicting demands between my work and home/family when I work from home.	4.00	0.80	Drop
56	I feel the job security is low due to work from home.	3.50	0.70	Drop
57	I find my job as less secured due to recent layoffs in work from home.	3.50	0.70	Drop
58	I find me busy at home with household works while working from home.	3.50	0.70	Drop
59	Stress at home makes me irritable during work from home.	3.50	0.70	Drop
60	I feel pressure to hide negative emotions related to work from home during virtual meetings.	3.25	0.65	Drop
61	I do not get sufficient breaks because of hectic schedule while working from home.	3.75	0.75	Drop
62	I find it difficult to work from home due to lack of separate office space at home.	4.00	0.80	Drop

63	I find it difficult to work from home due to lack of tools/equipment required to work.	3.50	0.70	Drop
64	I find it difficult to work from home due to lack of stable Internet connection.	3.75	0.75	Drop
65	The quantity of household work increased for me due to work from home.	4.00	0.80	Drop
66	During work from home, I feel emotionally overwhelmed because of the lack of boundaries between work and home.	3.75	0.75	Drop
67	I need to work hard to hide my true feelings/emotions during work from home.	3.25	0.65	Drop
68	I feel a lack of psychological detachment from work while working from home.	3.50	0.70	Drop
69	I am left with fewer resources to dedicate to family/personal life due to the constant connectivity during work from home.	3.75	0.75	Drop
70	Work from home hinders the knowledge sharing opportunities among coworkers.	3.50	0.70	Drop
71	I find it difficult to complete my tasks due to lack of interactions with coworkers during work from home.	3.50	0.70	Drop
72	I suffer in musculoskeletal pain in various body parts (e.g., back, neck, shoulder, arm/wrist, hip, knee, ankle/foot) due to work from home.	3.75	0.75	Drop
73	I am concerned about the security and privacy risks related to information technology use in work from home.	3.75	0.75	Drop
74	I experience headache/dizziness/blurriness /irritation/eye strain due to technology use during work from home.	3.75	0.75	Drop
75	I feel my supervisor does not trust me due to increased monitoring and control during work from home.	4.00	0.80	Drop
76	I feel loss of control over my professional and personal life due to work from home.	3.75	0.75	Drop
77	It is difficult for me to communicate with my supervisor/manager through virtual communication during work from home.	3.50	0.70	Drop
78	I do not get enough sleep because I work from home.	3.75	0.75	Drop
		Average htc index (Standard deviation)	0.77 (0.07)	

Challenging Telework Demands

1	I feel overloaded because of a lot of emails/virtual meetings while working from home.	4.00	0.80	Retain
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2	I am required to work longer hours while working from home.	3.75	0.75	Drop
3	It is difficult for me to disconnect from work due to work from home.	3.00	0.60	Drop
4	I am always anxious to promptly respond to work emails during work from home.	3.25	0.65	Drop
5	I feel there are unwritten norms and expectations about increasing productivity and performance because I work from home.	4.00	0.80	Retain
6	I feel an increase in expectations from family members about accommodating their needs because I work from home.	4.00	0.80	Retain
7	The workload increased in work from home due to formal work processes.	4.25	0.85	Retain
8	I feel I am busier because I work from home.	3.00	0.60	Drop
9	I need to go above and beyond to increase visibility of my work during work from home.	4.25	0.85	Retain
10	Work from home increases the expectations from coworkers/supervisors for immediate responses.	4.00	0.80	Retain
11	I need to put a lot of intentional effort to create connection in my workplace due to work from home.	4.25	0.85	Retain
12	I need to work fast due to work from home.	3.00	0.60	Drop
13	I need to work hard/put a lot effort due to work from home.	3.75	0.75	Drop
14	I do not get enough time to finish my job tasks due to work from home.	3.00	0.60	Drop
15	I need to do many things simultaneously at home when I work from home.	3.50	0.70	Drop
16	It is difficult for me to adapt with the required technologies for work from home.	3.50	0.70	Drop
17	I find it demanding to plan my work day autonomously while working from home.	3.75	0.75	Drop

Average htc
index (Standard
deviation)

0.73
(0.09)

Telework Resources

1	I can work longer hours and more work when I work from home.	4.00	0.80	Drop
2	I have the flexibility to stretch out work throughout the day during work from home.	4.00	0.80	Drop
3	I have more energy to put extra effort in my work because I work from home.	4.00	0.80	Drop

4	Work from home provides me with greater flexibility to collaborate with overseas teams/international coworkers.	4.00	0.80	Drop
5	Work from home provides me with the flexibility/opportunity to handle emergency situations at home.	4.25	0.85	Drop
6	Work from home saves my commuting time to work.	4.75	0.95	Retain
7	I have more time to spend with my family/friends due to work from home.	4.50	0.90	Retain
8	Work from home provides the flexibility/freedom to adjust personal/family responsibilities with work.	4.50	0.90	Retain
9	I can organize both my professional and personal works better due to work from home.	4.25	0.85	Drop
10	Work from home saves the dress-up and get ready time for work.	4.50	0.90	Retain
11	I have sufficient time to ensure quality work due to work from home.	4.50	0.90	Retain
12	I have autonomy on how to do my work during work from home.	4.50	0.90	Retain
13	Work from home saves money because I do not need to dress-up/make-up.	4.50	0.90	Retain
14	Work from home saves money because I do not need to commute.	4.50	0.90	Retain
15	Work from home saves money because I do not need to purchase lunch/coffee.	4.25	0.85	Drop
16	Work from home saves money because I do not need to put children in daycare.	3.50	0.70	Drop
17	I contribute to sustainability while working from home by reducing carbon footprint through no commute to work.	4.25	0.85	Drop
18	I have greater flexibility to plan/perform after hour personal/family works during work from home.	4.50	0.90	Retain
19	I experience less work-related distractions during work from home.	4.25	0.85	Drop
20	I can have greater focus/concentration in work while working from home.	4.50	0.90	Retain
21	I have more control over my work and nonwork time due to work from home.	4.30	0.86	Drop
22	I can work from anywhere because I can choose my work location during work from home.	3.75	0.75	Drop
23	I have greater opportunity for self-discipline due to work from home.	4.25	0.85	Drop
24	I have time to prepare healthy meals while working from home.	4.18	0.84	Drop
25	I can go for walk/do exercise/yoga when I work from home.	4.25	0.85	Drop

26	I can better support/contribute to my family/parents/children while working from home.	4.20	0.84	Drop
27	Work from home provides with the opportunity to share household chores equally with the spouse/partner/other members in family.	4.08	0.82	Drop
28	I can complete my tasks at work with minimum guidance and interactions due to work from home.	4.40	0.88	Retain
29	I have more time to complete/finish my job and personal tasks due to work from home.	4.55	0.91	Retain
30	I can work in a comfortable environment/attire/clothing when I work from home.	4.60	0.92	Retain
31	I can take care of my parents/children/pets when I work from home.	4.15	0.83	Drop
32	I am more proficient in using information technology due to work from home.	3.68	0.74	Drop
33	I can have asynchronous collaboration due to information technology usage while working from home.	4.18	0.84	Drop
34	I can work and collaborate efficiently due to information technology usage while working from home.	4.18	0.84	Drop
35	I feel motivated to work more when I work from home.	4.10	0.82	Drop
36	I find greater engagement among coworkers due to work from home.	3.73	0.75	Drop
37	I am more structured in my work and personal schedules due to work from home.	4.13	0.83	Drop
38	I am happier both at work and personal/family life because I work from home.	3.73	0.75	Drop
39	I can access to people at dispersed geographic locations for networking while working from home.	3.83	0.77	Drop
40	I have the flexibility to plan after-hour (night) office works due to work from home.	3.83	0.77	Drop
41	I can sleep more/better because I work from home.	3.98	0.80	Drop
42	I enjoy an improved relationship with my family/children/friends due to work from home.	3.98	0.80	Drop
43	Work from home provides me the flexibility to start and end my work day based on my needs/preferences.	4.55	0.91	Retain
44	I have more time and opportunities for self-care due to work from home.	4.50	0.90	Retain
45	I have more leisure time because I work from home.	4.18	0.84	Drop
46	I can have my lunch/snack/coffee based on my preferred time when I work from home.	4.05	0.81	Drop

47	I can learn new things for my career development since I do not need to commute when I work from home.	4.28	0.86	Drop
48	I have the flexibility to take breaks whenever I need while working from home.	4.55	0.91	Retain
49	I feel more productive because nobody is monitoring or controlling me during work from home.	4.48	0.90	Retain
50	I have better emotional regulation at work and personal life while working from home.	4.30	0.86	Drop
51	I have the opportunity to practice mindfulness when I work from home.	3.85	0.77	Drop
52	I can stay away from office politics while working from home.	4.13	0.83	Drop
53	I can better reflect on my ideas for creative solutions when I work from home.	4.40	0.88	Retain
54	I have flexibility to enjoy my life more due to work from home.	4.48	0.90	Retain
55	Work from home reduces the stress related to childcare/parent care/pet care as I can stay home provide care.	4.35	0.87	Retain
56	I have the autonomy to manage my own time and life due to work from home.	4.53	0.91	Retain
57	I have more mental capacity to concentrate at work because I am less stressed during work from home.	4.45	0.89	Retain
58	I have opportunity for multitasking when I work from home.	4.48	0.90	Retain
59	I feel less tired and relaxed when I work from home.	4.08	0.82	Drop
60	I have more time and energy to do other stuffs (personal/family/household/social work) at the end of work day when I work from home.	4.60	0.92	Retain
61	I can take a part-time job/work beside my first job when I work from home.	3.30	0.66	Drop
62	I can maintain family/other relationship commitments easily when I work from home.	3.78	0.76	Drop
63	I do not need to worry about safe driving/taking public transit to commute to work when I work from home.	3.33	0.67	Drop
64	I can maintain confidentiality at work when I work from home.	3.78	0.76	Drop
65	I feel highly engaged with my work when I work from home.	3.45	0.69	Drop
66	I have greater control over the work environment when I work from home.	4.03	0.81	Drop
67	I experience less microaggressions/bullying/abusive behavior at workplace due to work from home.	3.20	0.64	Drop

68	I feel greater psychological safety at work because of working from home.	3.58	0.72	Drop
69	Work from home provides me the opportunity to be creative.	3.50	0.70	Drop
70	My job requires high level of skill due to work from home.	2.78	0.56	Drop
71	I have the opportunity to develop my own abilities due to work from home.	3.88	0.78	Drop
72	I can perform a variety of tasks/work in my job due to work from home.	3.80	0.76	Drop
73	I can make a lot of decisions on my own at work while working from home.	3.95	0.79	Drop
74	My supervisor is concerned about my problems in work from home.	3.30	0.66	Drop
75	My supervisor pays attention to my feelings and problems during work from home.	4.18	0.84	Drop
76	My supervisor is helpful in getting my job done during work from home.	4.08	0.82	Drop
77	People I work with are competent in doing their jobs in the context of work from home.	3.88	0.78	Drop
78	People I work with take a personal interest (e.g., understand emotions, problems, and well-being) in me during work from home.	4.05	0.81	Drop
79	I find people I work with are friendly while working from home.	3.83	0.77	Drop
80	People I work with are helpful in getting the job done in the context of work from home.	4.13	0.83	Drop
81	My partner/family pays attention to my feelings and problems when I work from home.	3.80	0.76	Drop
82	My partner/family appreciates the way I do my job during work from home.	3.83	0.77	Drop
83	My partner/family helps me with a certain work and nonwork related task during work from home.	3.80	0.76	Drop
84	My partner/family gives me advice on how to handle things at work and home during work from home.	4.05	0.81	Drop
85	My home life helps me relax and feel ready for the next day's work during work from home.	2.95	0.59	Drop
86	The love and respect I get at home makes me feel confident about my work during work from home.	2.98	0.60	Drop
87	I can work hard during work from home since I can provide what is needed to my family.	3.15	0.63	Drop
88	I get support from my friends when needed during work from home.	4.05	0.81	Drop
89	My supervisor trusts me which helps me to perform and grow during work from home.	4.15	0.83	Drop

90	I can continue to work during my sickness because of work from home.	3.18	0.64	Drop
91	My supervisor encourages for social interaction among coworkers during work from home.	3.93	0.79	Drop
92	My supervisor helps me to meet personal/family/home obligations during work from home.	4.13	0.83	Drop
93	My supervisor provides sufficient feedback regularly to improve productivity/performance while working from home.	3.85	0.77	Drop
		Average htc index (Standard deviation)	0.81 (0.08)	

Table 9

Factor Correlations Matrix

Factor	1	2	3
1	0.664		
2	0.723	0.560	
3	-0.192	-0.399	0.896
Goodness of fit test			
Chi-square	df	sig.	
8134.53	1225	<0.001	

Table 10*Rotated Component Matrix of Orthogonal Rotation*

		EFA Factor Loading		
Items		1	2	3
CTD1	I feel overloaded because of a lot of emails/virtual meetings while working from home.		0.308	0.527
CTD5	I feel there are unwritten norms and expectations about increasing productivity and performance because I work from home.			0.691
CTD6	I feel an increase in expectations from family members about accommodating their needs because I work from home.			0.532
CTD7	The workload increased in work from home due to formal work processes.			0.759
CTD9	I need to go above and beyond to increase visibility of my work during work from home.			0.729
CTD10	Work from home increases the expectations from coworkers/supervisors for immediate responses.			0.724
CTD11	I need to put a lot of intentional effort to create connection in my workplace due to work from home.		0.494	0.448
HTD2	I lack relationship building opportunity with coworkers/management due to work from home.		0.728	
HTD3	I have less team building opportunities due to work from home.		0.782	
HTD5	I get less support from my supervisor due to work from home.		0.614	0.359
HTD6	I feel distant and disconnected from my organization due to work from home.		0.736	
HTD7	I do not get prompt responses about work-related questions from my coworkers/supervisor due to work from home.		0.576	
HTD8	Work from home limits the level of collaboration.		0.767	
HTD10	I feel lack of career development/growth opportunities while working from home.		0.656	
HTD11	Miscommunication/communication gap is more likely to occur during work from home.		0.693	
HTD12	I feel lack of communication among team members when we work from home.		0.731	
HTD13	I find lack of transparency in communication when we work from home.		0.707	
HTD24	I find it unhealthy to work from home due to sedentary positions at work.		0.478	

HTD27	I find it difficult to meet/network with people while working from home.	0.762	
HTD28	I feel lack of collaborative opportunity at work to brainstorm in work from home.	0.798	
HTD29	I feel lack of collaborative opportunity at work to come up with new/innovative solutions in work from home.	0.787	
HTD34	I find the virtual meetings to be less participative and engaged when we work from home.	0.670	
HTD35	I cannot understand emotions in communication and collaboration while working from home.	0.561	
HTD36	I have a distanced relationship with my manager/supervisor/coworkers due to work from home.	0.673	
HTD46	Work from home lacks the opportunity to understand nonverbal cues (e.g., facial expressions, body language, eye contact) in communication.	0.649	
TR6	Work from home saves my commuting time to work.	0.369	
TR7	I have more time to spend with my family/friends due to work from home.	0.648	
TR8	Work from home provides the flexibility/freedom to adjust personal/family responsibilities with work.	0.780	
TR10	Work from home saves the dress-up and get ready time for work.	0.653	
TR11	I have sufficient time to ensure quality work due to work from home.	0.660	-0.340
TR12	I have autonomy on how to do my work during work from home.	0.693	
TR13	Work from home saves money because I do not need to dress-up/make-up.	0.649	
TR14	Work from home saves money because I do not need to commute.	0.605	
TR18	I have greater flexibility to plan/perform after hour personal/family works during work from home.	0.798	
TR20	I can have greater focus/concentration in work while working from home.	0.489	-0.536
TR28	I can complete my tasks at work with minimum guidance and interactions due to work from home.	0.512	-0.371
TR29	I have more time to complete/finish my job and personal tasks due to work from home.	0.626	
TR30	I can work in a comfortable environment/attire/clothing when I work from home.	0.609	
TR40	I have the flexibility to plan after-hour (night) office works due to work from home.	0.648	
TR43	Work from home provides me the flexibility to start and end my work day based on my needs/preferences.	0.599	

TR44	I have more time and opportunities for self-care due to work from home.	0.749		
TR48	I have the flexibility to take breaks whenever I need while working from home.	0.617		
TR49	I feel more productive because nobody is monitoring or controlling me during work from home.	0.615	-0.322	
TR53	I can better reflect on my ideas for creative solutions when I work from home.	0.531	-0.362	0.309
TR54	I have flexibility to enjoy my life more due to work from home.	0.740		
TR55	Work from home reduces the stress related to childcare/parent care/pet care as I can stay home provide care.	0.537		
TR56	I have the autonomy to manage my own time and life due to work from home.	0.787		
TR57	I have more mental capacity to concentrate at work during work from home.	0.602	-0.459	
TR58	I have opportunity for multitasking when I work from home.	0.643		
TR60	I have more time and energy to do other stuffs (personal/family/household/social work) at the end of work day when I work from home.	0.684		

Note. N = 250. CTD = challenging telework demands; HTD = hindering telework demands; TR = telework resources.

