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A Double-Edged Sword?

How Technology-Assisted Supplemental Work Influences Burnout and Work Engagement

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Abstract

Organizations are continually confronted with automation, digital platforms, and other innovations that are changing the fundamental nature of work. Therefore, understanding what impact technology has on employees is crucial. This study investigates the role technology-assisted supplemental work, abbreviated to TASW, has on the relationships between job demands and burnout, and job resources and work engagement. This paper follows the spirit of previous research in the field; with four questionnaires used to measure job demands and resources, burnout, work engagement and TASW.

We distributed one web-based questionnaire to voluntary participants on social media by email, and distribution to friends and family. Based on the valid responses obtained ($n = 423$), multiple regression analyses were conducted. We found positive relationships between job demands and burnout, and job resources and work engagement. Further, negative relationship between job demands and work engagement, and job resources and burnout were found. We also found a positive relationship between TASW and burnout. The moderating role of TASW between the different independent variables and dependent variables was non-existent. In light of these findings we discuss theoretical contributions, limitations, directions for future research and implication for practice.

Introduction

It has been known for quite some time that certain job characteristics can have a serious impact on an employee's well-being (Bakker & Demerouti, 2007). Negative job characteristics or job demands, such as job strain, work pressure or role ambiguity can lead to exhaustion, impaired health or possible burnout (Demerouti, Bakker, Nachreiner & Schaufeli, 2001; Halbesleben & Buckley, 2004). Conversely, positive characteristics, or job resources, such as feedback, social support and flexibility can lead to work engagement and organizational commitment (Demerouti et al., 2001). In addition to ordinary job characteristics inherent in all professions, today's workers are faced with the impact of technology and the increasing demands that come from economic turbulence and constant downsizing, which makes organizations constantly chasing after more effective and productive ways of working (Derks & Bakker, 2014). With increasing workloads and more advanced technology, there has been an increase in non-standard working hours, including evening, night and weekend work (Härmä, 2006). Smartphones and other communication technology such as laptops, tablets and other devices have revolutionized when, where and how long employees can work after work hours (Boswell & Olson-Buchanan, 2007). One may even say that employers no longer hope that employees' use this technology; they expect it (Fenner & Renn, 2010). Some employers even provide the technology to increase the likelihood of their employees engaging in supplemental work at home. One might say that these technologies are no longer luxury items - they have become commodities. According to Winnick (2016), the average person touches their phone about 2600 times a day. This number gives us a notion as to how accessible people are, and/or how susceptible people are to different stimuli just from their phones. We are available 24/7 through our phones and other communication technology, and it has its advantages and disadvantages. Additionally, modern organizations' increasing expectations regarding availability suggest that employees feel compelled to immediately respond to work-related messages even during leisure time (Davis, 2002; Derks & Bakker, 2014).

In relation to our occupational life, smartphones and other technology allow us to be flexible, autonomous and more productive by constantly being connected to work, with the ability to collaborate and communicate with other employees (Diaz, Chiaburu, Zimmerman & Boswell, 2011). Further, using these technologies after work hours may also enhance an employee's career by signaling

that one is willing 'to go the extra mile' for the company (Fenner & Renn, 2010). In addition, smartphones may increase the connection between work and social life (Ragsdale & Hoover, 2016), thus influencing employees' perception of occupational stress and satisfaction. At the same time, smartphone and other communication technology usage after work hours has been linked to more detrimental conditions such as increased stress, potential burnout, decreased job satisfaction and increased turnover intention (Ragsdale & Hoover, 2016; Diaz et al., 2011; Wright et. al, 2014). This is supported by Lanaj, Johnson and Barnes (2014) who found that smartphone usage is related to lack of recovery as people continue to engage in work activity after working hours, thus extending the working day further, and putting themselves at risk of increased stress, and potential burnout.

If one removes other technology devices from the equation, smartphone usage alone has been linked to poor academic performance (Samaha & Hawi, 2001; Busch, 2016), depression and increased anxiety (Elhai, Dvorak, Levine & Hall, 2017) and (in some instances) related to addiction to smartphones (Lee, Chang, Lin & Cheng, 2014). Others are concerned with the issue of "connectedness", meaning that they are "always" connected through their smartphones (Smith, 2012). However, it is important to mention that individuals have different relationships to smartphones. On the one hand, some individuals feel dependent on it. On the other hand, some individuals use smartphones to alleviate boredom, which is often positive, whereas others use it as a coping mechanism related to anxiety or depression (Panova & Lleras, 2016). Although communication technology can allow flexibility (Diaz et al., 2011), it can reduce employees' opportunity to disengage, recharge their batteries and socialize with friends and family (Boswell & Olson-Buchanan, 2007; Lanaj et al., 2014; Kossek & Lautsch, 2008, 2012). Further, it is known that connectivity with work through technology such as smartphones and computers may contribute to stress and burnout when organizational norms are not clear regarding when it is appropriate to contact employees on their leisure time (Peeters, Montgomery, Bakker, & Schaufeli, 2005).

While there is plenty of research on how technology-assisted supplemental work and technology usage can affect work-life conflict and work-home interference (Derks & Bakker, 2014; Fenner & Renn, 2010), there is little research on technology-assisted supplemental work and technology usage's influence on

job demands and resources, burnout and work engagement. Thus, the purpose of this thesis is to build upon existing research by investigating technology-assisted supplemental work's moderating effect on job demands and job resources effect on burnout and work engagement.

Research Question

Research questions can be defined as questions that are set for a specific purpose, and in such a precise way that it can be elucidated using social science methods (Johannessen, Kristoffersen & Tufte, 2011). We have chosen to immerse ourselves in the following research question:

Can technology-assisted supplemental work moderate the relationship between job resources and work engagement, and between job demands and burnout?

These terminologies, technology-assisted supplemental work, job resources, work engagement, job demands and burnout, will be defined and explained further in the literature review in the following chapter. As we can see from the research question, it contains two independent variables; job demands and job resources, two dependent variables; burnout and work engagement, and one moderator; technology-assisted supplemental work.

To summarize, we intend to look at the relationship between demands and burnout, whether TASW moderates the relationship between job demands and burnout, and if TASW can have a direct impact on burnout. We will also research the relationship between job resources and work engagement, and whether TASW can moderate this relation. In addition, we will research if TASW can have a direct impact on work engagement. Lastly, we look at how job demands interact with work engagement, how job resources may interact with burnout, whether TASW can moderate job demands' relation to work engagement, and if TASW can moderate the relation between job resources and burnout. We have chosen to base this on the theoretical part to understand the terms stated in the research question and to avoid confusion. We would like to point out that we would use other literature where appropriate.

Outline of Thesis

To examine our research question, we will review the theoretical background for our research. We will start by introducing the job demands-resources model and relevant literature about stress. We will then move onto burnout, what is burnout and why focusing on burnout is important. Furthermore, work engagement will be introduced and discussed. Following this, we will discuss burnout and work engagement relationship with modern technology and how technology usage can influence burnout and work engagement. After a thorough literature review, the thesis moves onto methodology. Here we will provide a presentation of our research approach and research design, followed by the results from our analysis. After the results, we will present the discussion of our data. Finally, we will present our conclusion, limitations and directions for future research.

Theory

The following chapter will provide a thorough literature review on the Job Demands-Resources model, burnout, work engagement and technology-assisted supplemental work. By doing so, we aim to present a thorough foundation for our following hypotheses. As mentioned earlier, smartphone usage has been found to have both positive and negative effects on individuals. It has been posed that students perform worse due to smartphone addictions (Samaha & Hawi, 2001). At the same time, it has also been proven that smartphone usage at work can increase productivity (Coker, 2011). This thesis will attempt to research the effects of technology assisted supplemental work on burnout and work engagement to establish whether this activity is beneficial to organizations or not. In the literature review, the relevant and applicable theory will both be explained and discussed before the thesis further delves into the developed hypotheses.