Extraction method: Principal component analysis; Rotation method: Varimax.

Boldface values: Items with cross loading loaded on more than one factor.

Table 11*Pattern Matrix of Oblique Rotation*

		EFA Factor Loading		
Items		1	2	3
CTD1	I feel overloaded because of a lot of emails/virtual meetings while working from home.			0.503
CTD5	I feel there are unwritten norms and expectations about increasing productivity and performance because I work from home.			0.676
CTD6	I feel an increase in expectations from family members about accommodating their needs because I work from home.			0.516
CTD7	The workload increased in work from home due to formal work processes.			0.754
CTD9	I need to go above and beyond to increase visibility of my work during work from home.			0.715
CTD10	Work from home increases the expectations from coworkers/supervisors for immediate responses.			0.724
CTD11	I need to put a lot of intentional effort to create connection in my workplace due to work from home.	-0.462		0.401
HTD2	I lack relationship building opportunity with coworkers/management due to work from home.	-0.751		
HTD3	I have less team building opportunities due to work from home.	-0.821		
HTD5	I get less support from my supervisor due to work from home.	-0.594		
HTD6	I feel distant and disconnected from my organization due to work from home.	-0.749		
HTD7	I do not get prompt responses about work-related questions from my coworkers/supervisor due to work from home.	-0.554		
HTD8	Work from home limits the level of collaboration.	-0.777		
HTD10	I feel lack of career development/growth opportunities while working from home.	-0.644		
HTD11	Miscommunication/communication gap is more likely to occur during work from home.	-0.688		
HTD12	I feel lack of communication among team members when we work from home.	-0.721		
HTD13	I find lack of transparency in communication when we work from home.	-0.698		
HTD24	I find it unhealthy to work from home due to sedentary positions at work.	-0.471		

HTD27	I find it difficult to meet/network with people while working from home.	-0.800	
HTD28	I feel lack of collaborative opportunity at work to brainstorm in work from home.	-0.820	
HTD29	I feel lack of collaborative opportunity at work to come up with new/innovative solutions in work from home.	-0.795	
HTD34	I find the virtual meetings to be less participative and engaged when we work from home.	-0.668	
HTD35	I cannot understand emotions in communication and collaboration while working from home.	-0.540	
HTD36	I have a distanced relationship with my manager/supervisor/coworkers due to work from home.	-0.697	
HTD46	Work from home lacks the opportunity to understand nonverbal cues (e.g., facial expressions, body language, eye contact) in communication.	-0.685	
TR6	Work from home saves my commuting time to work.		0.393
TR7	I have more time to spend with my family/friends due to work from home.		0.654
TR8	Work from home provides the flexibility/freedom to adjust personal/family responsibilities with work.		0.817
TR10	Work from home saves the dress-up and get ready time for work.		0.699
TR11	I have sufficient time to ensure quality work due to work from home.		0.600
TR12	I have autonomy on how to do my work during work from home.		0.702
TR13	Work from home saves money because I do not need to dress-up/make-up.		0.663
TR14	Work from home saves money because I do not need to commute.		0.636
TR18	I have greater flexibility to plan/perform after hour personal/family works during work from home.		0.831
TR20	I can have greater focus/concentration in work while working from home.	0.542	0.361
TR28	I can complete my tasks at work with minimum guidance and interactions due to work from home.	0.347	0.435
TR29	I have more time to complete/finish my job and personal tasks due to work from home.		0.570
TR30	I can work in a comfortable environment/attire/clothing when I work from home.		0.635
TR40	I have the flexibility to plan after-hour (night) office works due to work from home.		0.651
TR43	Work from home provides me the flexibility to start and end my work day based on my needs/preferences.		0.612

TR44	I have more time and opportunities for self-care due to work from home.		0.740	
TR48	I have the flexibility to take breaks whenever I need while working from home.		0.659	
TR49	I feel more productive because nobody is monitoring or controlling me during work from home.	0.305	0.528	0.306
TR53	I can better reflect on my ideas for creative solutions when I work from home.	0.368	0.424	0.371
TR54	I have flexibility to enjoy my life more due to work from home.		0.706	
TR55	Work from home reduces the stress related to childcare/parent care/pet care as I can stay home provide care.		0.491	
TR56	I have the autonomy to manage my own time and life due to work from home.		0.802	
TR57	I have more mental capacity to concentrate at work during work from home.	0.458	0.480	0.361
TR58	I have opportunity for multitasking when I work from home.		0.629	
TR60	I have more time and energy to do other stuffs (personal/family/household/social work) at the end of work day when I work from home.		0.659	

Note. N = 250. CTD = challenging telework demands; HTD = hindering telework demands; TR = telework resources.

Extraction method: Principal component analysis; Rotation method: Direct oblimin.

Boldface values: Items with cross loading loaded on more than one factor.

Table 12*Items with Factor Loading Values - EFA*

Items		Mean	SD	Loading
CTD5	I feel there are unwritten norms and expectations about increasing productivity and performance because I work from home.	2.94	1.300	0.762
CTD6	I feel an increase in expectations from family members about accommodating their needs because I work from home.	3.19	1.404	0.584
CTD7	The workload increased in work from home due to formal work processes.	2.49	1.113	0.805
CTD9	I need to go above and beyond to increase visibility of my work during work from home.	2.96	1.317	0.813
CTD10	Work from home increases the expectations from coworkers/supervisors for immediate responses.	3.06	1.319	0.805
HTD2	I lack relationship building opportunity with coworkers/management due to work from home.	3.36	1.224	0.766
HTD3	I have less team building opportunities due to work from home.	3.47	1.186	0.834
HTD6	I feel distant and disconnected from my organization due to work from home.	2.74	1.278	0.751
HTD7	I do not get prompt responses about work-related questions from my coworkers/supervisor due to work from home.	2.36	1.178	0.598
HTD8	Work from home limits the level of collaboration.	2.82	1.247	0.809
HTD10	I feel lack of career development/growth opportunities while working from home.	2.56	1.235	0.640
HTD11	Miscommunication/communication gap is more likely to occur during work from home.	2.80	1.282	0.700
HTD12	I feel lack of communication among team members when we work from home.	2.69	1.222	0.748
HTD13	I find lack of transparency in communication when we work from home.	2.53	1.186	0.719
HTD24	I find it unhealthy to work from home due to sedentary positions at work.	2.28	1.275	0.458
HTD27	I find it difficult to meet/network with people while working from home.	3.14	1.264	0.775
HTD28	I feel a lack of collaborative opportunity at work to brainstorm in work from home.	2.74	1.213	0.810
HTD29	I feel a lack of collaborative opportunity at work to come up with new/innovative solutions in work from home.	2.55	1.158	0.779
HTD34	I find the virtual meetings to be less participative and engaged when we work from home.	2.74	1.348	0.690

HTD35	I cannot understand emotions in communication and collaboration while working from home.	2.32	1.106	0.573
HTD36	I have a distanced relationship with my manager/supervisor/coworkers due to work from home.	2.58	1.253	0.740
HTD46	Work from home lacks the opportunity to understand nonverbal cues (e.g., facial expressions, body language, eye contact) in communication.	3.23	1.252	0.677
TR6	Work from home saves my commuting time to work.	4.84	0.534	0.370
TR7	I have more time to spend with my family/friends due to work from home.	4.46	0.874	0.661
TR8	Work from home provides flexibility/freedom to adjust personal/family responsibilities with work.	4.51	0.915	0.812
TR10	Work from home saves the dress-up and get ready time for work.	4.62	0.857	0.684
TR12	I have autonomy on how to do my work during work from home.	4.43	0.853	0.697
TR13	Work from home saves money because I do not need to dress-up/make-up.	4.23	1.144	0.666
TR14	Work from home saves money because I do not need to commute.	4.70	0.729	0.623
TR18	I have greater flexibility to plan/perform after hour personal/family work during work from home.	4.53	0.777	0.825
TR29	I have more time to complete/finish my job and personal tasks due to work from home.	4.18	0.949	0.575
TR30	I can work in a comfortable environment/attire/clothing when I work from home.	4.71	0.613	0.614
TR40	I have the flexibility to plan after-hour (night) office work due to work from home.	4.26	0.994	0.663
TR43	Work from home provides me the flexibility to start and end my workday based on my needs/preferences.	4.19	1.088	0.623
TR44	I have more time and opportunities for self-care due to work from home.	4.19	0.994	0.752
TR48	I have the flexibility to take breaks whenever I need while working from home.	4.25	1.007	0.657
TR54	I have flexibility to enjoy my life more due to work from home.	4.41	0.808	0.720
TR55	Work from home reduces the stress related to childcare/parent care/pet care as I can stay home provide care.	4.09	1.109	0.504
TR56	I have the autonomy to manage my own time and life due to work from home.	4.31	0.921	0.793
TR58	I have the opportunity for multitasking when I work from home.	4.25	0.848	0.636

TR60	I have more time and energy to do other stuff (personal/family/household/social work) at the end of workday when I work from home.	4.33	0.890	0.664
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Note. N = 250. CTD = challenging telework demands; HTD = hindering telework demands; TR = telework resources.

Boldface values: Items with factor loading of less than 0.5.

Table 13

Model Fit Indices for Three-factor, Two-factor, and One-factor Models – CFA Sample 1

Models	χ^2	df	RMSEA	CFI	NFI	GFI	RFI	IFI	TLI	SRMR
Three-factor (challenging telework demands, hindering telework demands, and telework resources)	243.40*	178	0.03	0.98	0.93	0.92	0.91	0.98	0.97	0.04
Two-factor (challenging and hindering telework demands combined, and telework resources)	1108.40*	736	0.04	0.93	0.83	0.82	0.81	0.94	0.93	0.06
One-factor (challenging telework demands, hindering telework demands and telework resources combined)	1201.43*	655	0.06	0.90	0.81	0.82	0.77	0.90	0.88	0.11

Note. N = 250. χ^2 = chi-square statistics; RMSEA = root mean square error of approximation; CFI = comparative fit index; NFI = normed fit index ; GFI = goodness of fit index; RFI = relative fit index; IFI = incremental fit index; TLI = the Tucker-Lewis coefficient; SRMR = standardized root mean square residual.

*p < 0.001, two-tailed.

Table 14*Items with Standardized Factor Loadings - CFA Sample 1*

Items	Standardized factor loadings	Decision
CTD5 I feel there are unwritten norms and expectations about increasing productivity and performance because I work from home.	0.772	Retain
CTD6 I feel an increase in expectations from family members about accommodating their needs because I work from home.	0.547	Retain
CTD7 The workload increased in work from home due to formal work processes.	0.751	Retain
CTD9 I need to go above and beyond to increase visibility of my work during work from home.	0.816	Retain
CTD10 Work from home increases the expectations from coworkers/supervisors for immediate responses.	0.703	Retain
HTD2 I lack relationship building opportunities with coworkers/management due to work from home.	0.719	Retain
HTD3 I have less team building opportunities due to work from home.	0.749	Retain
HTD6 I feel distant and disconnected from my organization due to work from home.	0.731	Retain
HTD7 I do not get prompt responses about work-related questions from my coworkers/supervisor due to work from home.	0.632	Drop
HTD8 Work from home limits the level of collaboration.	0.788	Retain
HTD10 I feel lack of career development/growth opportunities while working from home.	0.690	Drop
HTD11 Miscommunication/communication gap is more likely to occur during work from home.	0.739	Retain
HTD12 I feel lack of communication among team members when we work from home.	0.798	Retain
HTD13 I find lack of transparency in communication when we work from home.	0.764	Retain
HTD24 I find it unhealthy to work from home due to sedentary positions at work.	0.486	Drop
HTD27 I find it difficult to meet/network with people while working from home.	0.720	Retain
HTD28 I feel a lack of collaborative opportunity at work to brainstorm in work from home.	0.799	Retain
HTD29 I feel a lack of collaborative opportunity at work to come up with new/innovative solutions in work from home.	0.810	Retain

HTD34	I find the virtual meetings to be less participative and engaged when we work from home.	0.697	Drop
HTD35	I cannot understand emotions in communication and collaboration while working from home.	0.610	Drop
HTD36	I have a distanced relationship with my manager/supervisor/coworkers due to work from home.	0.661	Drop
HTD46	Work from home lacks the opportunity to understand nonverbal cues (e.g., facial expressions, body language, eye contact) in communication.	0.600	Drop
TR6	Work from home saves my commuting time to work.	0.360	Drop
TR7	I have more time to spend with my family/friends due to work from home.	0.653	Drop
TR8	Work from home provides flexibility/freedom to adjust personal/family responsibilities with work.	0.789	Retain
TR10	Work from home saves the dress-up and getting ready time for work.	0.599	Drop
TR12	I have autonomy on how to do my work during work from home.	0.690	Drop
TR13	Work from home saves money because I do not need to dress-up/make-up.	0.614	Drop
TR14	Work from home saves money because I do not need to commute.	0.573	Drop
TR18	I have greater flexibility to plan/perform after hour personal/family work during work from home.	0.796	Retain
TR29	I have more time to complete/finish my job and personal tasks due to work from home.	0.611	Drop
TR30	I can work in a comfortable environment/attire/clothing when I work from home.	0.563	Drop
TR40	I have the flexibility to plan after-hour (night) office work due to work from home.	0.624	Drop
TR43	Work from home provides me the flexibility to start and end my workday based on my needs/preferences.	0.583	Drop
TR44	I have more time and opportunities for self-care due to work from home.	0.755	Retain
TR48	I have the flexibility to take breaks whenever I need while working from home.	0.587	Drop
TR54	I have flexibility to enjoy my life more due to work from home.	0.758	Retain
TR55	Work from home reduces the stress related to childcare/parent care/pet care as I can stay home provide care.	0.529	Drop
TR56	I have the autonomy to manage my own time and life due to work from home.	0.778	Retain
TR58	I have the opportunity for multitasking when I work from home.	0.634	Drop

TR60	I have more time and energy to do other stuff (personal/family/household/social work) at the end of workday when I work from home.	0.706	Retain
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Note. N = 250. CTD = challenging telework demands; HTD = hindering telework demands;
TR = telework resources.
Boldface values: Items with the standardized factor loadings of less than 0.7.

Table 15

Reliability and Validity Statistics – CFA Sample 1

Factor	Cronbach's alpha	Composite reliability	AVE	MSV	ASV
Challenging telework demands	0.836	0.844	0.524	0.233	0.122
Hindering telework demands	0.933	0.927	0.559	0.233	0.178
Telework resources	0.893	0.892	0.579	0.123	0.066

Note. N = 250. AVE = average variance extracted; MSV = maximum shared variance; ASV = average
shared variance.

Table 16*Items with Standardized Factor Loadings - CFA Sample 2 (SEM with Three-factor Model)*

Items	Standardized factor loadings	Decision
CTD1 Working from home creates implicit norms and expectations for increased productivity and performance.	0.619	Retain
CTD2 Working from home raises the expectations of my family members regarding accommodating their needs.	0.592	Retain
CTD3 My workload increased in work from home due to formal work processes.	0.449	Drop
CTD4 I need to exceed expectations to increase the visibility of my work while working from home.	0.417	Drop
CTD5 Work from home increases the expectations from coworkers and supervisors for immediate responses.	0.666	Retain
HTD1 Work from home limits my relationship building opportunity with coworkers/management.	0.850	Retain
HTD2 Work from home limits my team building opportunities.	0.812	Retain
HTD3 Working from home has left me feeling distant and disconnected from my organization.	0.843	Retain
HTD4 Work from home limits my opportunities to collaborate.	0.854	Retain
HTD5 Work from home is more likely to create miscommunication or communication gap.	0.876	Retain
HTD6 Work from home limits my opportunities to communicate with my team members.	0.745	Retain
HTD7 Work from home lacks transparency in communication.	0.845	Retain
HTD8 I struggle to connect and network with people while working from home.	0.891	Retain
HTD9 Work from home limits my collaborative opportunity at work to brainstorm.	0.861	Retain
HTD10 Work from home limits my collaborative opportunity at work to come up with new/innovative solutions.	0.870	Retain
TR1 Work from home provides the flexibility to adjust personal and family responsibilities with work.	0.636	Retain
TR2 Work from home provides me with greater flexibility to plan and perform after hours personal and family works.	0.670	Retain
TR3 Working from home provides me with more time and opportunities for self-care.	0.667	Retain
TR4 Working from home gives me the flexibility to enjoy my life more.	0.647	Retain
TR5 Work from home provides me with the autonomy to manage my own time and life.	0.483	Drop

TR6	When I work from home, I have more time and energy for personal, family, household, and social activities at the end of the workday.	0.649	Retain
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Note. N = 250. CTD = challenging telework demands; HTD = hindering telework demands; TR = telework resources. Boldface values: Items with factor loadings of less than 0.50.

Table 17

Model Fit Indices for Three-factor and Two-factor Models – CFA Sample 2

Model	χ^2	df	RMSEA	CFI	NFI	GFI	RFI	IFI	TLI	SRMR
Three-factor (challenging telework demands, hindering telework demands, and telework resources)	183.82*	122	0.04	0.98	0.94	0.93	0.93	0.98	0.97	0.04
Two-factor (challenging and hindering telework demands combined, and telework resources)	127.43*	78	0.05	0.98	0.95	0.94	0.94	0.98	0.98	0.03

Note. N = 250. χ^2 = chi-square statistics; RMSEA = root mean square error of approximation; CFI = comparative fit index; NFI = normed fit index; GFI = goodness of fit index; RFI = relative fit index; IFI = incremental fit index; TLI = the Tucker-Lewis coefficient; SRMR = standardized root mean square residual.

*p < 0.001, two-tailed.

Table 18

Reliability and Validity Statistics – CFA Sample 2

Factor	Cronbach's alpha	Composite reliability	AVE	MSV	ASV
Challenging telework demands	0.651	0.653	0.387	0.245	0.139
Hindering telework demands	0.961	0.962	0.717	0.034	0.021
Telework resources	0.791	0.809	0.460	0.245	0.126

Note. N = 250. AVE = average variance extracted; MSV = maximum shared variance; ASV = average shared variance.

Table 19*Items with Standardized Factor Loadings - CFA Sample 2 (SEM with Two-factor Model)*

Items		Standardized factor loadings	Decision
CTD1	Working from home creates implicit norms and expectations for increased productivity and performance.	0.013	Drop
CTD2	Working from home raises the expectations of my family members regarding accommodating their needs.	-0.137	Drop
CTD3	My workload increased in work from home due to formal work processes.	-0.100	Drop
CTD4	I need to exceed expectations to increase the visibility of my work while working from home.	-0.152	Drop
CTD5	Work from home increases the expectations from coworkers and supervisors for immediate responses.	-0.173	Drop
HTD1	Work from home limits my relationship building opportunity with coworkers/management.	0.850	Retain
HTD2	Work from home limits my team building opportunities.	0.811	Retain
HTD3	Working from home has left me feeling distant and disconnected from my organization.	0.843	Retain
HTD4	Work from home limits my opportunities to collaborate.	0.853	Retain
HTD5	Work from home is more likely to create miscommunication or communication gap.	0.877	Retain
HTD6	Work from home limits my opportunities to communicate with my team members.	0.745	Retain
HTD7	Work from home lacks transparency in communication.	0.845	Retain
HTD8	I struggle to connect and network with people while working from home.	0.891	Retain
HTD9	Work from home limits my collaborative opportunity at work to brainstorm.	0.860	Retain
HTD10	Work from home limits my collaborative opportunity at work to come up with new/innovative solutions.	0.870	Retain
TR1	Work from home provides the flexibility to adjust personal and family responsibilities with work.	0.632	Retain
TR2	Work from home provides me with greater flexibility to plan and perform after hours personal and family works.	0.669	Retain
TR3	Working from home provides me with more time and opportunities for self-care.	0.670	Retain
TR4	Working from home gives me the flexibility to enjoy my life more.	0.658	Retain
TR5	Work from home provides me with the autonomy to manage my own time and life.	0.463	Drop

TR6	When I work from home, I have more time and energy for personal, family, household, and social activities at the end of the workday.	0.653	Retain
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Note. N = 250. CTD = challenging telework demands; HTD = hindering telework demands; TR = telework resources.

Boldface values: Items with factor loadings of less than 0.50.

Table 20*Reliability and Validity Statistics – CFA Sample 2 (Two-factor Model)*

Factors		Items	Standardized factor loadings	Cronbach's alpha	Composite reliability	AVE	MSV
Telework demands	HTD1	Work from home limits my relationship building opportunity with coworkers/management .	0.850	0.961	0.962	0.715	0.008
	HTD2	Work from home limits my team building opportunities.	0.812				
	HTD3	Working from home has left me feeling distant and disconnected from my organization.	0.843				
	HTD4	Work from home limits my opportunities to collaborate.	0.855				
	HTD5	Work from home is more likely to create miscommunication or communication gap.	0.876				
	HTD6	Work from home limits my opportunities to communicate with my team members.	0.744				
	HTD7	Work from home lacks transparency in communication.	0.845				
	HTD8	I struggle to connect and network with people while working from home.	0.891				
	HTD9	Work from home limits my collaborative opportunity at work to brainstorm.	0.861				
	HTD10	Work from home limits my collaborative opportunity at work to come up with new/innovative solutions.	0.869				

Telework resources	TR1	Work from home provides the flexibility to adjust personal and family responsibilities with work.	0.651	0.791	0.792	0.432	0.008
	TR2	Work from home provides me with greater flexibility to plan and perform after hours personal and family works.	0.630				
	TR3	Working from home provides me with more time and opportunities for self-care.	0.685				
	TR4	Working from home gives me the flexibility to enjoy my life more.	0.667				
	TR6	When I work from home, I have more time and energy for personal, family, household, and social activities at the end of the workday.	0.652				

Note. N = 250. AVE = average variance extracted; MSV = maximum shared variance; ASV = average shared variance.

Table 21

Descriptive Statistics, Internal Consistencies and Correlations Between the Variables of Nomological Network

Variable	Range	Mean	Standard deviation	Cronbach's alpha	1	2	3	4	5
1. Telework demands	1-5	3.422	1.048	0.961					
2. Telework resources	1-5	4.078	0.640	0.791	0.074				
3. Burnout	0-6	1.798	0.939	0.878	-0.120	-0.709**			
4. Work engagement	0-6	4.333	1.068	0.859	0.096	0.421**	-0.424**		
5. Job satisfaction	1-5	4.068	0.708	0.728	0.054	0.282**	-0.316**	0.580**	
6. Job performance	0-6	4.741	0.837	0.881	0.124*	0.526**	-0.359**	0.498**	0.400**

Note. N = 250.

*p < 0.05, **p < 0.01.

Table 22

SEM Results for Hypothesized Nomological Network

Hypothesis	Relationships	Coefficient	Standard error	p-value	Decision
H1(a)	Telework demands → Burnout	-0.057	0.043	0.266	Not supported
H1(b)	Telework demands → Work engagement	0.061	0.059	0.315	Not supported
H3(a)	Telework demands → Job satisfaction	0.038	0.043	0.589	Not supported
H4(a)	Telework demands → Job performance	0.074	0.042	0.215	Not supported
H2(a)	Telework resources → Burnout	-0.838	0.147	**	Supported
H2(b)	Telework resources → Work engagement	0.620	0.160	**	Supported
H3(b)	Telework resources → Job satisfaction	0.500	0.099	**	Supported
H4(b)	Telework resources → Job performance	0.620	0.116	**	Supported

Note. N = 250. ** = p < 0.01

Table 23*Results of Moderation Tests for the Relationships between Telework Demands and Outcome**Variables*

Moderating Relationships	Coefficient	Standard error	p-value
Telework demands*Telework intensity → Burnout	-1.348	0.194	**
Telework demands*Telework intensity → Work engagement	1.602	0.216	**
Telework demands*Telework intensity → Job satisfaction	0.857	0.150	**
Telework demands*Telework intensity → Job performance	1.345	0.168	**

Note. N = 250. ** = p < 0.01

Table 24*Descriptive Statistics, Internal Consistencies and Correlations Between the Variables of Study 2*

Variable	Range	Mean	Standard deviation	Cronbach's alpha	Composite reliability	AVE	1	2	3	4
1. Telework demands	1-5	2.254	0.985	0.952	0.959	0.699				
2. Telework resources	1-5	4.627	0.598	0.888	0.915	0.683	-0.309**			
3. Collaboration at individual-level	1-5	3.646	1.120	0.954	0.963	0.814	-0.107*	-0.002		
4. Individual innovative behavior	1-5	3.516	0.794	0.913	0.930	0.599	-0.144**	0.33	0.570**	
5. Leader-member exchange	1-5	3.738	0.954	0.955	0.961	0.676	-0.080	0.22	0.423**	0.384**

Note. N = 389. *p < 0.05, p**<0.01.

Table 25*Model Fit Indices for Four-factor, Three-factor, Two-factor and One-factor Models – Study 2*

Model	χ^2	df	RMSEA	CFI	NFI	GFI	RFI	IFI	TLI	SRMR
Four-factor model (telework demands, telework resources, collaboration, individual innovative behavior)	500.774*	372	0.030	0.986	0.949	0.922	0.941	0.986	0.984	0.036
Three-factor model (telework demands, telework resources, collaboration and innovative behavior combined)	2342.454*	402	0.112	0.795	0.763	0.597	0.744	0.795	0.778	0.091
Two-factor model (telework demands and resources combined, collaboration and innovative behavior combined)	3277.194*	404	0.135	0.696	0.669	0.525	0.643	0.697	0.673	0.120
One-factor model (all constructs combined)	6478.192*	405	0.197	0.358	0.345	0.308	0.297	0.360	0.310	0.253

Note. N = 389. χ^2 = chi-square statistics; RMSEA = root mean square error of approximation; CFI = comparative fit index; NFI = normed fit index ; GFI = goodness of fit index; RFI = relative fit index; IFI = incremental fit index; TLI = the Tucker-Lewis coefficient; SRMR = standardized root mean square residual.

*p < 0.001, two-tailed.

Table 26*Results of Regression Analysis Examining the Direct Relationships – Hypotheses 1-5*

Dependent variable	Predictor	b	SE	t	p	95% Confidence Interval	R	R square	Adjusted R square	F change	Sig. F change
Individual innovative behavior	Telework demands	-0.148	0.043	-2.801	0.005	[-0.203, -0.036]	0.145	0.021	0.016	4.133	0.017
	Telework resources	-0.013	0.070	-0.249	0.803	[-0.156, 0.121]					
Collaboration at individual-level	Telework demands	-0.120	0.060	-2.249	0.025	[-0.255, -0.017]	0.114	0.013	0.008	2.530	0.081
	Telework resources	-0.039	0.100	-0.735	0.463	[-0.269, 0.123]					
Individual innovative behavior	Collaboration at individual-level	0.570	0.030	13.658	0.000	[0.346, 0.462]	0.570	0.325	0.324	186.542	0.000

Table 27*Mediation Analysis Results for the Effect of Telework Demands on Individual Innovative**Behavior Via Collaboration*

Path	B	b	SE	t	p	95% CI
Total effect (c): Telework demands → Individual innovative behavior	-0.144	-0.116	0.041	-2.87	0.004	[-0.196, -0.037]
Direct effect (c'): Telework demands → Individual innovative behavior	-0.084	-0.068	0.034	-2.01	0.046	[-0.134, -0.001]
Indirect effect: Telework demands → Individual innovative behavior via collaboration	-0.060	-0.049	0.031			[-0.098, 0.000]

Table 28*Mediation Analysis Results for the Effect of Telework Resources on Individual Innovative**Behavior Via Collaboration*

Path	B	b	SE	t	p	95% CI
Total effect (c): Telework resources → Individual innovative behavior	0.033	0.043	0.067	0.642	0.521	[-0.089, 0.176]
Direct effect (c'): Telework resources → Individual innovative behavior	0.034	0.045	0.055	0.810	0.418	[-0.064, 0.154]
Indirect effect: Telework resources → Individual innovative behavior via collaboration	-0.001	-0.002	0.041			[-0.084, 0.076]

Table 29*Results of Moderation Analysis using Process Macro 1 for Hypotheses 8-13*

Criterion	Predictor	b	SE	95% CI	t	p	R	R square
Collaboration at individual-level	Telework demands	-0.137	0.06	[-0.256, -0.018]	-2.267	0.024	0.120	0.014
	Telework resources	-0.050	0.105	[-0.255, 0.156]	-0.473	0.636		
	Telework demands X Telework resources	-0.070	0.093	[-0.253, 0.114]	-0.746	0.456		
Individual innovative behavior	Telework demands	-0.122	0.042	[-0.205, -0.038]	-2.859	0.004	0.173	0.030
	Telework resources	0.024	0.074	[-0.120, 0.169]	0.331	0.741		
	Telework demands X Telework resources	-0.123	0.066	[-0.252, 0.006]	-1.874	0.062		
Collaboration at individual-level	Telework intensity	0.024	0.005	[0.000, 0.013]	4.435	< .001	0.244	0.060
	Telework demands	-0.095	0.057	[0.092, -0.207]	-1.687	0.092		
	Telework intensity X Telework demands	0.001	0.006	[0.868, -0.010]	0.166	0.868		
Collaboration at individual-level	Telework intensity	0.026	0.005	[0.015, 0.037]	4.839	<.001	0.255	0.065
	Telework resources	-0.009	0.093	[-0.192, 0.174]	-0.097	0.923		
	Telework intensity X Telework resources	0.019	0.008	[0.002, 0.035]	2.261	0.024		
Individual innovative behavior	Telework intensity	0.013	0.004	[0.005, 0.020]	3.24	0.001	0.216	0.047