Job Demands-Resources Model

The Job Demands-Resources (JD-R) model is a highly popular model among researchers when examining the effects of job characteristics on employees' wellbeing. The JD-R model proposes that two set of working conditions can be distinguished from any kind of job; job demands and job resources (Demerouti, Bakker, Nachreiner & Schaufeli, 2001; Schaufeli & Bakker, 2004). The flexibility of the model allows it to pose as an overarching

model as it can be applied across different occupational settings (Bakker & Demerouti, 2007). The scope of, and degree of flexibility in the model, has also made it appealing for researchers as well as practitioners (Schaufeli & Taris, 2014). To understand the JD-R model, we need to introduce the key terms of the theory; job demands and job resources.

Job demands can be referred to as “the degree to which the environment contains stimuli that promptly require attention and response” (Jones & Fletcher, 1996, p, 34). In other words, job demands are “things that have to be done” (Schaufeli & Bakker, 2004). More specifically it refers to those physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain psychological and physiological costs, such as exhaustion (Demerouti et al., 2001). Examples of job demands are work overload, heavy lifting, job insecurity and interpersonal conflict (Schaufeli & Taris, 2014). Although job demands seem like negative characteristics at work, research has proven that job demands are not necessarily negative, they are only negative when the job demands are relatively high and when the employee is not recovered from the previous time; then they can transform into job stressors, and/or lead to burnout (Demerouti et al., 2011; Meijman & Mulder, 1998).

The second set of working conditions is job resources. Job resources refer to those physical, psychological, social, or organizational aspects of the job that may do any of the following; “1) be functional in achieving work goals, 2) reduce job demands at the associated physiological and psychological costs, and 3) stimulate personal growth and development” (Demerouti et al., 2001, p. 501). In other words, job resources are work conditions that provide resources for the individual employee (Hakanan & Roodt, 2010). Examples of job resources can be autonomy, feedback, job security and social support (Schaufeli & Taris, 2014). Job resources are not only important when dealing with job demands, but they are also important in their own right as they can be seen as means to the attainment or protection of other valued resources (Bakker & Demerouti, 2007, p. 312).

In addition, the JD-R model has two basic proposals; that (high) job demands lead to strain and impaired health, and that (high) job resources lead to increased motivation and higher productivity (Demerouti et al., 2001; Schaufeli & Taris, 2014). As mentioned earlier, the JD-R model proposes that job characteristics can have a large effect on employee’s wellbeing (Bakker & Demerouti, 2007). Research has shown that (high) job demands such as work

pressure and emotional demands may lead to sleeping problems, exhaustion and poor health, and that (high) job resources such as social support and autonomy may influence processes leading to work engagement and organizational commitment (Bakker & Demerouti, 2007). Job demands, and job resources are often negatively correlated, as high job demands may prevent the mobilization of job resources (Bakker & Demerouti, 2007). Therefore, the JD-R model suggests that high job demands, and a lack of resources, may create a thriving environment for burnout, and potentially reduced work engagement (Schaufeli & Bakker, 2004). There can also be a positive correlation between the two, where high job resources combined with low job demands may result in high motivation and engagement (Bakker & Demerouti, 2007).

In addition to job demands and job resources, there are two psychological processes in the JD-R model; the energetic process and the motivational process. These processes help to explain how employees behave when they are faced with job demands or job resources. The energetic process is where employees adapt to high job demands by either protecting their performance by taxing their energy or at another cost, or by accepting a reduction in performance (Schaufeli & Bakker, 2004). If an employee is exposed to long-term excessive job demands where they do not adequately recover, they expose themselves to sustained activation and overtaxing, which can eventually result in exhaustion – a common symptom of burnout. Furthermore, the lack of resources inhibits that job demands are met and that work goals are reached, which can lead to withdrawal behavior, another symptom of burnout (Demerouti et al., 2001; Schaufeli & Taris, 2014.). The second process, the motivational process, explains the link between job resources, work engagement and organizational outcomes. Job resources can either play an intrinsic or an extrinsic motivational role. It can have an intrinsic motivational role, such as work contexts that support psychological autonomy, competence and other similar contexts which may enhance and increase intrinsic motivation (Schaufeli & Bakker, 2004). It can also play an extrinsic motivational role as work environments that offer many resources foster the readiness to dedicate one's efforts and abilities to work tasks (Meijman & Mulder, 1998). If this is the case, it is likely that the task will be completed successfully and that the work goal will be achieved (Schaufeli & Bakker, 2004, p. 298). The JD-R model proposes that the interaction between job demands and job resources is crucial for the development of job strain and motivation, as it has been shown that job resources may buffer

the effects of job demands on job strain, including burnout (Bakker & Demerouti, 2007; Bakker, Demerouti, Taris, Schaufeli & Schreurs, 2003).

Stress

To shed light on the effects of job demands, it is crucial to discuss stress and burnout, as they are common outcomes of job demands (Demerouti et al., 2001). Stress can be defined in many ways. McGowan, Gardner and Fletcher (2006) defined stress as “the relationship between the person and the environment that is appraised by the person as taxing and endangering his or her well-being” (p. 92). It can also be defined as a stimulus, a response, or the result of an interaction between the two, with the interaction described in terms of some imbalance between the person and the environment (Cooper, Dewe & Driscoll, 2001), where stress can be both positive and negative. Positive stress, also referred to as eustress, is a positive response to a stressor (Simmons, 2000). Eustress can be exciting and enticing, and can enhance people’s sense of satisfaction and accomplishment, and improve performance.

The opposite of eustress, distress, is the unpleasant and unhealthy side of stress. Distress, most commonly known as stress, affects individual’s ability to think critically, one’s attention span and decision-making ability, which can be detrimental in an organizational setting. Distress can cause lower performance, higher staff turnover and absenteeism (Huczynski & Buchanan, 2013). This thesis focuses on distress and will be described as stress.

Occupational stress.

Occupational stress can be defined as the response people may have when presented with work demands and pressures that do not match their knowledge and abilities and challenge their ability to cope (World Health Organization). Occupational stress can for example be caused by poor organization of work and poor work design, poor management, and lack of support from colleagues and supervisors (Leka, Griffiths & Cox, 2004). Occupational stress can occur in a wide range of work circumstances but is often made worse when employees feel they have little support from supervisors and colleagues and where they have little control over work or how they can cope with its demands and pressures (Leka et al., 2004).

Occupational stress can have many different effects. For instance, individuals can become increasingly irritable, tired, and anxious, and suffer from

physical problems such as headaches, heart disease and troubles with sleep. These issues can become so severe that they can hinder individuals from ever working again (Leka et al., 2004). Occupational stress has increasingly become a concern for many organizations as it can have both direct and indirect implications for an organization. At an organizational level occupational stress may increase absenteeism and turnover, and reduce productivity, as stressed workers are more likely to be unhealthy, poorly motivated, less productive and less safe at work (Leka et al., 2004). All of the above-mentioned effects can critically affect an organization's performance and ability to adapt in an increasingly competitive market and could possibly hinder the organization's ability to survive in the market (Leka et al., 2004). This makes it crucial for organizations to understand and tackle the phenomena of occupational stress before it develops into burnout.

Burnout

As mentioned earlier, stress can be both positive and negative for an individual. Stress only becomes a serious issue when it is taxing and draining energy from the individual. This state of exhaustion, fatigue and cynicism is called burnout. Burnout is a serious issue, not just for the individual involved, but also for teams, organizations and the society (Valcour, 2016). This chapter will explain and discuss the syndrome of burnout, its implications and limitations for both individuals and organizations.

Back in the days, burnout was defined as “a syndrome of emotional exhaustion, depersonalization and reduced personal accomplishment that can occur among individuals who do ‘people work’ of some kind” (Maslach, 1982, p. 3). Today burnout can be applied to individuals across professions (Demerouti et al., 2001) and it is commonly known as a state of mental weariness (Schaufeli & Bakker, 2004). Burnout is defined as a syndrome of emotional exhaustion, cynicism or depersonalization, and reduced professional efficacy (Maslach, Schaufeli & Leiter, 2001).

The emotional component of burnout is exhaustion, which refers to feelings of strain, particularly to chronic fatigue resulting from overtaxing work (Salmela-Aro, Rantanen, Hyvönen, Tilleman & Feldt, 2010). Exhaustion is when people feel overextended, both physically and emotionally. They feel drained of energy, waking up just as exhausted as when they went to bed (Maslach & Leiter, 1997). Exhaustion can for example stem from intense time pressure, demands of

being available 24/7, or simply having too much to do at work and it can cause individuals to be unable to concentrate on their work (Valcour, 2016). Burnout can also be described as the wearing out of an individual due to excessive demands on one's resources (Freudenberger, 1974), or as a state of physical, emotional, and mental exhaustion, which occurs after long exposure to situations that are emotionally demanding (Montgomery, Panagopoulos & Benos, 2006).

The cognitive component of burnout is cynicism (Salmela-Aro et al., 2010). Cynicism, or depersonalization, consists of an indifferent or a distal attitude toward work in general, and the people with whom one works with, losing interest in one's work, and not seeing work as meaningful (Salmela-Aro et al., 2010). Cynicism represents an erosion of engagement (Valcour, 2016), and it essentially means that one distances oneself from work.

The behavioral component of burnout is reduced professional efficacy (Salmela-Aro et al., 2010). Professional inefficacy refers to diminished feelings of competence, successful achievement, and accomplishment both in one's job and in the organization. Inefficacy refers to the lack of achievement and productivity and feeling incompetent (Valcour, 2016).

Burnout is often associated with both physical and mental issues such as muscular pain, depression and anxiety (Wang et al., 2015). It has also been associated with personal problems such as physical exhaustion, insomnia, increased use of alcohol and drugs and increased marital and family issues (Maslach, Jackson & Leiter, 1997). At an organizational level burnout is known to affect absenteeism, intention to leave, morale, decreased commitment and performance, and decreased creativity (Maslach & Goldberg, 1998; Maslach et al., 2001; Halbesleben & Buckley, 2004; Maslach et al., 1997; Schaufeli, Maslach & Marek, 1993), therefore making it a critical issue for organizations to tackle, reduce and avoid (Johnstone, Kaiser, Injeyan, Sappleton, Chitayat, Stephens & Shuman, 2016). Thus, our first hypotheses are as follows:

Hypothesis 1: There is a positive relationship between job demands and burnout

Hypothesis 2: There is a negative relationship between job demands and work engagement

Work Engagement

Most people spend a lot of time working, or at least being at work. Some people are absorbed in their work; they talk and dream about work, while others are rather disengaged; they go to work because they need to, not because they necessarily want to (Ind, 2010). The cost and benefits of these two groups of employees are vastly different. While engaged employees are highly productive and efficient, disengaged employees are unproductive, and costly for the organization (Ind, 2010).

This background information lays the foundation as to why the psychological relationship between an employee and their work has become more important over the last decade. To become effective and productive, organizations are not only focusing on hiring the most talented individuals, but also on motivating employees so that they can unleash their full potential at work. Organizations are increasingly expecting their employees to be proactive, taking responsibility over their professional development and committing themselves to high performance standards, and in other words, to be engaged employees (Bakker & Leiter, 2010). In this part of our thesis, we delve into the world of work engagement and discuss the various aspect of the terminology and the practical implications of work engagement in an organizational setting.

Research on employee-organization relationships involves ever-increasing references to the concept of work engagement. It was the researcher William Kahn who introduced the concept of engagement in 1990 (Bakker, Demerouti & Sanz Vergel, 2014). According to Kahn (1990), there was a minimal amount of research on how employees take different roles in the organization, how employees were psychologically present during moments of their role performance. In other words, there was a lack of research on how employees differ physically, cognitively and emotionally in the roles they engage in at work. Kahn defined engagement as “the harnessing of organization members’ selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performance “(1990, p. 694).

Work engagement has many different definitions and it can be applied in equally as many different contexts. The general definition of work engagement is that it is a positive, fulfilling, affective-motivational state of work-related well-being that can be seen as an antipode of burnout as it is characterized by vigor, dedication and absorption (Schaufeli & Bakker, 2004; Bakker & Demerouti,

2008; Bakker & Leiter, 2010). Maslach and Leiter (1997) stated that the three dimensions of work engagement; energy, involvement and efficacy can be seen as the opposite of the three dimensions in burnout; exhaustion, cynicism and lack of professional efficacy.

This thesis will focus on work engagement being a concept that can influence employees' experience of work-related activities. Further, this thesis defines work engagement as a motivational concept, meaning that engaged employees feel obliged to seek challenging goals, in other words, engaged employees have a desire to succeed. Work engagement goes beyond particular situations as engaged employees accept a personal commitment to their goals, and they want to succeed in their work-related activities (Bakker & Leiter, 2010). Work engagement can also reflect the personal energy employees bring to their work. According to Bakker, Schaufeli, Leiter and Taris (2008) engaged employees seem to exude more energy, and they quickly engage in their work (Bakker & Leiter, 2010). In other words, engagement is defined by a high level of ability and strong relations with one's work (Bakker & Leiter, 2010). In addition, engaged employees often experience positive emotions connected to work; they have the capacity to be energetic and they rapidly transfer that energy to their work and others (Bakker & Demerouti, 2008; Bakker & Leiter, 2010). The fact that engaged employees often are happy can explain why engaged employees are more productive. Happy people are more sensitive to opportunities at work, they are more confident and optimistic (Cropanzano & Wright, 2001).

Engaged employees do not reserve their energy for something more important in the future; they see work as an energy gain. It is also essential to mention that work engagement reflects intense involvement in work as engaged employees pay attention, and often acknowledge the necessary details while getting to the essence of challenging problems. Engaged employees also become absorbed in their work, they can experience flow in which they lose track of time and diminish their response to distractions (Bakker & Leiter, 2010). Even though engaged employees can delve into their work and lose track of their time, it does not mean that engaged employees have the urge to work excessive hours and the uncontrollable need to work, work engagement and workaholism do not go hand in hand (Sonnentag, Mojza, Binnewies & Scholl, 2008).

As we have now discussed the concept of work engagement and why work engagement is important to research, we can delve into the connection between

work engagement and job resources. Research has consistently shown that job resources such as social support from colleagues and supervisors, performance feedback, skill variety, autonomy, and learning opportunities are positively related with work engagement (Halbesleben, 2010). Job resources can either have an intrinsic motivational role as it fosters employees' growth, learning and development, or play an extrinsic motivational role as they are instrumental in achieving work goals (Bakker & Leiter, 2010). It is known that job resources fulfill basic human needs, such as the needs for autonomy, relatedness and competence (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008). For instance, proper feedback fosters learning, thereby increasing job competence, whereas decision latitude and social support satisfies the need for autonomy and the need to belong, respectively (Bakker & Leiter, 2010). In environments where job resources have a motivational role, it increases the likelihood that the required task will be completed successfully, and that the work goals will be fulfilled. This can happen through supportive colleagues and performance feedback, but the most important part is that the outcome is positive, and engagement is likely to occur. (Schaufeli & Bakker, 2004; Bakker & Leiter, 2010).

Additionally, job resources become more pertinent and gain their motivational potential when employees are met with high job demands (Bakker & Demerouti, 2007; Hakanen & Roodt, 2010). Hakanen, Bakker and Demerouti (2005) found that job resources are most beneficial in maintaining work engagement under the condition of high job demands (Bakker & Leiter, 2010). Other research supports this notion; Bakker, Hakanen, Demerouti and Xanthopoulou (2007) found that job resources worked as a buffer and reduced the negative relationship between misbehavior among the students and work engagement. Further, they found that job resources especially influenced work engagement when the teachers were confronted with high levels of misbehavior among the students. In general, there is support in this field of study that when job demands are high, the more important job resources become for maintaining high level of work engagement.