Individual innovative behavior	Telework demands	-0.102	0.04	[-0.182, -0.023]	-2.54	0.012		
	Telework intensity X Telework demands	-0.001	0.004	[-0.008, 0.007]	-0.122	0.903		
	Telework intensity	0.014	0.003	[0.006, 0.021]	3.691	<.001	0.198	0.039
	Telework resources	0.041	0.066	[-0.090, 0.172]	0.615	0.538		
	Telework intensity X Telework resources	0.009	0.006	[-0.001, 0.021]	1.657	0.098		

Table 30*Results of Moderated Mediation Analysis using Process Macro 8 for Hypotheses 14*

Outcome: Collaboration at individual-level (Mediator)	b	SE	t	p	LLCI	ULCI
Telework demands	-0.095	0.057	-1.687	0.092	-0.207	0.016
Telework intensity	0.024	0.005	4.435	<.001	0.013	0.035
Telework demands X Telework intensity	0.001	0.006	0.166	0.868	-0.010	0.012
Model R ² = 0.059, F(3, 385) = 8.13, p < 0.001						
Outcome: Individual innovative behavior (Dependent Variable)	b	SE	t	p	LLCI	ULCI
Telework demands	-0.065	0.034	-1.918	0.056	-0.132	0.002
Collaboration at individual-level	0.391	0.030	12.860	<.001	0.332	0.451
Telework intensity	0.003	0.003	0.943	0.346	-0.003	0.010
Telework demands X Telework intensity	-0.001	0.003	-0.254	0.800	-0.008	0.006
Model R ² = 0.333, F(4, 384) = 48.12, p < 0.001						
Conditional Indirect Effects						
Telework intensity (Moderator)	Effect	Boot SE	Boot LLCI	Boot ULCI		
-10.34 (Low)	-0.041	0.043	-0.131	0.040		
0 (Mean)	-0.037	0.024	-0.087	0.009		
10.34 (High)	-0.034	0.038	-0.111	0.040		
Index of Moderated Mediation						
Index	Boot SE	Boot LLCI	Boot ULCI			
0.000	0.003	-0.006	0.007			

Table 31*Results of Moderated Mediation Analysis using Process Macro 8 for Hypotheses 15*

Outcome: Collaboration at individual-level (Mediator)	b	SE	t	p	LLCI	ULCI
Telework resources	-0.009	0.0928	-0.0967	0.923	-0.1915	0.1735
Telework intensity	0.026	0.0054	4.8387	<.001	0.0154	0.0365
Telework resources X Telework intensity	0.0188	0.0083	2.2605	0.024	0.0024	0.0351
Model R ² = 0.065, F(3, 385) = 8.92, p < 0.001						
Outcome: Individual innovative behavior (Dependent Variable)	b	SE	t	p	LLCI	ULCI
Telework resources	0.045	0.056	0.799	0.425	-0.065	0.154
Collaboration at individual-level	0.394	0.031	12.876	<.001	0.334	0.455
Telework intensity	0.004	0.003	1.200	0.231	-0.003	0.011
Telework resources X Telework intensity	0.003	0.005	0.494	0.622	-0.007	0.012
Model R ² = 0.329, F(4, 384) = 47.10, p < 0.001						
Conditional Indirect Effects						
Telework intensity (Moderator)	Effect	Boot SE	Boot LLCI	Boot ULCI		
-10.34 (Low)	-0.080	0.051	-0.184	0.020		
0 (Mean)	-0.004	0.038	-0.079	0.069		
10.34 (High)	0.073	0.058	-0.042	0.188		
Index of Moderated Mediation						
Index	Boot SE	Boot LLCI	Boot ULCI			
0.007	0.004	0.000	0.015			

Table 32*Summary of Hypotheses Test Results – Study 2*

Hypothesis	Results	Findings
Hypothesis 1	Supported	Telework demands negatively predicted individual innovative behavior.
Hypothesis 2	Not supported	Telework resources did not positively predict individual innovative behavior.
Hypothesis 3	Supported	Telework demands negatively predicted collaboration.
Hypothesis 4	Not supported	Telework resources did not positively predict collaboration.
Hypothesis 5	Supported	Collaboration positively predicted innovative behavior.
Hypothesis 6	Not supported	Collaboration did not mediate the relationship between telework demands and individual innovative behavior.
Hypothesis 7	Not supported	Collaboration did not mediate the relationship between telework resources and individual innovative behavior.
Hypothesis 8	Not supported	Telework resources did not moderate the relationship between telework demands and collaboration.
Hypothesis 9	Not supported	Telework resources did not moderate the relationship between telework demands and individual innovative behavior.
Hypothesis 10	Not supported	Telework intensity did not moderate the relationship between telework demands and collaboration.
Hypothesis 11	Supported	Telework intensity moderated the relationship between telework resources and collaboration.
Hypothesis 12	Not supported	Telework intensity did not moderate the relationship between telework demands and individual innovative behavior.
Hypothesis 13	Not supported	Telework intensity did not moderate the relationship between telework resources and individual innovative behavior.

Hypothesis 14	Not supported	The indirect effect of telework demands on individual innovative behavior through collaboration was not moderated by telework intensity.
Hypothesis 15	Marginally supported	The indirect effect of telework resources on individual innovative behavior through collaboration was moderated by higher telework intensity.

Figure 1

Proposed Research Model

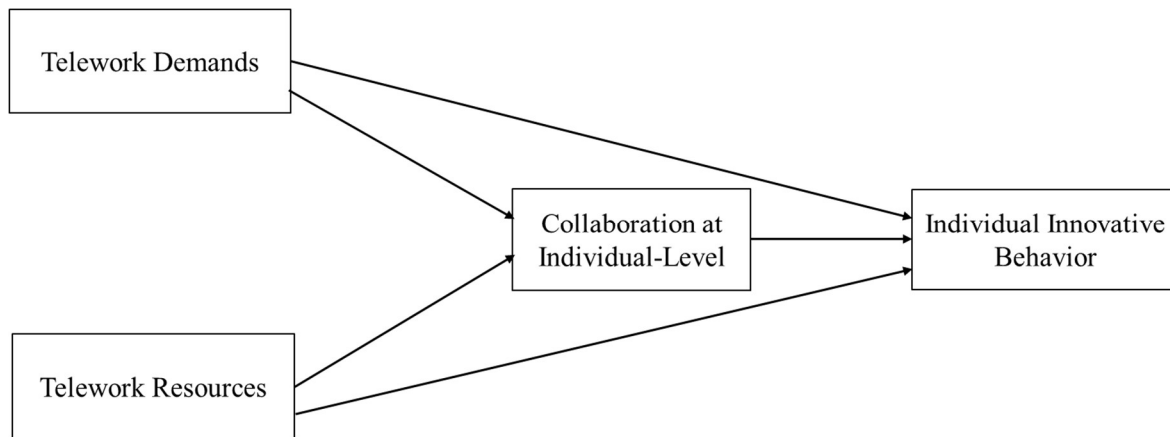


Figure 2

Outcomes of Telework

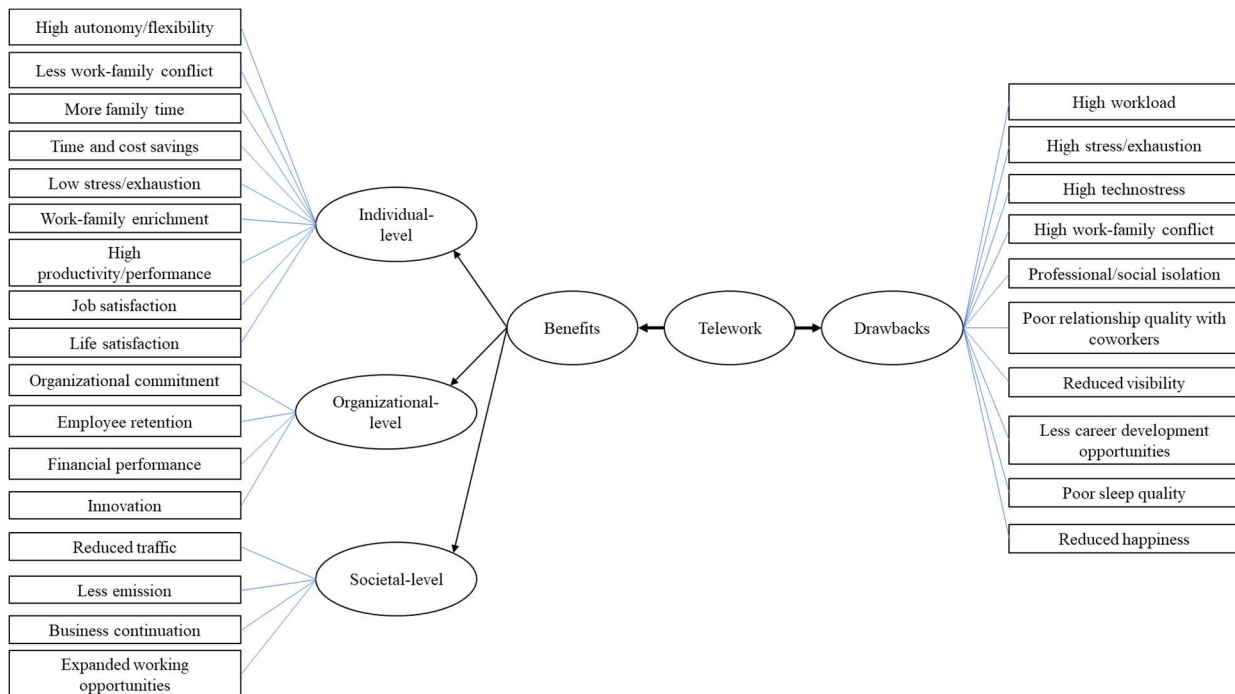


Figure 3

The Revised Job Demands and Resources Model by Schaufeli (2017)

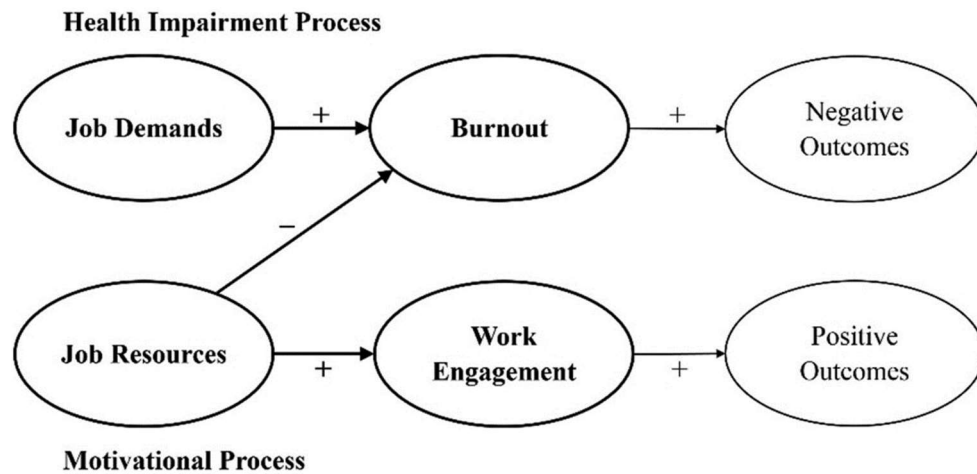


Figure 4

Collaborative Performance Framework by Bedwell et al. (2012)

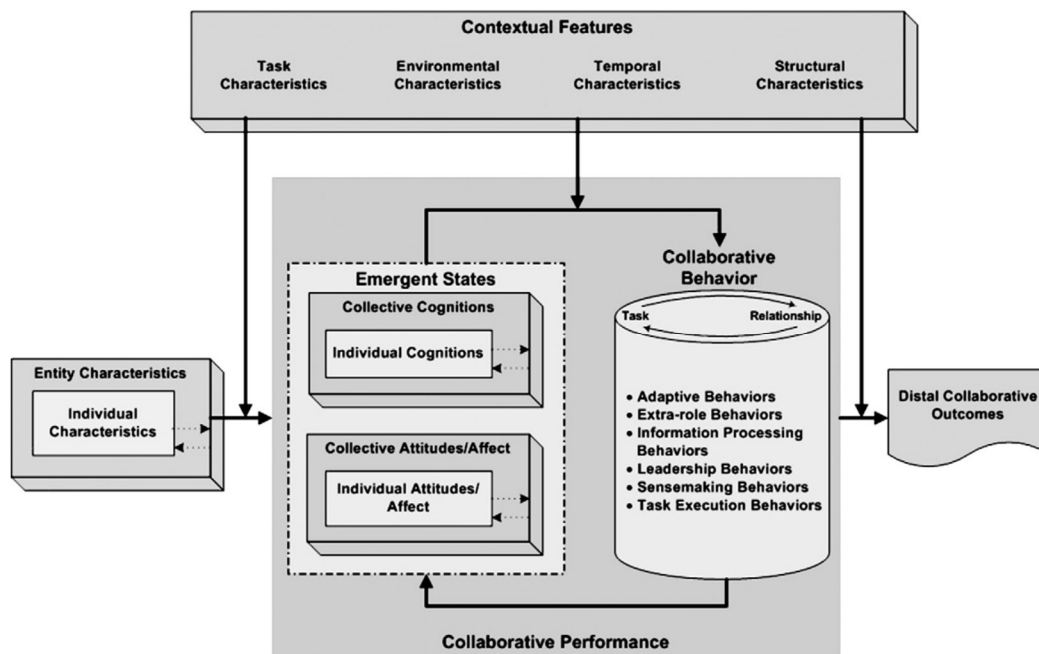


Figure 5

Scale Development and Validation Process Adopted in the Current Study

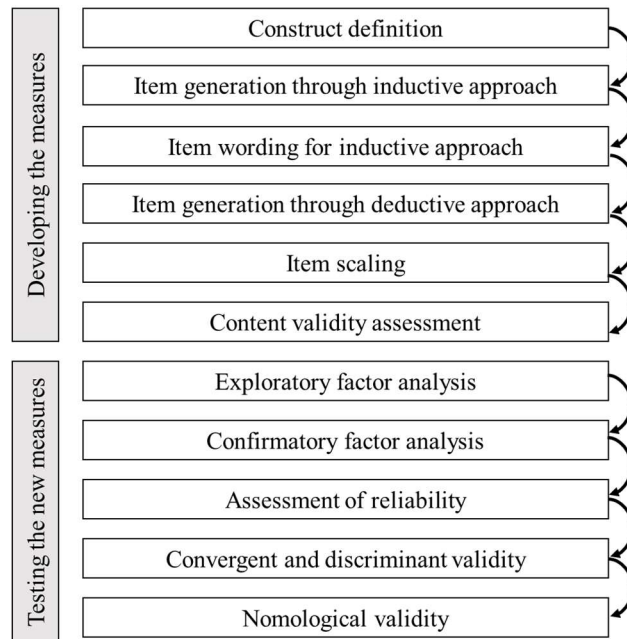
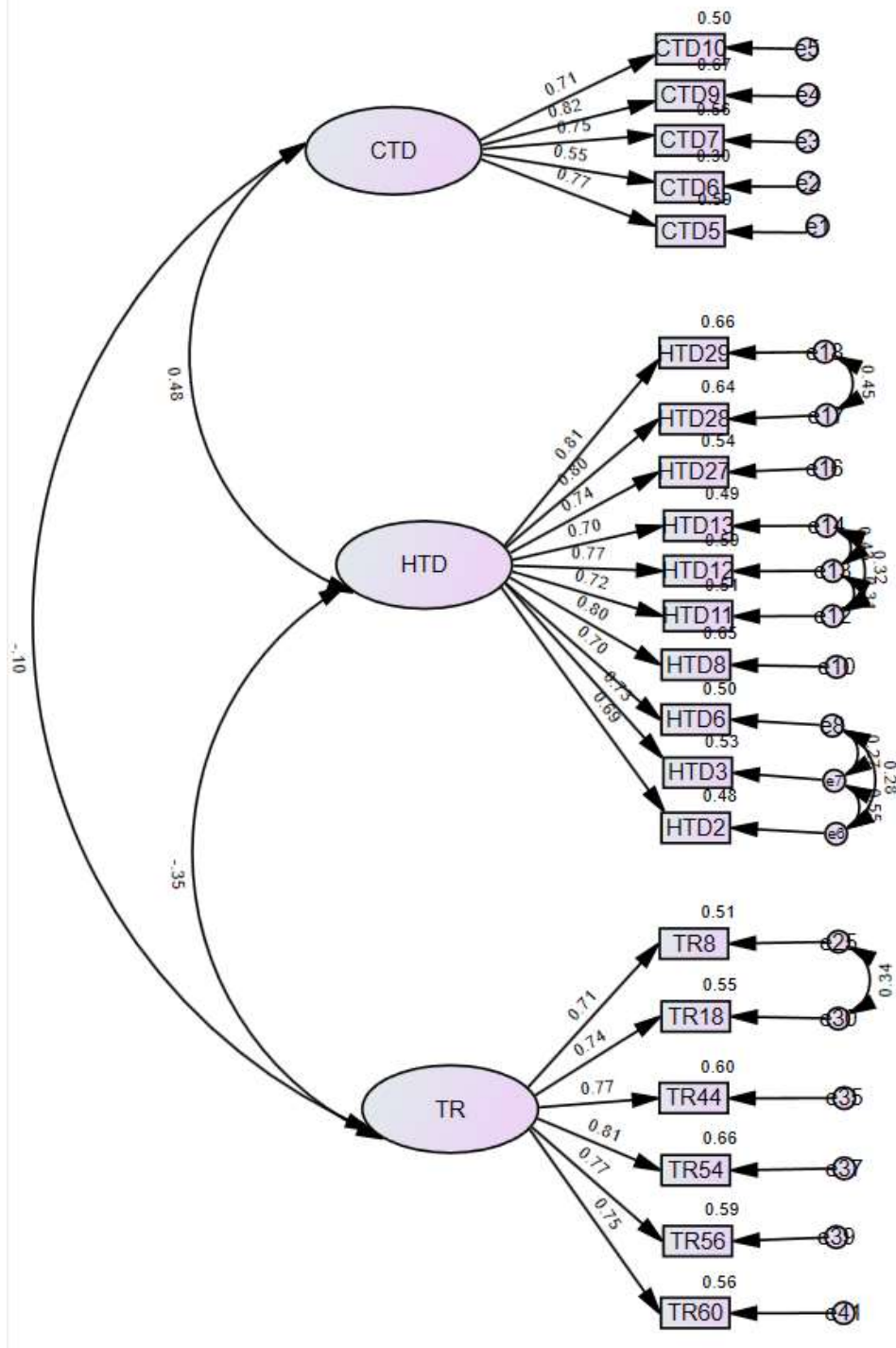


Figure 6

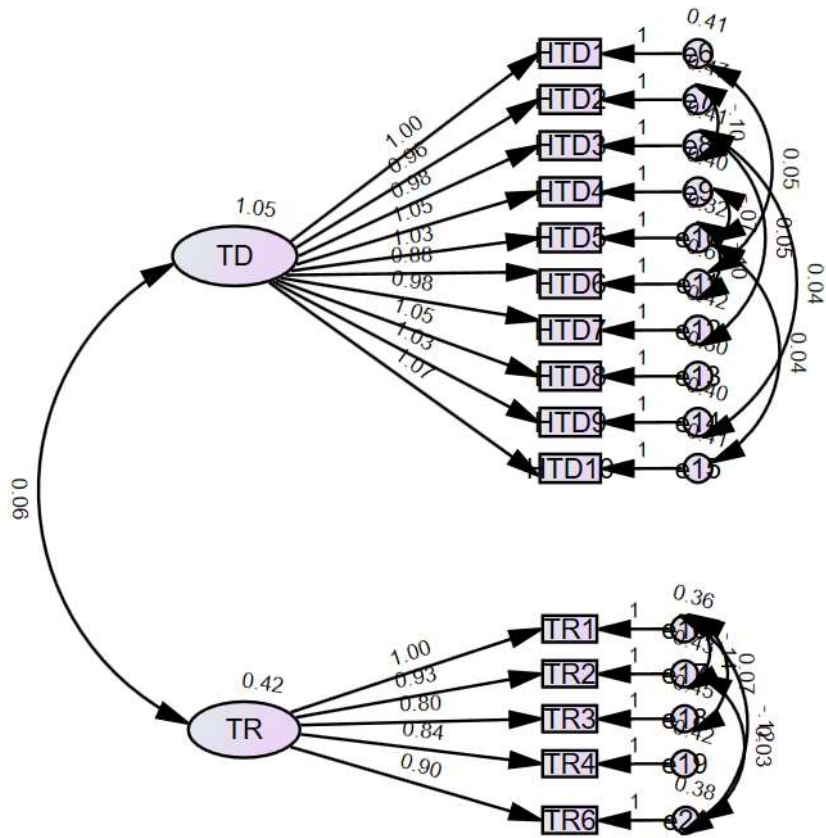
Path Diagram of Three-Factor Model from CFA – Sample 2



Note. CTD = Challenging telework demands, HTD = Hindering telework demands, and TR = Telework resources.

Figure 7

Path Diagram of Two-Factor Model from CFA – Sample 2



Note. TD = Telework demands, and TR = Telework resources.

Figure 8

Hypothesized Nomological Network of Telework Demands and Telework Resources

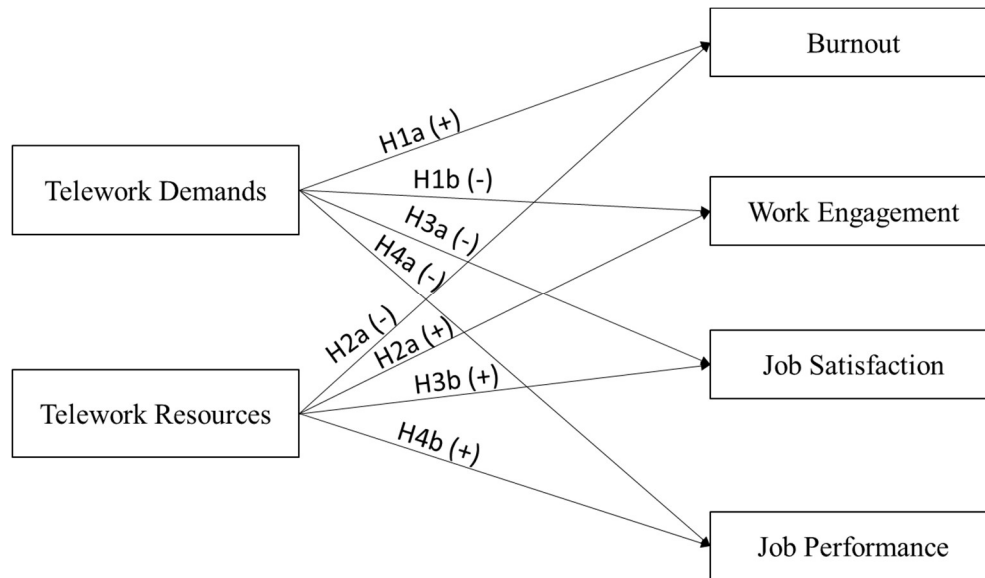


Figure 9

Results for Hypothesized Regression Model of Nomological Network

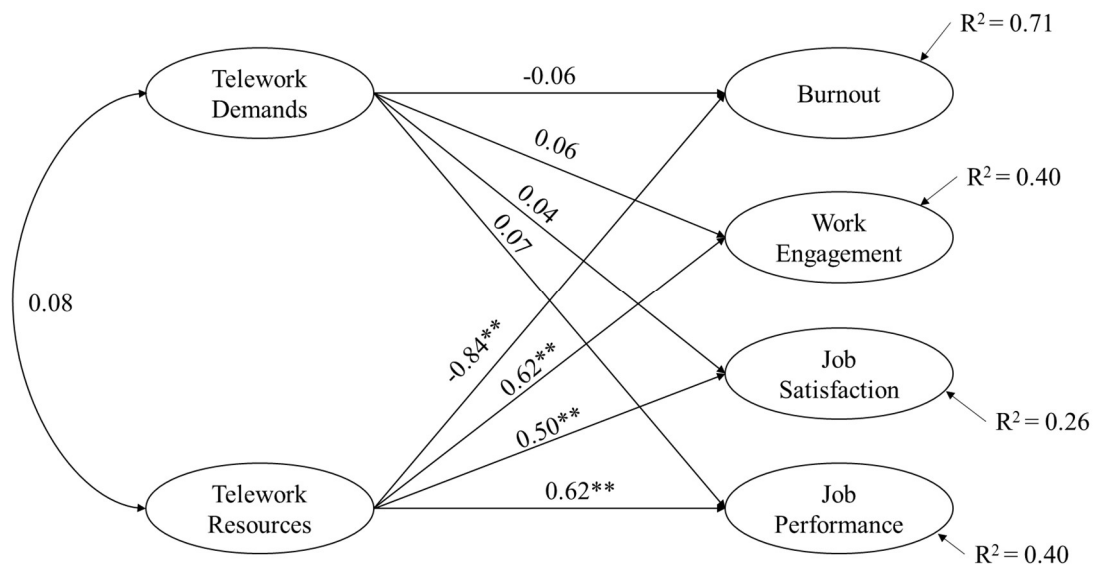


Figure 10

Telework Intensity Moderating the Relationship between Telework Demands and Burnout

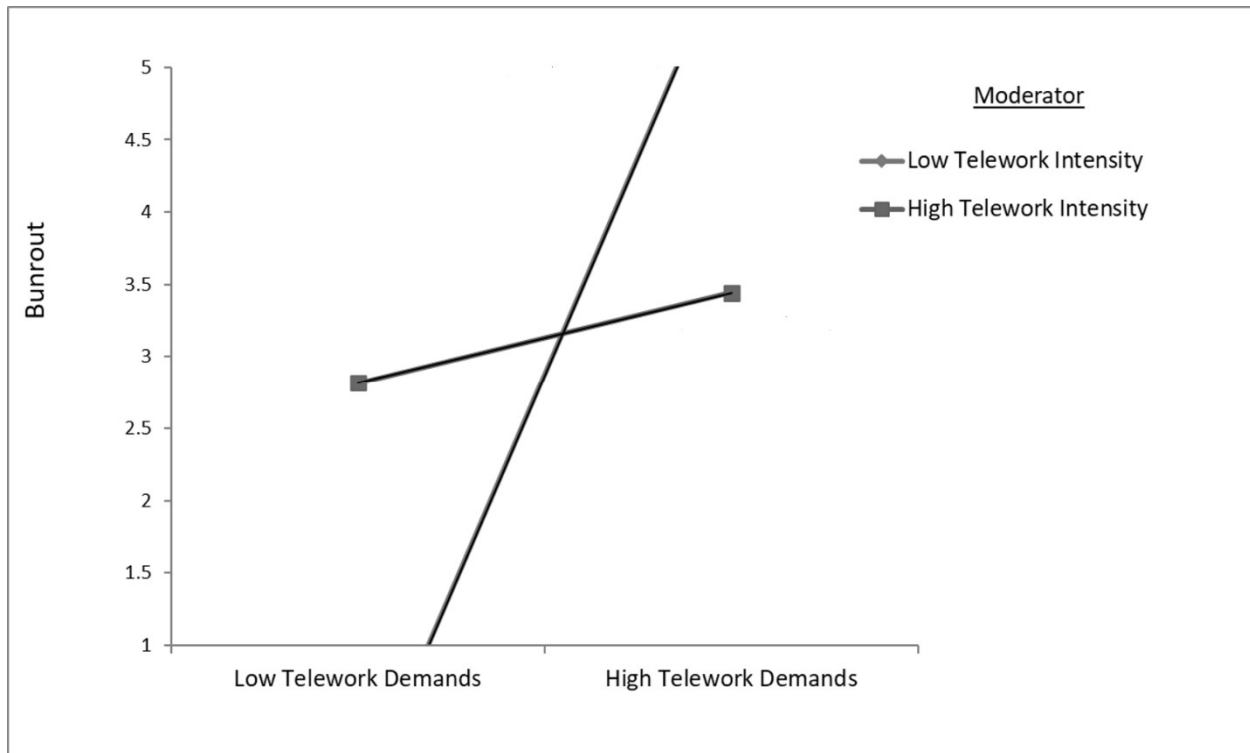


Figure 11

Telework Intensity Moderating the Relationship between Telework Demands and Work Engagement

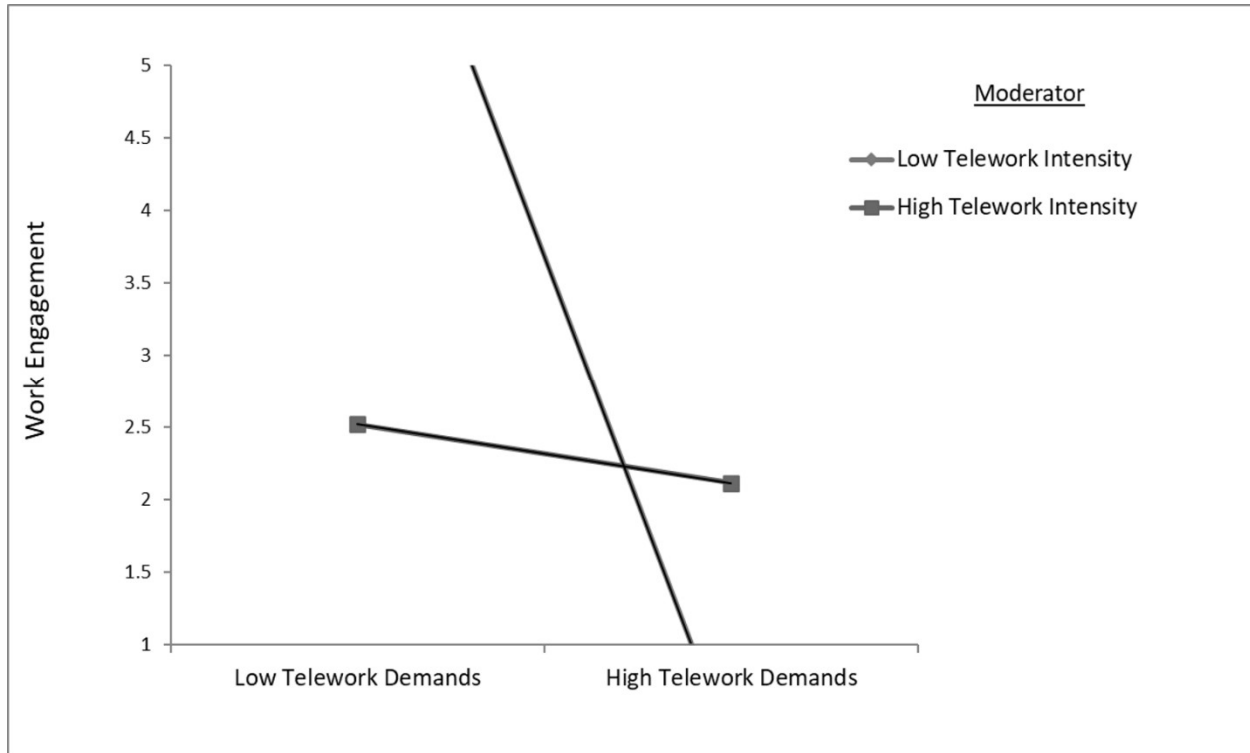


Figure 12

Telework Intensity Moderating the Relationship between Telework Demands and Job Satisfaction