In conclusion, work engagement among employees is a concept that can separate the successful organizations from the unsuccessful ones. Therefore, everyone needs to focus on creating environments where work engagement can evolve and thrive. Work engagement is not only an issue for organizations, but also for individuals. If an organization strives work engagement, everyone must

take responsibility in creating an environment where work engagement will thrive. Based on this our second hypotheses are as follow:

***Hypothesis 3:** There is a positive relationship between job resources and work engagement*

***Hypothesis 4:** There is a negative relationship between job resources and burnout*

The Impact of Technology-Assisted Supplemental Work

As mentioned earlier, this thesis focuses on the relationship between technology-assisted supplemental, job demands and resources, work engagement and burnout. To avoid high turnover due to burnout, organizations should focus on how to reduce elements that can cause burnout. Today, millions of employees use communication technology such as smartphones, cell phones and laptops to do their jobs away from their traditional office (Boswell & Olson-Buchanan, 2007). This technology allows employees to expand their workday by performing role-prescribed tasks at home after regular working hours (Fenner & Renn, 2010). Although this activity can be fruitful for some, others experience technology-assisted supplemental work as detrimental to their private and family life (Derks & Bakker, 2014; Boswell & Olson-Buchanan, 2007).

Before we delve further into our analysis, we start by defining technology-assisted supplemental work (TASW). TASW is defined as the performance of role-prescribed job tasks by full-time employees with the aid of advanced information and telecommunications technology at home, when away from home or while on holiday (Fenner & Renn, 2004). TASW is characterized by “1) it is distributed supplemental work at home by full-time employees after regular working hours, 2) it is often discretionary, performed by professional or other white-collar workers, and is not covered by a formal contract or compensation agreement, and 3) it is performed with information and communication technology, such as laptops, cellular phones, smartphones and PDAs” (Fenner & Renn, 2010, p. 66). In other words, TASW is working while physically being away from your workplace through technology such as laptops and other communication technology, and the additional work is not compensated as it is not described in your contract. TASW is different from working at home as employees who work from home on a regular basis have greater boundaries

regarding their work sphere and family sphere. Research states that employees who work from home experience less stress than those who engage in TASW (Fenner & Renn, 2010). The other difference between TASW and common supplemental work is the role of technology in the supplemental work that is often required by the way of working.

Technology has changed how people work; you have instant access to important documents and the ability to connect with your coworkers without having to leave your home (Fenner & Renn, 2004). “It is this this anytime-anywhere connectedness of employees to their work, coworkers, supervisors, customers, and other organizational stakeholders with modern technologies blurs the traditional boundaries that have customarily separated work from family and has changed the meaning of being at home” (p. 184). This instant access to work can cause conflict with one’s role at home and with family, otherwise known as work-home conflict or work-home interference (Fenner & Renn, 2010), which will be further discussed in the next chapter. TASW can also encourage other behavior such as increased productivity and organizational responsiveness (Fenner & Renn, 2010). Although the use of information technology has changed since the creation of the terminology TASW in 2004, thus making the terminology slightly outdated, we still believe that it is relevant to measure how TASW influences employee’s levels of work engagement and burnout.

The Role of Smartphone Usage.

As the role and usage, as well as the advancement of smartphones have changed since Fenn and Renner defined TASW in 2004, it is important to discuss the role of smartphones in TASW in 2018. Smartphone usage is differentiated from regular work-related computer use after working hours. Computers is a more passive technology that requires that one sits down, turns on and logs in to the device before one can engage in work-related activity. In contrast, it is much easier to engage in work-related activity and TASW on a smartphone as one is more exposed to interruptions due to instant notifications (Derks & Bakker, 2014). This is supported by Chesley (2005) who reported that mobile phone usage was associated with increases in negative forms of spillover linked to increased distress and lower family satisfaction, while regular computer usage was not. To further investigate this subject, this chapter will introduce and discuss the role of smartphone usage in today's society in both positive and negative aspects in regard to work-family balance and lack of recovery.

First, we start off by defining what a smartphone is; a smartphone is a wireless device with functions to manage the calendar, make phone calls, browse the internet, and to receive and send emails, anytime, anywhere (Derks & Bakker, 2014). Through smartphone usage and other communication technology, employees can extend their working hours by staying connected to work even though they are not formally at work (Boswell & Olson-Buchanan, 2007).

The usage of smartphones in an organizational setting has been linked to being easily interrupted (Smith 2012); users feeling pressured to answer when the smartphone receives a notification (Derks & Bakker, 2014) and having an “electronic leash” (Diaz et al., 2011, p. 500). Researchers also examined the field of work-life balance (WLB), work-home interference (WHI), and its relation to smartphone usage. WHI can be defined as a form of inter-role conflict in which the role pressure from the work domain is incompatible with the role pressure from the family domain, in such a way that participation in the work role conflicts with participation in the home role (Greenhaus & Beutell, 1985). Derks, van Duin, Tims and Bakker (2015) found that individuals working in an “always-on” culture experienced more WHI, and that smartphone usage was positively related to WHI, confirming previous research in the field (Boswell & Buchanan, 2007). Further, Derks and Bakker (2014) researched smartphone use and its connection to WHI. They found that smartphone use was positively correlated with WHI, and that intensive smartphone usage was positively correlated with burnout, where burnout was operationalized as exhaustion and cynicism. In addition to this, Ragsdale and Hoover (2016) researched smartphones serving as job demands, and attachment to smartphones being a resource in the job demands-resources model. They found that work-related smartphone use was negatively correlated to work-family conflict, but that the effect was not detrimental for individuals who were attached to their smartphone, these individuals actually had higher levels of work engagement (Ragsdale & Hoover, 2016). A survey by the American Psychological Association (2017) suggests that 40-45 percent of the employees surveyed were constantly or often connected to their devices during a typical workday. The survey also suggests that those who check their devices more often have higher stress levels than those who do not interact frequently with their devices (APA, 2017).

In addition to this, it has also been found that smartphone usage can interfere in individual’s ability to recover from work (Lanaj, Johnson & Barnes,

2014), serving as a source of WHI. The ability to relax and recover from work is essential for one's physical and mental health. If one is unable to recover from the strain and stress from work, one may start to experience fatigue, one of the symptoms of burnout (Demerouti, Taris & Bakker, 2007). The Effort-Recovery (E-R) theory suggests that efforts exerted at work is associated with stress related acute load reactions, such as increased heart rate and fatigue (Meijman & Mulder, 1998).

The optimal situation for recovery is when the individual is able to decrease the stress levels to pre-stressor levels after working hours, so one is able to return to work the next day fully recharged and recovered (Meijman & Mulder, 1998). Thus, if the stressors are allowed to increase past working hours, for example, if one continues to work from home after work, recovery will be incomplete (Derks, ten Brummelhuis, Zecic & Bakker, 2014). A core component of recovery is the psychological detachment, the ability to detach from work on one's leisure time (Etzion, Eden & Lapidot, 1998). This is supported by Sonnentag (2001) who proved that employees need after-work hours to detach from work to recover from the strain or stress from work (Derks et al., 2014). This detachment is not exclusive to being physically away from work, the individual must stop thinking and engaging mentally in work-related issues (Sonnentag & Krueel, 2006). Psychological detachment is especially important after stressful and demanding days at work (Sonnentag & Bayer, 2005). One could postulate that it can be difficult to recover and detach from work when someone is available 24/7 through a smartphone and other technology that allow one to work after hours (Derks et al., 2014). In addition to smartphones interfering with one's ability to detach and recover, Lanaj and colleagues (2014) documented that smartphone usage interferes with one's sleeping habits, which is a crucial part of recovering. The potential lack of recovery can influence an employees' ability to engage at work.

It can seem like employers' wish to realize return on investment and have engaged employees is posing as a double-edged sword. On the one hand, employers are gaining more flexible and reachable employees through smartphones and other technology that allows employees to connect to work after hours. On the other hand, if employees are not able to detach from work post working hours, employers can attain increasingly stressed and tired employees that are not able to perform to their true potential. We therefore have reason to

believe that perceived perspective taking will have the same effect on resistance to change. Based on this our further hypotheses are as follow:

Hypothesis 5: *There is a positive relationship between technology-assisted supplemental work and burnout*

Hypothesis 6: *There is a positive relationship between technology-assisted supplemental work and work engagement*

Hypothesis 7: *Technology-assisted supplemental work will moderate the positive relationship between job demands and burnout*

Hypothesis 8: *Technology-assisted supplemental work will moderate the negative relationship between job demands and work engagement*

Hypothesis 9: *Technology-assisted supplemental work will moderate the positive relationship between job resources and work engagement*

Hypothesis 10: *Technology-assisted supplemental work will moderate the negative relationship between job resources and burnout*

Our conceptual model with hypotheses is presented in Figure 1.

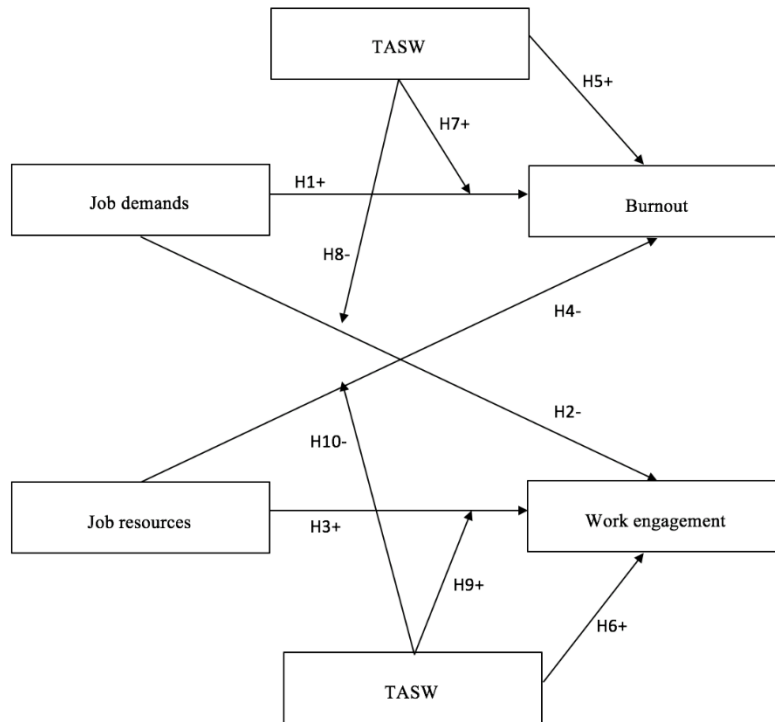


Figure 1. Conceptual Model with Hypotheses

Methodology

Sample and Procedure

During the spring of 2018, we distributed one web-based questionnaire to voluntary participants on social media such as Facebook and LinkedIn, by email and distribution to friends and family, thus convenience sampling. We chose to use a quantitative approach for our data collection, as there already is sufficient research and information on our research topic. To ensure anonymity and eliminate interviewer bias, we have chosen to use standardized questionnaires. To minimize the presence of response distortion, we have highlighted confidentially in the invitation and the introduction text where we emphasize that all responses would remain anonymous (Chan, 2009). Convenience sampling was chosen as it is indeed convenient, it is also inexpensive, and it allows for a much easier data collection process (Henry, 1990). The questionnaire has been digital as it allows for more flexibility related to distribution. Digital surveys are also cost effective compared to postal surveys. The negative side of digital surveys is the loss of any respondents due to lack of internet access.

We received a total of 423 respondents, but 54 of these were incomplete and could therefore not be included in the survey, resulting in a response rate of 88,7 %. Out of the respondents, 347 (82.03% are female and 76 (17.97%) are men. When it comes to age, 70.7% were under 40 years old, 29.3% were between 41 and 69 years old and none over 60 years old. The largest portion of the respondents have had their current position in the company for more than a year (44.4 %), the second largest group had worked there for four years or more (36.4%) while the minority had worked in the company less than a year (21%). Lastly, 39% of the people reported that their employer covers the expenses for mobile phones, while 61% had not.

Measures

The scales included in the questionnaire were mainly originally in English, and therefore we followed the recommendation of Brislin for translation (1986). The questionnaire was translated from English to Norwegian and then back translated to English by a bilingual. In retrospect, we compared the back-translated version with the original version and based on this made a few minor adjustments. In addition to the first section of the questionnaire, which collects background information of the respondents, our questionnaire is composed by four already established questionnaires.

Job Demands-Resources Model. To measure the independent variables job demands and job resources, we used Østlyngen, Storjord, Stellander and Martinussen's TAB measure (Total Arbeidsbelasting) (2003). The TAB measure consists of a total of 23 items, where six items measures personal control (resources), three questions measures social support (resources), five questions measures job satisfaction (resources) and nine items measure stress/workload at work (demands). Based on this division, we have chosen to delineate the hypotheses so that the concept of demands deals with work pressure and workload, and resources deal with social support, autonomy and work satisfaction. All items compared to TAB were measured using a seven-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (7). The TAB-questionnaire is originally in Norwegian. The survey includes measures such as "Hvor stressende er jobben din?" and "I hvilken grad er dine arbeidsoppgaver varierte?". All questions were negatively framed, except for two items that were reversed and positively angled. Inclusion of such items can reduce

common method variance (Chung et al, 2012). The scale's validity and reliability have been validated in previous studies (Østlyngen, Storjord, Stellander & Martinussen, 2003), meaning the scale has been found to measure what it claims to measure, and it has shown consistent results under constant conditions (Hair, Black, Babin & Anderson, 2010).

Burnout. The dependent variable, burnout, was measured with the 9-item Bergen Burnout Inventory by Salmela-Aro and colleagues (2010). The scale is built up by three factors (cynicism, exhaustion and reduced professional efficacy) which together composite burnout in work life. These items were measured using a six-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (6). Examples of items from the survey are "Jeg sover ofte dårlig på grunn av omstendigheter på jobb" and "Mine forventninger til jobben og mine prestasjoner har blitt redusert". Earlier research has established that scale's validity, together with satisfactory reliability in a variety of contexts under both voluntary and imposed conditions (Salmela-Aro and colleagues, 2010).

Work Engagement. To measure the dependent variable, work engagement, we used Schaufeli, Bakker and Salanova's Utrecht Work Engagement (UWES) Scale (2006) which consist of a total of 17 items where four items measure vigor, four questions measure dedication and five items measure absorption. A shortened version of this survey, called UWES 9, is also widely used. In this context, we have based UWES 9 on the design of the survey. These items were measured by using a seven-point Likert scale ranging from "not at any in the last year" (1) to "daily" (7). Examples of items are "Jeg er full av energi i arbeidet mitt" and "Jeg er stolt av arbeidet mitt". The scale's validity and reliability have been validated in previous studies (Schaufeli, Bakker and Salanova, 2006), meaning the scale has been found to measure what it claims to measure, and it has shown consistent results under constant conditions (Hair, Black, Babin & Anderson, 2010).

Technology-Assisted Supplemental Work (TASW). The cover the moderating variable, technology-assisted supplemental in work life, we used the Technology-Assisted Supplemental Work (TASW) developed by Fenner and Renn (2004), which consists of a total of 6 items. These items were measured using a five-point Likert scale ranging from "never" (1) to "always" (5). Examples of items are "Jeg føler at mobiltelefonen eller PCen min hjelper meg når jeg vil jobbe hjemmefra på kvelden eller i helgene" and "Når jeg henger etter i arbeidet

mitt, jobber jeg mye på kvelden eller i helgene for å ta igjen ved å bruke mobiltelefonen min". The scale's validity and reliability have been validated in previous studies (Fenner and Renn, 2004), meaning the scale has been found to measure what it claims to measure, and it has shown consistent results under constant conditions (Hair, Black, Babin & Anderson, 2010).

Analyses

In this thesis, factor analysis is not conducted since all the items are adapted from prior research and are assumed to form selected variables. The authors presuppose that the established questionnaires can be used as scales and demonstrated satisfactory levels of convergence and discriminant validity. This assumption is done since all the questionnaires are thoroughly tested and we find no theoretical reason for this to be tested again with our dataset. Scale reliability is tested to identify the items that do not achieve desired reliability. Items that meet the requirement is combined by a summated mean function into variables. The normality and validity of the variables will be assessed by using normality tests and correlation analysis.