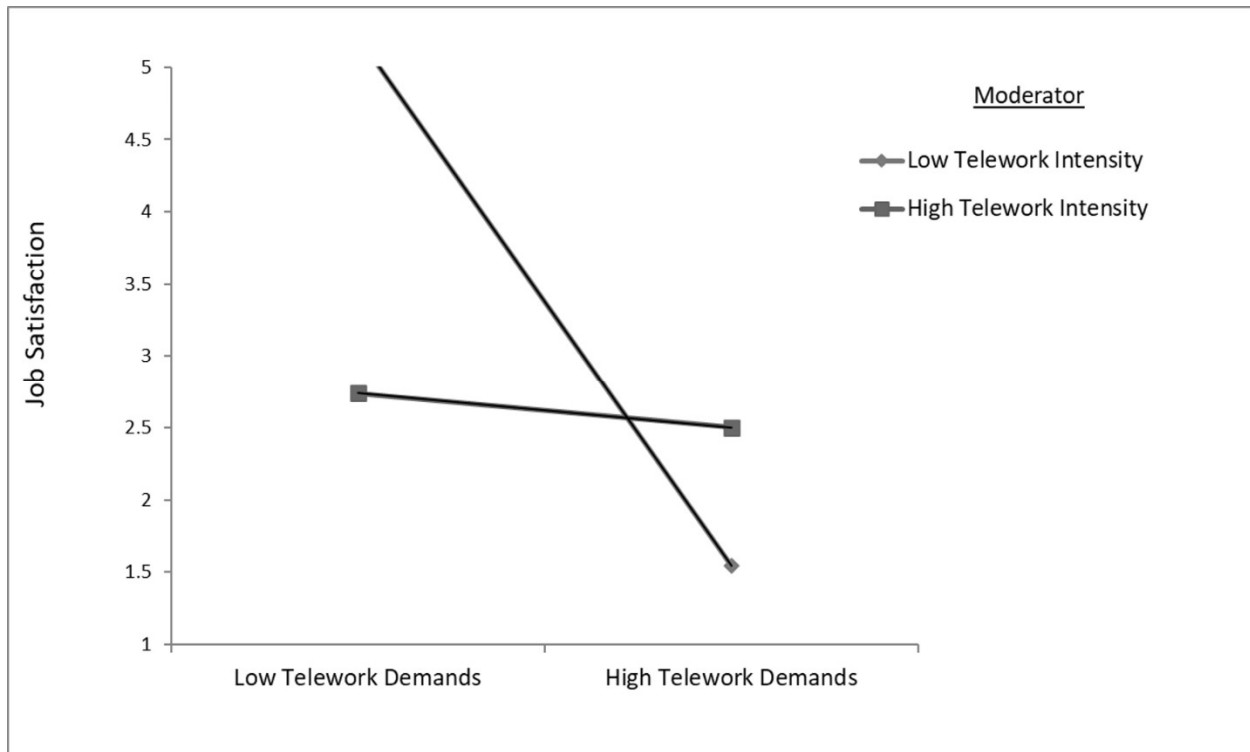


Figure 13

Telework Intensity Moderating the Relationship between Telework Demands and Job Performance

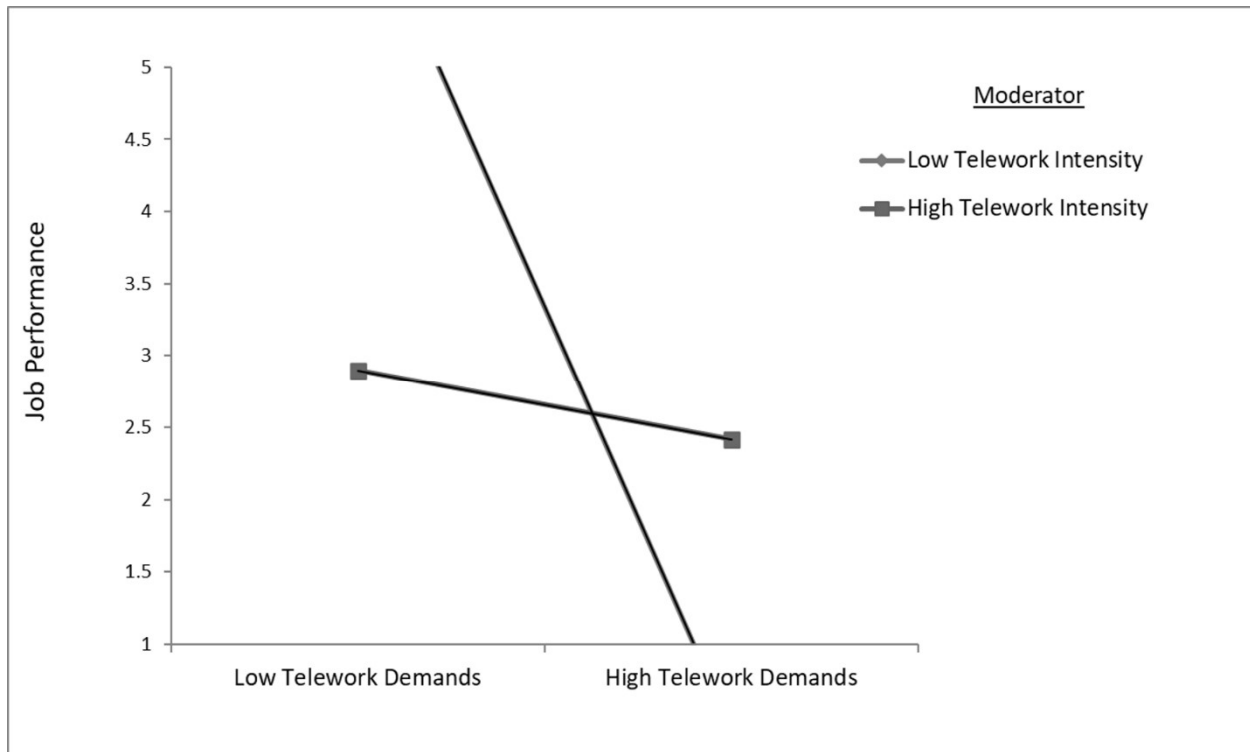


Figure 14

Hypothesized Research Model Study 2

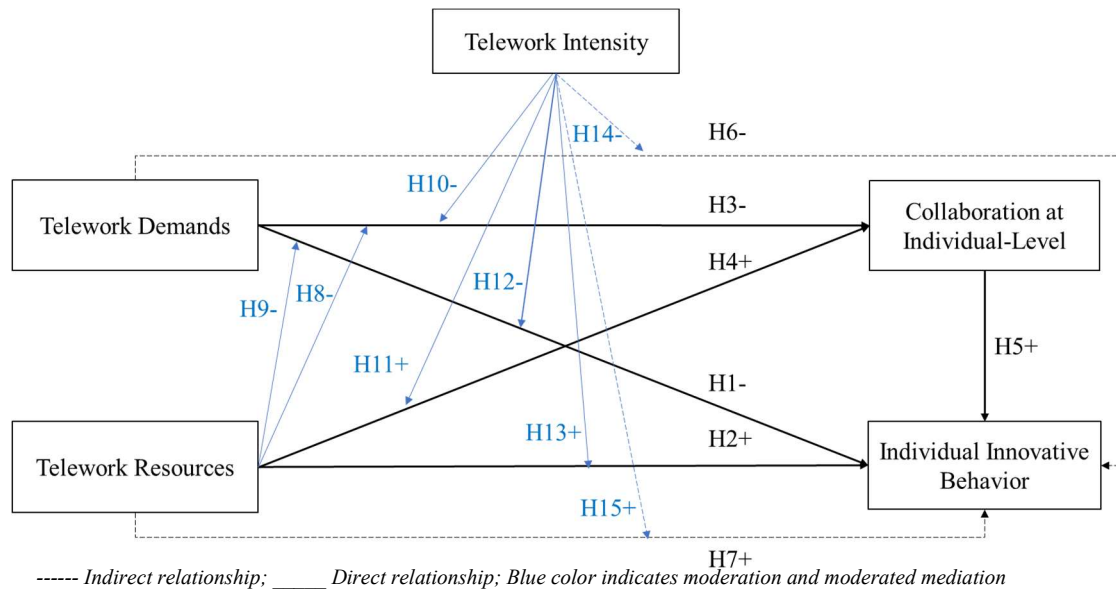


Figure 15

Q-Q Plot for Standardized Residuals Demonstrated Normality

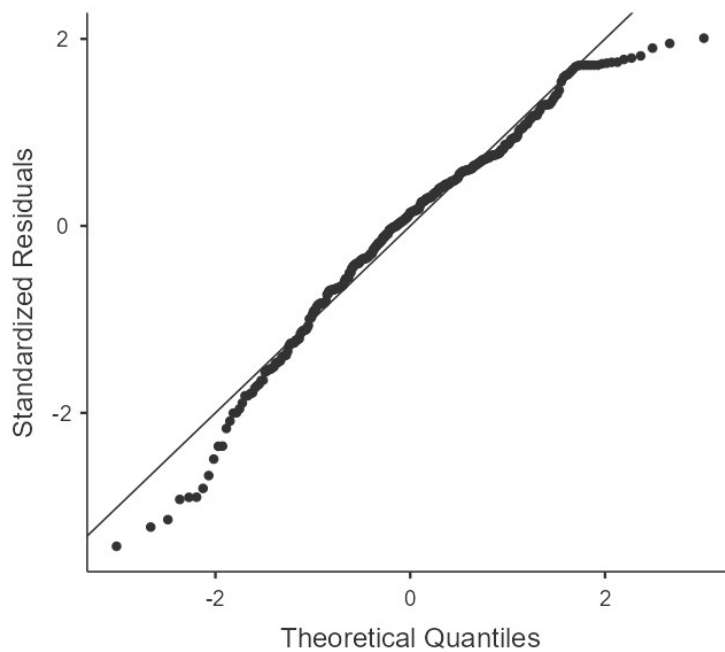
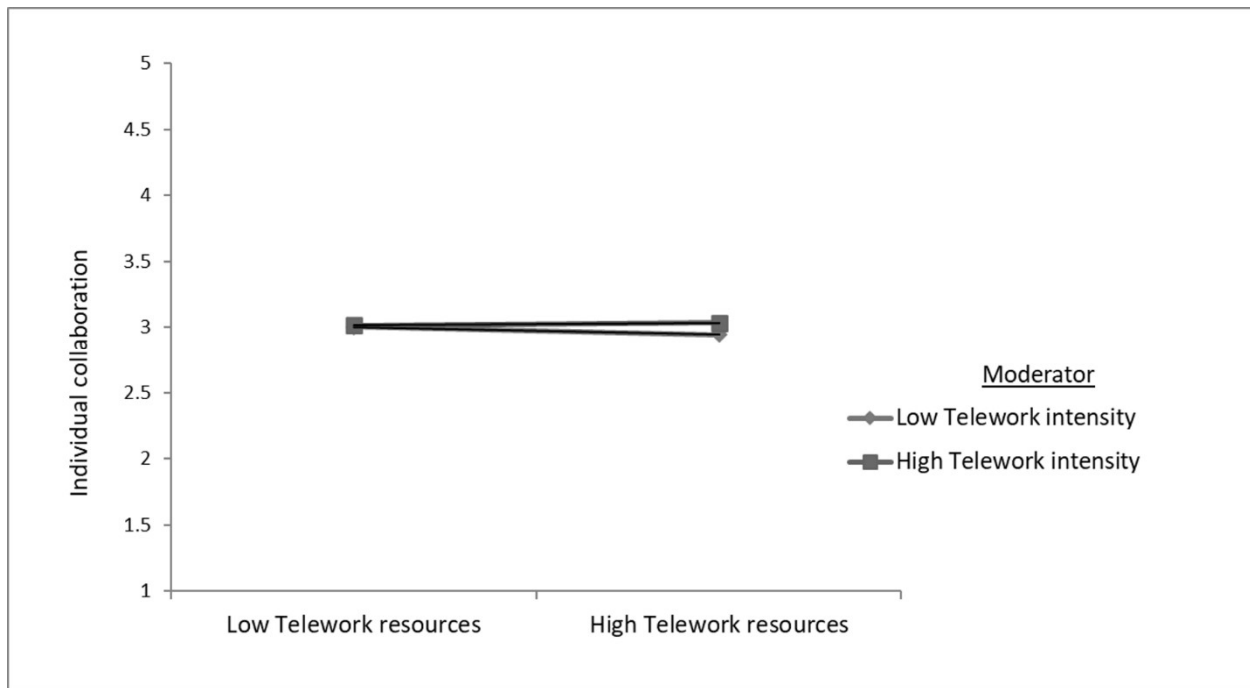


Figure 16

Telework Intensity Moderating the Relationship between Telework Resources and Collaboration



Appendices

Ethics Approval



OFFICE OF
RESEARCH
ETHICS (ORE)
3rd Floor, Kaneff
Tower
4700 Keele St.
Toronto ON
Canada M3J 1P3
Tel 416 736 5914
www.research.yorku.ca

Certificate #:	STU 2023-066
Approval Period:	05/31/23-05/31/24

ETHICS APPROVAL

To: **Ayesha Tabassum**
Graduate Student of Human Resources Management
atabass@yorku.ca

From: Alison M. Collins-Mrakas, Director, Research Ethics
(on behalf of Janessa Drake, Chair, Human Participants Review Committee)

Date: Wednesday, May 31, 2023

Title: **Impact of Telework on Individual Innovative Behaviors through Mediation of Individual Collaboration: A Demands and Resources Perspective**

Risk Level: ☒ Minimal Risk ☐ More than Minimal Risk

Level of Review: ☒ Delegated Review ☐ Full Committee Review

I am writing to inform you that this research project, "Impact of Telework on Individual Innovative Behaviors through Mediation of Individual Collaboration: A Demands and Resources Perspective" has received ethics review and approval by the Human Participants Review Sub-Committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines.

Note that approval is granted for one year. Ongoing research – research that extends beyond one year – must be renewed prior to the expiry date.

Any changes to the approved protocol must be reviewed and approved through the amendment process by submission of an amendment application to the HPRC prior to its implementation.

Any adverse or unanticipated events in the research should be reported to the Office of Research ethics (ore@yorku.ca) as soon as possible.

For further information on researcher responsibilities as it pertains to this approved research ethics protocol, please refer to the attached document, "RESEARCH ETHICS: PROCEDURES to ENSURE ONGOING COMPLIANCE".

Should you have any questions, please feel free to contact me at acollins@yorku.ca.

Yours sincerely,

Alison M. Collins-Mrakas M.Sc., LL.M.
Director, Office of Research Ethics



OFFICE OF
RESEARCH
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Toronto ON
Canada M3J 1P3
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Certificate #: STU 2023-066
Initial Approval: 05/31/23-05/31/24
Amendments: Amendment approved: 12/06/23
Renewals:
Current Approval
Period: 05/31/23-05/31/24

ETHICS AMENDMENT APPROVAL

To: **Ayesha Tabassum - Graduate Student**
Human Resources Management
Faculty of Liberal Arts & Professional Studies
atabass@yorku.ca

From: Alison M. Collins-Mrakas, Director, Research Ethics
(on behalf of You-ta Chuang, Chair, Human Participants Review Committee)

Date: Wednesday, December 6, 2023

Title: **Impact of Telework on Individual Innovative Behaviors through Mediation of Individual Collaboration: A Demands and Resources Perspective**

Risk Level: ☒ Minimal Risk ☐ More than Minimal Risk

Level of Review: ☒ Delegated Review ☐ Full Committee Review

With respect to your research project entitled, "**Impact of Telework on Individual Innovative Behaviors through Mediation of Individual Collaboration: A Demands and Resources Perspective**", the committee notes that, as there are no substantive changes to either the methodology employed or the risks to participants in and/or any other aspect of the research project, a renewal of approval re the proposed amendment(s) to the above project is granted.