To test our hypotheses, we used multiple regression. Where we include control variables to control for potential confounding effects, these are remained constant throughout the analyses; Age: coded from 1 (under 20 years) to 4 (over 70 years), gender: Man, 1; Women, 2, education: coded from 1 (primary school) to 5 (more than 5 years with higher education), tenure in years: coded from 1 (less than 1 year) to 4 (4 years or more), manager (Yes, 1; No, 2). These controls are used often in the human resources management (Tzafirir, Baruch & Dolan, 2004; Zhu, Newman, Miao & Hooke, 2013; Purcell & Hutchinson, 2007; Blunsdon & Reed, 2003; Mayer, Kuenzi, Greenbaum, Bardes & Salvador, 2009). We also include work hours: coded from 1 (less than 37.5 h/week) to 3 (more than 47.5 h/week), and work phone (Yes, 1; No, 2), these are included as we assume they will influence the relationship between the variables.

The interaction term is computed by centering the variables before multiplying them with one another. In words, the mean of the independent and the moderator variables (centering the variables) is subtracted from each variable and further multiplied together to make the interaction term. The purpose of centering is to reduce the correlations between the interaction terms and independent variables, so that the effect of the independent variables is distinguishable from

the interactions. This ensures that the model will not have an estimating problem in the form of multicollinearity.

Finally, the results of the multiple regression analysis and moderation analysis are summarized, and the hypotheses testing results are presented. The moderator analysis followed the spirit and recommendations from Sharma, Durand & Gur-Arie (1981) where the moderator variables are split into different dimensions of moderators, based on the level of significance among the independent variables and the moderator in the regression analysis.

Results

Descriptive statistics, including means, standard deviations, coefficient alpha reliabilities, and correlations among variables are presented in Table 1. The questionnaires were computed into final scales by averaging the items. The scales demonstrated high internal consistency, with reliability estimates ranging from 0.837 to 0.945. Further, the variables met the requirement for Skewness and Kurtosis. A rule of thumb on the requirement for Skewness is that it should be between -2 and 2, and for Kurtosis should be between -4 and 4 (Sørebø, personal communication, 2012). The tolerance for the independent variables and the variance inflation factor (VIF) to check for multicollinearity among independent variables, is assessed in each hypothesis. The bivariate correlations, means, standard deviations and reliability estimates are reported in Table 1.

Table 1. Descriptive Statistics, Scale, Reliabilities and Correlations

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Age ¹	2.253	0.5196	-											
2. Gender ²	1.8203	0.38437	-0.057	-										
3. Education ³	3.3097	1.00051	0.095*	-0.071	-									
4. Tenure ⁴	2.7092	1.16549	.392**	-0.011	-.146**	-								
5. Work hours ⁵	1.6738	0.60991	.254**	-.230**	.170**	0.07	-							
6. Manager ⁶	1.7092	0.45466	-.300**	.134**	0.021	-.339**	-.351**	-						
7. Work phone ⁷	1.6099	0.48834	-.255**	.295**	-.305**	-0.087*	-.428**	.299**	-					
8. Demands	4.2709	1.02943	.122*	.143**	-0.056	.216**	.187**	-.223**	-0.072	(-0.837)				
9. Burnout	2.6115	0.98041	0.011	.158**	-0.104*	.218**	0.023	-0.051	0.097*	.578**	(0.869)			
10. Resources	4.8785	1.01059	0.107*	-.121*	0.026	0.034	-.171**	-.242**	-.256**	-.175**	-.593**	(-0.927)		
11. Work engagement	5.3325	1.39856	.154**	-0.04	0.019	0.03	.185**	-.263**	-.245**	-.157**	-.597**	.671**	(-0.945)	
12. TASW	3.5032	1.05325	.111*	-.144*	.232**	0.042	.321**	-.291**	-.526**	.272**	0.072	.200**	.162**	(-0.865)

Notes: n = 423. Coefficient alphas are displayed on the diagonal, in parentheses. ¹Age: coded from 1 (under 20 years) to 4 (over 70 years); ²Gender: Man, 1; Women, 2; ³Education: coded from 1 (primary school) to 5 (more than 5 years with higher education); ⁴Tenure: coded from 1 (less than a year) to 4 (4 years or more); ⁵Work hours: coded from 1 (less than 37.5 h/week) to (more than 47.5 h/week); ⁶Manager: Yes, 1; No, 2; ⁷Work phone: Yes, 1; No, 2; *p < .05; ** p < .01

The positive and significant relationship between work engagement and work hours ($r=.185$, $p<.01$) suggests that workers who work more, experience higher levels of work engagement. This is further suggested since the relationship between work hours and resources is significant positive ($r=.171$, $p<.01$). More work hours also have significant positive relationship with job demands ($r=.187$, $p<.01$), more surprisingly is that the interaction between burnout and work hours is not significant.

As expected, job resources ($r=.671$, $p<.01$) were significantly and positively related to work engagement, and significantly negatively related to burnout ($r=-.175$, $p<.01$). This confirms that job resources are work conditions that provide resources for the individual employee (Hakanan & Roodt, 2010). Further, job demands ($r=-.157$, $p<.01$) were significantly and negatively related to work engagement, and significantly positively related to burnout ($r=.578$, $p<.01$). This postulates Freudenberg's (1974) theory that burnout can be described as the wearing out of an individual due to excessive demands on one's resources.

Work phone is significantly negative correlated to job resources, work engagement and TASW ($r=-.256$, $p<.01$; $r=-.245$, $p<.01$; and $r=-.526$, $p<.01$), and is significantly positive correlated with burnout ($r=.097$, $p<.05$). This may indicate that people whose phone expenses are covered by their employer perceive their device as more of a burden than an advantage. However, job demands, job resources and work engagement were significantly and positively correlated to TASW ($r=.272$, $p<.01$; $r=.200$, $p<.01$; and $r=.162$, $p<.01$, respectively). More surprisingly, TASW and burnout does not have significant or negative correlation. This may indicate that our respondents are open to do work with the assistance of technology and may see this as an opportunity and an advantage. Based on the correlations in Table 1, we can reject hypothesis 8 and 9, and most likely hypothesis 7 and 10. This is because a moderator must be uncorrelated (non-significant and small $r<0.1$) to the independent and dependent variables (Sharma et al., 1981). This means that TASW is most likely an intervening or an independent variable. The prerequisite for TASW is most likely broken, but we still want to investigate the relationship in a multiple regression analysis.

Test of the Hypotheses

In line with the theory described under methodology and analyses, multiple regression analysis was applied to evaluate the hypotheses. The results

are structured after hypotheses with direct effects between independent variables and dependent variables, Table 2 and 3. Further, the direct influence of TASW on the dependent variables are shown in Table 4 and 5. Lastly, the different moderating roles between the independent and dependent variables are presented through Table 6 to 9. This has been done to put some structure and order to the analysis since we have two dependent variables.

Hypothesis 1 and 4. H1 stated that job demands are positively related to burnout, and H4 stated that that job resources are negatively related to burnout. The results are presented in Table 1. There were no indications for (multi)collinearity (i.e., tolerance value well above .10 and VIF value well below 10). The control variables in Model 1 explained 9.2% of the variance in burnout. The addition of job demands raised the explained variance significantly to 37.6% ($F = 23.84$, $p < .001$). In addition, Model 2 shows that job demands are significantly related to burnout ($\beta = .572$, $p < .001$). The results confirm hypothesis H1. Further, the table shows that resources explain 45.7% of the variance in burnout and is significantly negative related to burnout ($\beta = -.64$, $p < .001$) found in Model 3. This confirms H4. We wanted to see if this still holds, when regressed in the same model. The results are found under Model 4. Here we also found support for job demands being significantly positive and job resources being significantly negative related to burnout ($\beta = .428$, $p < .001$; and $\beta = -.525$, $p < .001$, respectively). The variance also increases to 60.4%, higher than any of the other models. We can with confidence say that hypotheses H1 and H4 are confirmed.

Table 2. The relationship between the independent variables (demands; resources) and burnout

Variables	Burnout regressed on the control variables	Burnout regressed on the control variables and demands	Burnout regressed on the control variables and resources	Burnout regressed on the control variables and both demands and resources
	Model 1	Model 2	Model 3	Model 4
Age	-0.072	-0.067	-0.063	-0.061
Gender	0.165***	0.038	0.149***	0.057
Education	-0.05	-0.017	-0.086	-0.055
Tenure	0.247***	0.151***	0.209***	0.143***
Work hours	0.095	-0.011	0.107*	0.026
Manager	0.015	0.074	-0.106*	-0.041
Work phone	0.062	0.094	-0.08	-0.031
Demands		0.572***		0.428***
Resources			-0.64***	-0.525***
R ²	0.092	0.376	0.457	0.604
Adjusted R ²	0.072	0.36	0.443	0.592
F	4.586***	23.84***	33.301***	53.462***

Note: * $p < .05$, ** $p < .01$, *** $p < 0.001$; $N = 423$; Standardized coefficients are presented

Hypothesis 2 and 3. H2 stated that job demands are negatively related to work engagement, and H3 stated that that job resources are positively related to work engagement. The results are presented in Table 3. There was no indication of a (multi)collinearity problem. Model 1, containing the control variables, where manager and work phone regressed significantly negative on work engagement. Further, explained 12.9% of the variance in work engagement. Model 2 was significant ($F = 9.28, p < .001$) and explained 18.4% of the variance in work engagement. Job demands in Model 2 has a significant and negative relationship with work engagement ($\beta = -.252, p < .001$). The results confirm hypothesis 2. When adding job resources to the control variables the R^2 increased significantly. Model 3 explains 46.7% of the variance in work engagement, and job resources has a positively significant relationship with work engagement ($\beta = .623, p < .001$). This confirms hypothesis 3. Here we also see the same pattern between the independent variables and dependent variables, where job resources seem to have a greater effect to the dependent variables (burnout; work engagement). This is investigated in Model 4, where both job resources and job demands are added to the control variables. Here we also found support for job demands being significantly negative and job resources being significantly positive related to work engagement ($\beta = -.098, p < .05$; and $\beta = .598, p < .001$, respectively). The variance also increases to 48.4% higher than any of the other models. We can with confidence say that hypotheses H2 and H3 are confirmed.

Table 3. The relationship between the independent variables (demands; resources) and work engagement

	Work engagement regressed on the control variables	Work engagement regressed on the control variables and demands	Work engagement regressed on the control variables and resources	Work engagement regressed on the control variables and both demands and resources
	Model 1	Model 2	Model 3	Model 4
Age	0.087	0.085	0.071	0.071
Gender	0.012	0.067	0.036	0.056
Education	-0.082	-0.099	-0.047	-0.055
Tenure	-0.109	-0.069	-0.067	-0.053
Work hours	0.042	0.088	0.023	0.041
Manager	-0.197***	-0.227***	-0.079	-0.096*
Work phone	-0.224***	-0.235***	-0.1*	-0.109*
Demands		-0.252***		-0.098*
Resources			0.623***	0.598***
R^2	0.129	0.184	0.467	0.484
Adjusted R^2	0.111	0.164	0.463	0.47
F	6.991***	9.28***	37.371***	34.159***

Note: * $p < .05$, ** $p < .01$, *** $p < 0.001$; $N = 423$; Standardized coefficients are presented

Hypothesis 5. H5 stated that Technology-Assisted Supplemental Work (TASW) is positively related to burnout. The results are presented in Table 4. There was no indication of a (multi)collinearity problem. Model 1 is the same as in Table 2. Model 2 was significant ($F = 4.621$, $p < .001$) and explained 8.4% of the variance in burnout. TASW in Model 2 has a significant and positive relationship with burnout ($\beta = .152$, $p < .05$). The results confirm H5. The relationship is not investigated in greater detail under hypothesis 5, as TASW is the moderator in this paper and will be further investigated in the moderator hypotheses.

Table 4. The relationship between the technology-assisted supplemental work (TASW) and burnout

Variables	Burnout regressed on the control variables	Burnout regressed on the control variables and TASW
	Model 1	Model 2
Age	-0.072	-0.062
Gender	0.165***	0.153**
Education	-0.05	-0.052
Tenure	0.247***	0.259***
Work hours	0.095	0.06
Manager	0.015	0.024
Work phone	0.062	0.118
TASW		0.152*
R ²	0.092	0.107
Adjusted R ²	0.072	0.084
F	4.586***	4.621***

Note: * $p < .05$, ** $p < .01$, *** $p < 0.001$; $N = 423$; Standardized coefficients are presented

Hypothesis 6. H6 stated that Technology-Assisted Supplemental Work (TASW) is positively related to work engagement. The results are presented in Table 5. There was no indication of a (multi)collinearity problem. Model 1 is the same as in Table 2. Here Model 2 explained 12.4% of the variance in work engagement. This is less than Model 1, which only includes the control variables. Further TASW does not have a significant relationship with work engagement ($\beta = -.012$, n.s.), meaning that the results do not confirm hypothesis 6. The relationship is not investigated in greater detail under H6, as TASW is the moderator in this thesis and it will be further investigated in the moderator hypotheses.

Table 5. The relationship between technology-assisted supplemental work (TASW) and work engagement

Variables	Work engagement regressed on the control variables	Work engagement regressed on the control variables and TASW
Age	0.087	0.084
Gender	0.012	0.027
Education	-0.082	-0.081
Tenure	-0.109	-0.11
Work hours	0.042	0.051
Manager	-0.197***	-0.187**
Work phone	-0.224***	-0.23***
TASW		-0.012
R ²	0.129	0.124
Adjusted R ²	0.111	0.101
F	6.991***	5.436***

Note: *p<.05, ** p<.01, ***p<0.001; N = 423; Standardized coefficients are presented

Hypothesis 7. H7 stated that Technology-Assisted Supplemental Work (TASW) moderates the positive relationship between job demands and burnout. The results are presented in Table 6, in which Model 1 and Model 2 are the same as in Table 2. The tolerance value remained well above .10 and the VIF value remained well below 10 (i.e., no (multi)collinearity problems). Model 3 and Model 4 in Table 4 show that the addition of both TASW and the interaction term did not result in a significant change in explaining the variance in burnout (Model 3, TASW $\beta = -.003$, n.s.; Model 4, TASW $\beta = -.002$, n.s.; Interaction term $\beta = .042$, n.s.). The level of significance means that TASW is a possible homologizer. Following Sharma et al. (1981), the moderator has to be uncorrelated to both the dependent and independent variable to be a possible homologizer. Based on Table 1 and Table 6, we see that TASW is not a possible homologizer, therefore TASW is only an intervening or independent variable. The results do not confirm H7, which means that TASW does not moderate the relationship between job demands and burnout.