Any further changes to the approved protocol must be reviewed and approved through the amendment process by submission of an amendment application to the HPRC prior to its implementation.

Ongoing research – research that extends beyond one year – must be renewed prior to the expiry date.

Any adverse or unanticipated events in the research should be reported to the Office of Research ethics (ore@yorku.ca) as soon as possible.

For further information on researcher responsibilities as it pertains to this approved research ethics protocol, please refer to the attached document, "**RESEARCH ETHICS: PROCEDURES to ENSURE ONGOING COMPLIANCE**".

Should you have any questions, please feel free to contact me at: acollins@yorku.ca.

Yours sincerely,

Alison M. Collins-Mrakas M.Sc., LL.M.
Director,
Office of Research Ethics

Interview Consent Form

Date: 06/20/2023

Study Name: Impact of Telework on Individual Innovative Behaviors through Mediation of Collaboration: A Demands and Resources Perspective

Researcher:

Ayesha Tabassum, PhD Candidate, School of Human Resources Management, Atkinson Building, Room 150, 4700 Keele Street, Toronto, ON M3J1P3. Email: atabass@yorku.ca

Supervisor: Dr. Parbudyal Singh, Professor, School of Human Resources Management, Atkinson Building, Room 150, 4700 Keele Street, Toronto, ON M3J1P3 Email: singhp@yorku.ca

Purpose of the Research: The primary purpose of this dissertation research is to examine the impact of telework (work from home/remote work) on individual innovative behaviors. To achieve this objective, the present research adopts a demands-and-resources perspective to conceptualize two new constructs – telework demands and telework resources. In absence of measurement scales for telework demands and telework resources, the current research also aims to conceptualize, develop, and validate measurement scales for telework demands and telework resources. Then the research tests the hypothesized research model to investigate the impact of telework demands and telework resources on individual innovative behaviors through mediation of collaboration. The research will be presented and reported in various forms including dissertation report, dissertation defence presentation, conference presentation, journal publication, complying to journal data availability policies, workshop/seminar/training presentation, newspaper/magazine publication, and teaching materials.

What You Will Be Asked to Do in the Research: You will be asked to answer a series of questions describing your experiences of telework demands, telework resources, and their impact on collaboration and innovative behaviors along with your gender, age, education, parental status, job title/position, department/division, the length of service in current job and service. You will also be asked if we can make an audio recording of your responses so that a transcription of your responses may be used for analysis. The interview will take place over Zoom and is expected to last roughly 40-60 minutes.

Risks and Discomforts: Although we do not foresee any risks or discomfort from your participation in the research, you may feel uncomfortable or anxious while describing telework related negative experiences. In such an event, you can refer to the following online resources to manage your negative feelings:

- <https://www.psychologytoday.com/ca/blog/women-s-mental-health-matters/201509/7-ways-deal-negative-thoughts>
- <https://www.wikihow.com/Deal-With-Negative-Thoughts>
- <https://psychcentral.com/blog/how-to-sit-with-painful-emotions/>
- <https://www.psychologytoday.com/ca/blog/critical-feeling/201608/5-ways-deal-feelings-you-d-rather-not-feel>

Additionally, you can refuse to answer questions and/or leave the interview at any time if you experience any discomfort.

Benefits of the Research and Benefits to You: You will gain better insights about telework demands and telework resources, and their impact on collaboration and innovative behaviors. You can access the study results upon the completion of the research. This research will help us to advance our knowledge about collaborative and innovative behaviors in the context of telework.

Voluntary Participation and Withdrawal: Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer, to stop participating, or to refuse to answer particular questions will not influence the nature of your relationship with the researcher and York University either now, or in the future.

Should you wish to withdraw after the study, you will have the option to also withdraw your data up until the analysis is complete. Your decision to withdraw will not influence the nature of your relationship with the researcher.

Confidentiality: Unless you choose otherwise, all information you supply during the research will be held in confidence and your name will not appear in any report or publication of the research. The researcher will keep a link that identifies you to your coded information, but this link will be kept secure and available only to the researcher. Any information

that can identify you will remain confidential. Data will be collected through transcription and audio recordings via Zoom. Your text and audio data will be securely stored and only the researcher will have access to this information. Confidentiality will be provided to the fullest extent possible by law.

The data collected in this research project may be used – in an anonymous form - by the researcher in subsequent research investigations exploring similar lines of inquiry. Such projects will still undergo ethics review by the HPRC, our institutional REB. Any secondary use of anonymized data by the researcher will be treated with the same degree of confidentiality and anonymity as in the original research project.

This study will use the Zoom platform to collect data, which is an externally hosted cloud-based service. When information is transmitted over the internet privacy cannot be guaranteed. There is always a risk your responses may be intercepted by a third party (e.g., government agencies, hackers). Further, while York University researchers will not collect or use IP addresses or other information which could link your participation to your computer or electronic devices without informing you, there is a small risk with any platform such as this of data that is collected on external servers falling outside the control of the research team. If you are concerned about this, we would be happy to make alternative arrangements (where possible) for you to participate, perhaps via telephone or in-person. Please contact Ayesha Tabassum (atabass@yorku.ca) for further information.

Text and recordings (audio) will be saved in a password protected file to researcher's local computer, not the cloud-based service.

Please note that it is the expectation that participants agree not to make any unauthorized recordings of the content of a meeting / data collection session.

Questions About the Research? If you have questions about the research in general or about your role in the study, please feel free to contact Ayesha Tabassum, email: atabass@yorku.ca and/or Dr. Parbudyal Singh e-mail: singhp@yorku.ca and/or PhD Program, The School of Human Resources Management, York University, Phone: 416.736.2100 ext.55806, e-mail: gradhrm@yorku.ca. This research has received ethics review and approval by the Human Participants Review Sub-Committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Director, Research Ethics in the Office of Research Ethics, 3rd Floor, Kaneff Tower, York University (e-mail ore@yorku.ca).

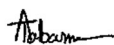
Legal Rights and Signatures:

I (fill in your name here), consent to participate in the study titled "Impact of Telework on Individual Innovative Behaviors through Mediation of Collaboration: A Demands and Resources Perspective" conducted by Ayesha Tabassum. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature _____

Date _____

Participant



Signature _____

Date 06/20/2023 _____

Principal Investigator

Additional consent

1. Audio recording

- ☐ I consent to the audio-recording of my interview.

Signature _____

Date _____

Participant Name:

2. Direct quote use (To support the research findings, one or multiple direct quotes from your interview may be used in research dissemination such as conference paper presentation and journal article publication. However, as mentioned earlier, your identity will be anonymized.)

- ☐ I consent to the usage of direct quote(s) from my interview in the research dissemination.

Signature _____

Date _____

Participant Name:

3. Use of personal information

- ☐ I consent to the use, processing and collection of my personal data (e.g., gender, age, education, marital status, parental status, job title, department/division, job tenure) for research purposes.

Signature _____

Date _____

Participant Name:

Interview Protocol

Thank you for agreeing to participate in this interview. As you may know, I am a PhD candidate at the School of Human Resource Management, York University. I am conducting this interview as part of the primary data collection tool for my dissertation research on telework. The goal of this research is to explore the demands and resources related to telework and their impact on your collaborative and innovative behaviors. The interview may last about 40-60 minutes, but I welcome as much detailed feedback from you as you are willing to give, and greatly appreciate the time you've given for this. I guarantee that your answers will be treated as strictly confidential and will be anonymized for further processing.

Do you have any questions for me before I begin?

Segment 1: Telework resources

1. How would you describe the benefits of work from home? What are some work-related benefits and nonwork-related benefits?
2. In your opinion, what factors contributed to these benefits?
3. We consider these factors as resources. Can you categorize these resources into work and nonwork resources (personal, home, family resources).
4. What resources have you gained because of WFH?
5. What resource have you lost because of WFH?

Segment 2: Telework demands

1. How would you describe the drawbacks/disadvantages of work from home? What are some work-related and nonwork-related disadvantages?
2. In your opinion, what factors contributed to these drawbacks?
3. We consider these factors as demands. Can you categorize these resources into work and nonwork demands (personal, home, family demands).
4. Would you consider some of these demands harmful or negative compared to others? Why?
5. Would you consider some of these demands challenging or stimulating? Why?
Probe: I am asking you this because there are some demands which are known as challenging demands because they stimulate personal growth and development although they can be the source of stress. Others are hindering demands, which deter personal growth and development by decreasing motivation and engagement.

Section 3 – Impact of telework demands and resources

Thank you. As you have already identified your telework-related demands and resources, now I would like to know more about the impact of these demands and resources on your collaborative and innovative behavior at your job.

1. How do these telework demands influence your collaborate behavior in the job?

Probe: Can you please provide some examples? Can you please explain how and why?

2. How do these telework demands influence your innovative behavior in the job?
3. How do these telework resources influence your ability to collaborative behavior in the job?
4. How do these telework resources influence your innovative behavior in the job?

Interview Demographic Information Form

Please answer the following questions as you find appropriate.

Gender: ☐ Female ☐ Male

☐ Others: (please specify) _____ ☐ Prefer not to answer

Age: _____ years

Highest level of education: ☐ High school ☐ Diploma/Professional certificate ☐ Bachelor's

☐ Master's ☐ Ph.D./Doctoral studies

Ethnicity: _____

Job title: _____

Department/Division: _____

Occupation group:

- ☐ Legislative and senior management occupations
- ☐ Business, finance and administration occupations
- ☐ Natural and applied sciences and related occupations
- ☐ Health occupations
- ☐ Occupations in education, law and social, community and government services
- ☐ Occupations in art, culture, recreation and sport
- ☐ Sales and service occupations
- ☐ Trades, transport and equipment operators and related occupations
- ☐ Natural resources, agriculture and related production occupations
- ☐ Occupations in manufacturing and utilities
- ☐ Not sure/Could not find in the above list, please write here: _____

Do you have any supervisory role/responsibilities? ☐ Yes ☐ No

How long have you been working in your current position? _____ year(s)

How many hours do you telework (work remotely or work from home) each week? _____

How many hours do you get for in-person interaction with coworkers each week? _____

How long have you been teleworking (working from home/remotely)? _____ year(s)

What is the nature of telework? ☐ Voluntary (Flexible option) ☐ Involuntary

(Imposed/Forced)

Marital status: ☐ Married ☐ Not married (In-partnership) ☐ Divorced/Separated ☐ Never married

Parental status: Do you have child(ren)? ☐ Yes ☐ No

If yes, how many child(ren) do you have? _____ Age of child(ren):

Do you have pets at home? ☐ Yes ☐ No

SME Package

Email Solicitation

Dear Professor _____,

As an acknowledged expert in the area of telework, I am writing to request your assistance in what we believe you will find to be an innovative new approach to the study of this complex issue.

My name is Ayesha Tabassum and I am a PhD candidate at the School of Human Resources Management, York University, Canada, working under the direction of Dr. Parbudyal Singh. We are currently working on a project titled “Impact of Telework on Individual Innovative Behaviors through Mediation of Collaboration: A Demands and Resources Perspective”. As part of the research, we are developing and validating measurement scales for “Challenging Telework Demands”, “Hindering Telework Demands”, and “Telework Resources”.

Your expertise is needed for the evaluation of a preliminary set of items representative of the challenging telework demands, hindering telework demands, and telework resources scales.

Once you agree to provide your expert assistance, you will receive a survey link within a week to your work email address. The survey contains a 188-item questionnaire requesting your assessment of the proposed items, detailed definitions of challenging telework demands, hindering telework demands, and telework resources, and a summary of the steps taken in item generation.

Your efforts in helping us with the questionnaire would be greatly appreciated, and crucial for the completion of the research project. Please reach out to me if you have any questions about the project and the assessment.

Thank you.

Best,
Ayesha

Ayesha Tabassum ABD (she/her)
PhD Candidate and Contract Faculty
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Definitions of the Constructs

Telework (Working Remotely/Work from Home) Demands

Based on the definition of job demands (Demerouti et al., 2001), telework demand is defined as below:

Telework demands are the physical, psychological, social, or organizational aspects of telework that require sustained physical or psychological effort in both work and nonwork domains and thus are associated with certain physiological and/or psychological costs in both domains.

Telework demand is a multifaceted construct encompassing four types of telework characteristics: *physical* (e.g., work pressure, work intensification, household work, childcare responsibilities), *psychological* (e.g., role ambiguity, role conflict, techno-overload), *social* (e.g., lack of face-to-face communication), and *organizational* (e.g., the expectation for constant availability, reduced visibility), which create exhaustion and burnout among teleworkers and lead to various negative work and personal outcomes. In the presence of high telework demands employees require high levels of energy to deal with the demands which leads to physiological and psychological costs.

However, based on the challenge-hindrance stressor framework by Cavanaugh et al. (2000), I argue that not all telework demands are equally exhausting for teleworkers. Some telework demands may present challenges for teleworkers, which are likely to stimulate personal growth and gain by increasing motivation and work engagement. On the contrary, certain telework demands may act as hindrances for personal growth and achievements and thus, are likely to diminish motivation and engagement and are likely to cause increased burnout.

Challenging Telework (Working Remotely/Work from Home) Demands

Challenging telework demands are the physical, psychological, social, or organizational aspects of telework that are stressful but promote personal growth, development, and achievement and thus are associated with benefits in work and nonwork domains.

Hindering Telework (Working Remotely/Work from Home) Demands

Hindering telework demands are the physical, psychological, social, or organizational aspects of telework that create obstacles to personal growth, development, and achievement and thus are associated with costs in work and nonwork domains.

Thus, the challenging telework demands are likely to have greater positive outcomes compared to hindering telework demands that are more likely to produce negative outcomes.

Telework (Working Remotely/Work from Home) Resources

Similarly, based on the definition of job resources (Demerouti et al., 2001), telework resource is defined as below:

Telework resources refer to the physical, psychological, social, or organizational aspects of telework that may help in either reducing the physiological and psychological costs associated with telework demands in both work and nonwork domains, or may aid in achieving goals in both domains, or may promote personal growth and development among teleworkers.

Telework resource is a multifaceted construct encompassing four types of telework characteristics: *physical* (e.g., time and energy savings from the commute, more time for family), *psychological* (e.g., autonomy, concentration), *social* (e.g., constant connection through ICT), and *organizational* (e.g., less engagement in organizational politics), which aid in fostering motivation and minimizing the strain among teleworkers. The telework resources thus lead to various positive personal and organizational outcomes by increasing work engagement and reducing exhaustion, anxiety, and health-related complaints.

References

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- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The Job Demands-Resources Model of burnout. *Journal of Applied Psychology*, 86(3), 499–512. <https://dx.doi.org/10.1037/0021-9010.86.3.499>

Steps Taken in Item Generation

Generating items representative of the challenging telework demands, hindering telework demands, and telework resources followed a three-iteration process, as follows: 1) item generation from individual interview, 2) item generation from existing measures, and 3) item generation from literature review.

Item generation from individual interview

The first iteration in the item generation process consisted in conducting 25 individual semi-structured interviews with teleworkers from various industries and occupations. These interviews were conducted between June-August 2023, with the purpose of inductively developing the item pool based on teleworkers' daily experiences. These interviews generated a pool of 135 items.

Item generation from existing measures

The next iteration in the item generation process consisted of the adoption of items from existing measurement scales including the Job Content Questionnaire (Karasek et al., 1998), Negative Spillover from Family to Work Scale (Grzywacz & Marks, 2000), Home Demands Scale (Peeters et al., 2005), Family Support Scale (Peeters & Le Blanc, 2001), Positive Spillover from Family to Work Scale (Grzywacz & Marks, 2000), and Home Resource measure (Hakanen et al., 2008). This iteration resulted in 29 additional items.

Item generation from literature review

In addition, 24 items were added to the item pool from extant literature by reviewing published articles on telework. Thus, the researcher arrived at a set of 188 items for all three constructs of challenging telework demands, hindering telework demands, and telework resources. Among these, 17 items represent challenging telework demands, 78 items represent hindering telework demands, and the rest 93 items represent telework resources.

References

- Grzywacz, J. G., & Marks, N. F. (2000). Reconceptualizing the work–family interface: An ecological perspective on the correlates of positive and negative spillover between work and family. *Journal of Occupational Health Psychology, 5*(1), 111.
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Informed Consent Form for Study 1 – EFA, CFA, Nomological Validity

Date: 3/25/2023

Study Name: Impact of Telework on Individual Innovative Behaviors through Mediation of Collaboration: A Demands and Resources Perspective

Researcher:

Ayesha Tabassum, PhD Candidate, School of Human Resources Management, Atkinson Building, Room 150, 4700 Keele Street, Toronto, ON M3J1P3. Email: atabass@yorku.ca

Supervisor: Dr. Parbudyal Singh, Professor, School of Human Resources Management, Atkinson Building, Room 150, 4700 Keele Street, Toronto, ON M3J1P3 Email: singhp@yorku.ca

Purpose of the Research: The primary purpose of this dissertation research is to examine the impact of telework on individual innovative behaviors through mediation of collaboration. To achieve this objective, the present research adopts a demands-and-resources perspective to conceptualize two new constructs – telework demands and telework resources. In absence of measurement scales for telework demands and telework resources, the current research also aims to conceptualize, develop, and validate measurement scales for telework demands and telework resources. The research will be presented and reported in various forms including dissertation report, dissertation defence presentation, conference presentation, journal publication, complying to journal data availability policies, workshop/seminar/training presentation, newspaper/magazine publication, and teaching materials.

What You Will Be Asked to Do in the Research: You will be asked to participate in an online survey. The survey questions aim to seek understanding your challenging telework demands, hindering telework demands, and telework resources.

Risks and Discomforts: Although we do not foresee any risks or discomfort from your participation in the research, you may feel uncomfortable or anxious while rating telework related negative experiences. In such an event, you can refer to the following online resources to manage your negative feelings:

- <https://www.psychologytoday.com/ca/blog/women-s-mental-health-matters/201509/7-ways-deal-negative-thoughts>
- <https://www.wikihow.com/Deal-With-Negative-Thoughts>
- <https://psychcentral.com/blog/how-to-sit-with-painful-emotions/>
- <https://www.psychologytoday.com/ca/blog/critical-feeling/201608/5-ways-deal-feelings-you-d-rather-not-feel>

Additionally, you can refuse to answer questions and/or leave the survey at any time if you experience any discomfort.

Benefits of the Research and Benefits to You: You will gain better insights about telework demands and telework resources, and their impact on collaboration and innovative behaviors. You can access the study results upon the completion of the research. This research will help us to advance our knowledge about collaborative and innovative behaviors in the context of telework.

Voluntary Participation and Withdrawal: Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer, to stop participating, or to refuse to answer particular questions will not influence the nature of your relationship with York University either now, or in the future.

Should you wish to withdraw after the study, you will have the option to also withdraw your data up until the analysis is complete.

Confidentiality: All information you supply during the research will be kept completely confidential. The survey data will be safely stored in a password protected local drive by the researcher. Confidentiality will be provided to the fullest extent possible by law.

The data collected in this research project may be used – in an anonymous form - by the researcher in subsequent research investigations exploring similar lines of inquiry. Such projects will still undergo ethics review by the HPRC, our

institutional REB. Any secondary use of anonymized data by the researcher will be treated with the same degree of confidentiality and anonymity as in the original research project.

The researcher acknowledges that the host of the online survey (e.g., Qualtrics, Survey Monkey etc.) may automatically collect participant data without their knowledge (i.e., IP addresses.) Although this information may be provided or made accessible to the researchers, it will not be used or saved without participant's consent on the researcher's system. Further, "Because this project employs e-based collection techniques, data may be subject to access by third parties as a result of various security legislation now in place in many countries and thus the confidentiality and privacy of data cannot be guaranteed during web-based transmission."

Questions About the Research? If you have questions about the research in general or about your role in the study, please feel free to contact Ayesha Tabassum, email: atabass@yorku.ca and/or Dr. Parbudyal Singh e-mail: singhp@yorku.ca and/or PhD Program, The School of Human Resources Management, York University, Phone: 416.736.2100 ext.55806, e-mail: gradhrm@yorku.ca. This research has received ethics review and approval by the Human Participants Review Sub-Committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Director, Research Ethics in the Office of Research Ethics, 3rd Floor, Kaneff Tower, York University (e-mail ore@yorku.ca).

☐ I consent to participate in the survey.

☐ I do not consent to participate in the survey.

List of Questionnaire Items Used for CFA and Nomological Validity

Telework Demands

Responses provided on a 5-point Likert scale (1 = ‘strongly disagree’ to 5 = ‘strongly agree’).

- | | |
|-------|---|
| CTD1 | Working from home creates implicit norms and expectations for increased productivity and performance. |
| CTD2 | Working from home raises the expectations from my family members regarding accommodating their needs. |
| CTD3 | My workload increased in work from home due to formal work processes. |
| CTD4 | I exceed expectations to increase the visibility of my work while working from home. |
| CTD5 | Work from home increases the expectations from coworkers and supervisors for immediate responses. |
| HTD1 | Work from home limits my relationship building opportunity with coworkers/management. |
| HTD2 | Work from home limits my team building opportunities. |
| HTD3 | Working from home has left me feeling distant and disconnected from my organization. |
| HTD4 | Work from home limits my opportunities to collaborate. |
| HTD5 | Work from home is more likely to create miscommunication or communication gap. |
| HTD6 | Work from home limits my opportunities to communicate with my team members. |
| HTD7 | Work from home lacks transparency in communication. |
| HTD8 | I struggle to connect and network with people while working from home. |
| HTD9 | Work from home limits my collaborative opportunity at work to brainstorm. |
| HTD10 | Work from home limits my collaborative opportunity at work to come up with new/innovative solutions. |

Telework Resources

Responses provided on a 5-point Likert scale (1 = ‘strongly disagree’ to 5 = ‘strongly agree’).

- | | |
|-----|--|
| TR1 | Work from home provides the flexibility to adjust personal and family responsibilities with work. |
| TR2 | Work from home provides me with greater flexibility to plan and perform after hour personal and family works. |
| TR3 | Working from home provides me with more time and opportunities for self-care. |
| TR4 | Working from home gives me the flexibility to enjoy my life more. |
| TR5 | Work from home provides me with the autonomy to manage my own time and life. |
| TR6 | When I work from home, I have more time and energy for personal, family, household, and social activities at the end of the workday. |

Burnout

(The Maslach Burnout Inventory—General Survey - MBI-GS; Schaufeli et al., 1996)

Responses provided on a 7-point scale (0 = Never, 1 = A few times a year or less, 2 = Once a month or less, 3 = A few times a month, 4 = Once a week, 5 = A few times a week, 6 = Every day).

Emotional Exhaustion

EE1. I feel emotionally drained from my work.

EE2. I feel used up at the end of the workday.

EE3. I feel fatigued when I get up in the morning and have to face another day at work.

EE4. Working all day is a real strain for me.

EE5. I feel burned out from my work.

Work Engagement

The Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2006)

Responses provided on a 7-point rating scale (0 = Never, 1 = seldom, 2 = occasionally, 3 = sometimes, 4 = frequently, 5 = often, 6 = always)

Vigor

VG1. At my work, I feel bursting with energy.

VG2. At my job, I feel strong and vigorous.

VG3. When I get up in the morning, I feel like not going to work. (R)

Dedication

DD1. I am enthusiastic about my job.

DD2. My job inspires me.

DD3. I am proud of the work that I do.

Absorption

AB1. I feel happy when I am working intensely.

AB2. I am immersed in my job.

AB3. I get carried away when I am working.

Job Satisfaction

(Michigan Organizational Assessment Questionnaire - MOAQ; Cook et al., 1981)

Responses provided on a 5-point Likert scale (1 = 'strongly disagree' to 5 = 'strongly agree').

JS1. I am satisfied with my current work.

JS2. Generally speaking, I'm really satisfied with my job.

JS3. Usually, I really enjoy my work.

Job Performance (Individual Work Performance Questionnaire (IWPQ 2.0) – (Koopmans et al., 2013)

Responses provided on a 5-point rating scale (0 = seldom, 1 = sometimes, 2 = frequently, 3 = often, 4 = always).

TP1. I managed to plan my work so that it was done on time.

TP2. I kept in mind the results that I had to achieve in my work.

TP3. I was able to separate main issues from side issues at work.

TP4. I was able to perform my work well with minimal time and effort.

Demographic Information

Gender: ☐ Female ☐ Male

☐ Others: (please specify) _____ ☐ Prefer not to answer

Age: _____ years

Highest level of education: ☐ High school ☐ Diploma/Professional certificate ☐ Bachelor's ☐ Master's ☐ Ph.D./Doctoral studies

Ethnicity: _____

Job title: _____

Department/Division: _____

Occupation group:

☐ Legislative and senior management occupations

☐ Business, finance and administration occupations

☐ Natural and applied sciences and related occupations

☐ Health occupations

☐ Occupations in education, law and social, community and government services

☐ Occupations in art, culture, recreation and sport

- ☐ Sales and service occupations
- ☐ Trades, transport and equipment operators and related occupations
- ☐ Natural resources, agriculture and related production occupations
- ☐ Occupations in manufacturing and utilities

Do you have any supervisory role/responsibilities? ☐ Yes ☐ No

How long have you been working in your current position? _____ year(s)

How many hours do you telework (work remotely or work from home) each week? _____

How many hours do you get for in-person interaction with coworkers each week? _____

How long have you been teleworking (working from home/remotely)? _____ year(s)

Marital status: ☐ Married ☐ In-partnership ☐ Divorced/Separated ☐ Never married

Parental status: Do you have child(ren)? ☐ Yes ☐ No

If yes, how many child(ren) do you have? _____

Informed Consent Form for Study 2

Date: 3/25/2023

Study Name: Impact of Telework on Individual Innovative Behaviors through Mediation of Collaboration: A Demands and Resources Perspective

Researcher:

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The data collected in this research project may be used – in an anonymous form - by the researcher in subsequent research investigations exploring similar lines of inquiry. Such projects will still undergo ethics review by the HPRC, our institutional REB. Any secondary use of anonymized data by the researcher will be treated with the same degree of confidentiality and anonymity as in the original research project.

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☐ I consent to participate in the survey.

☐ I do not consent to participate in the survey.

List of Questionnaire Items Used for Study 2

Telework Demands

Responses provided on a 5-point Likert scale (1 = 'strongly disagree' to 5 = 'strongly agree').

1. Work from home limits my relationship building opportunity with coworkers/management.
2. Work from home limits my team building opportunities.
3. Working from home has left me feeling distant and disconnected from my organization.
4. Work from home limits my opportunities to collaborate.
5. Work from home is more likely to create miscommunication or communication gap.
6. Work from home limits my opportunities to communicate with my team members.
7. Work from home lacks transparency in communication.
8. I struggle to connect and network with people while working from home.
9. Work from home limits my collaborative opportunity at work to brainstorm.
10. Work from home limits my collaborative opportunity at work to come up with new/innovative solutions.

Telework Resources

Responses provided on a 5-point Likert scale (1 = 'strongly disagree' to 5 = 'strongly agree').

1. Work from home provides the flexibility to adjust personal and family responsibilities with work.
2. Work from home provides me with greater flexibility to plan and perform after hour personal and family work.
3. Working from home provides me with more time and opportunities for self-care.
4. Working from home gives me the flexibility to enjoy my life more.
5. When I work from home, I have more time and energy for personal, family, household, and social activities at the end of the workday.

Leader-Member Exchange

Responses provided on a 5-point Likert scale (1 = 'strongly disagree' to 5 = 'strongly agree').

Affect

1. I like my supervisor very much as a person.
2. My supervisor is the kind of person one would like to have as a friend.
3. My supervisor is a lot of fun to work with.

Loyalty

1. My supervisor defends my work actions to a superior, even without complete knowledge of the issue in question.
2. My supervisor would come to my defense if I were "attacked" by others.
3. My supervisor would defend me to others in the organization if I made an honest mistake.

Contribution

1. I do work for my supervisor that goes beyond what is specified in my job description.
2. I am willing to apply extra efforts, beyond those normally required, to meet my supervisor's work goals.
3. I do not mind working my hardest for my supervisor.

Professional Respect

1. I am impressed with my supervisor's knowledge of his/her job.
2. I respect my supervisor's knowledge of and competence on the job.
3. I admire my supervisor's professional skills.

Collaboration at Individual-Level

Responses provided on a 5-point Likert scale (1 = 'strongly disagree' to 5 = 'strongly agree').

1. I actively cooperate with other employees in generating ideas for new products/services/processes.
2. I actively cooperate with other employees in evaluating and refining ideas for new products/services/processes.
3. I actively cooperate with other employees in establishing new product/service/process development goals and priorities.
4. I actively share information about new products/services/processes with other employees.
5. I actively communicate for new products/services/process development.
6. I am actively represented on project teams and other strategic activities for new product/service/process development.

Individual Innovative Behavior

Responses provided on a 5-point Likert scale (1 = 'strongly disagree' to 5 = 'strongly agree').

1. I create new ideas for difficult issues.
2. I search out new working methods, techniques, or instruments.
3. I generate original solutions for problems.
4. I mobilize support for innovative ideas.
5. I acquire approval for innovative ideas.
6. I make important organizational members enthusiastic for innovative ideas.
7. I transform innovative ideas into useful applications.
8. I introduce innovative ideas into the work environment in a systematic way.
9. I evaluate the utility of innovative ideas.

Demographic Information

Gender: ☐ Female ☐ Male

☐ Others: (please specify) _____ ☐ Prefer not to answer

Age: _____ years

Highest level of education: ☐ High school ☐ Diploma/Professional certificate ☐ Bachelor's ☐ Master's ☐ Ph.D./Doctoral studies

Ethnicity: _____

Job title: _____

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Occupation group:

- ☐ Legislative and senior management occupations
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- ☐ Health occupations
- ☐ Occupations in education, law and social, community and government services
- ☐ Occupations in art, culture, recreation and sport
- ☐ Sales and service occupations
- ☐ Trades, transport and equipment operators and related occupations
- ☐ Natural resources, agriculture and related production occupations
- ☐ Occupations in manufacturing and utilities

Do you have any supervisory role/responsibilities? ☐ Yes ☐ No

How long have you been working in your current position? _____ year(s)

How many hours do you telework (work remotely or work from home) each week? _____

How many hours do you get for in-person interaction with coworkers each week? _____

How long have you been teleworking (working from home/remotely)? _____ year(s)

Marital status: ☐ Married ☐ In-partnership ☐ Divorced/Separated ☐ Never married

Parental status: Do you have child(ren)? ☐ Yes ☐ No

If yes, how many child(ren) do you have? _____