Table 6. The relationship between the demands, technology-assisted supplementa work (TASW), the interaction term and burnout

Variables	Burnout regressed on the control variables	Burnout regressed on the control variables and demands	Burnout regressed on the control variables, damands and TASW	Burnout regressed on the control variables, damands, TASW and interaction term
	Model 1	Model 2	Model 3	Model 4
Age	-0.072	-0.067	-0.068	-0.068
Gender	0.165***	0.038	0.035	0.031
Education	-0.05	-0.017	-0.012	-0.01
Tenure	0.247***	0.151***	0.164**	0.16**
Work hours	0.095	-0.011	-0.019	-0.022
Mangager	0.015	0.074	0.067	0.069
Work phone	0.062	0.094	0.085	0.085
Demands		0.572***	0.565***	0.568***
TASW			-0.003	-0.002
TASW x Demands				0.042
R ²	0.092	0.376	0.368	0.37
Adjusted R ²	0.072	0.36	0.35	0.349
F	4.586***	23.84***	19.88***	17.965***

Note: *p<.05, ** p<.01, ***p<0.001; N = 423; Standardized coefficients are presented

Hypothesis 8. H8 stated that Technology-Assisted Supplemental Work (TASW) moderates the negative relationship between job demands and work engagement. The results of the multiple regression are presented in Table 7. Model 1 and Model 2 are the same as in Table 3. The tolerance value remained well above .10 and the VIF value remained well below 10, indicating no problems with collinearity. Table 7, Model 3 and Model 4 show that the addition of both TASW and the interaction term did not result in a significant change in explaining the variance in burnout (Model 3, TASW $\beta = .059$, n.s.; Model 4, TASW $\beta = .059$, n.s.; Interaction term $\beta = -.014$, n.s.). The level of significance means that TASW is a possible homologizer. Following Sharma et al. (1981), the moderator must be uncorrelated to both the dependent and independent variable to be a possible homologizer. Based on Table 1 and Table 7, we see that TASW is not a possible homologizer, therefore TASW is only an intervening or independent variable. The results do not confirm H8, meaning that TASW does not moderate the relationship between job demands and work engagement.

Table 7. The relationship between the demands, technology-assisted supplementa work (TASW), the interaction term and work engagement

	Work engagement regressed on the control variables	Work engagement regressed on the control variables and demands	Work engagement regressed on the control variables, damands and TASW	Work engagement regressed on the control variables, damands, TASW and interaction term
	Model 1	Model 2	Model 3	Model 4
Age	0.087	0.085	0.087	0.087
Gender	0.012	0.067	0.082	0.083
Education	-0.082	-0.099	-0.099	-0.1
Tenure	-0.109	-0.069	-0.066	-0.064
Work hours	0.042	0.088	0.087	0.089
Manager	-0.197***	-0.227***	-0.207***	-0.207***
Work phone	-0.224***	-0.235***	-0.215**	-0.215**
Demands		-0.252***	-0.261***	-0.262***
TASW			0.059	0.059
TASW x Demands				-0.014
R ²	0.129	0.184	0.179	0.18
Adjusted R ²	0.111	0.164	0.155	0.153
F	6.991***	9.28***	7.458	6.7***

Note: *p< .05, ** p<.01, ***p<0.001; N = 423; Standardized coefficients are presented

Hypothesis 9. H9 stated that Technology-Assisted Supplemental Work (TASW) moderates the positive relationship between job resources and work engagement. The results of the multiple regression are presented in Table 8. There were no problems with multicollinearity. Model 1 and Model 2 are the same as Model 1 and Model 3 in Table 3. In Table 8, Model 3 and Model 4 show that the addition of both TASW and the interaction term, did not result in a significant change in explaining the variance in work engagement (Model 3, TASW β =-.048, n.s.; Model 4, TASW β =- .046, n.s.; Interaction term β = -.032, n.s.). Here we see from the level of significance that TASW is a possible homologizer. As TASW is not uncorrelated to both the dependent and independent variable, TASW is only an intervening/independent variable. The results do not confirm H9, which means that TASW does not moderate the relationship between job resources and work engagement.

Table 8. The relationship between the resources, technology-assisted supplementa work (TASW), the interaction term and work engagement

	Work engagement regressed on the control variables	Work engagement regressed on the control variables and resources	Work engagement regressed on the control variables, resources and TASW	Work engagement regressed on the control variables, resources, TASW and interaction term
	Model 1	Model 2	Model 3	Model 4
Age	0.087	0.071	0.077	0.074
Gender	0.012	0.036	0.038	0.035
Education	-0.082	-0.047	-0.033	-0.031
Tenure	-0.109	-0.067	-0.072	-0.073
Work hours	0.042	0.023	0.031	0.029
Manager	-0.197***	-0.079	-0.084	-0.086
Work phone	-0.224***	-0.1*	-0.112*	-0.113*
Resources		0.623***	0.62***	0.619***
TASW			-0.048	-0.046
TASW x Resources				-0.032
R ²	0.129	0.467	0.468	0.469
Adjusted R ²	0.111	0.463	0.452	0.452
F	6.991***	37.371***	30.01***	27.025***

Note: *p< .05, ** p<.01, ***p<0.001; N = 423; Standardized coefficients are presented

Hypothesis 10. H10 stated that Technology-Assisted Supplemental Work (TASW) moderates the negative relationship between job resources and burnout. The results of the multiple regression are presented in Table 9. There were no problems with multicollinearity. Model 1 and Model 2 are the same as Model 1 and Model 3 in Table 2. In Table 9, Model 3 and Model 4 show that the addition of both TASW and the interaction term, did not result in a significant change in explaining the variance in work engagement. Further, TASW and job resources are significant ($\beta = -.641$, $p < .001$.; $\beta = .19$, $p < .001$), and the interaction term is non-significant ($\beta = -.003$, n.s.). Based on the level of significance, we see that TASW is an intervening or independent variable (Sharma et al., 1981). The results do not confirm H10, meaning that TASW does not moderate the relationship between job resources and burnout.

Table 9. The relationship between the resources, technology-assisted supplementa work (TASW), the interaction term and burnout

	Burnout regressed on the control variables	Burnout regressed on the control variables and resources	Burnout regressed on the control variables, resources and TASW	Burnout regressed on the control variables, resources, TASW and interaction term
	Model 1	Model 2	Model 3	Model 4
Age	-0.072	-0.063	-0.054	-0.055
Gender	0.165***	0.149***	0.142***	0.142***
Education	-0.05	-0.086	-0.101*	-0.101*
Tenure	0.247***	0.209***	0.22***	0.22***
Work hours	0.095	0.107*	0.081	0.081
Manager	0.015	-0.106*	-0.082	-0.082
Work phone	0.062	-0.08	-0.004	-0.004
Resources		-0.64***	-0.641***	-0.641***
TASW			0.189***	0.19***
TASW x Resources				-0.003
R ²	0.092	0.457	0.475	0.475
Adjusted R ²	0.072	0.443	0.46	0.458
F	4.586***	33.301***	30.872***	27.695***

Note: *p< .05, ** p<.01, ***p<0.001; N = 423; Standardized coefficients are presented

General Discussion

The purpose of this thesis was to investigate the moderating role of technology-assisted supplemental work in the relationships between job demands and resources, burnout and work engagement. The findings can be used as a springboard to further investigate the impact of technology in our lives. First, we will discuss the findings related to our hypotheses. We will start by discussing the relationships between job demands and resources, burnout and work engagement. We will then discuss TASW's relation to burnout and work engagement. Finally, we will discuss the moderating role of TASW in the relationship between job demands, job resources, burnout and work engagement.

As shown in the results, hypotheses 1 to 4 are confirmed. This means that there is a positive relationship between job demands and burnout, and a positive relationship between job resources and work engagement. These results are in line with previous research within the JD-R model (Schaufeli & Bakker, 2004; Bakker & Demerouti, 2007). The results also show that there is a negative relationship between job resources and burnout, meaning that job resources will decrease the notion of burnout. This is in line with research, which shows that individuals who have access to job resources use these resources to deal with job demands; job demands that can lead to burnout (Bakker & Schaufeli, 2007). Further, the results show that there is a negative relationship between job demands and work

engagement. This means that the presence of (high) job demands will lower work engagement, which is in line with research in the field of the JD-R model (Bakker & Demerouti, 2007).

We also researched whether there is a relationship between technology-assisted supplemental and burnout and work engagement, respectively. The results confirmed hypothesis 5, meaning that TASW has a significant and positive relationship with burnout. This is both expected and unexpected. Previous research within the field of TASW has not concluded that TASW influences burnout, but that TASW can increase perceptions of work-to-life conflict as TASW can further blur the lines between the work and family domains (Fenner & Renn, 2010; Wright et al., 2014). This is also confirmed by Boswell & Olson-Buchanan (2007) who found that motivated and engaged employees would greater engage in TASW, but that this engagement would have its price. TASW and other similar activity do increase work-life conflict, where work-life conflict and work home interference has been linked to an increased sense of burnout (Derks & Bakker, 2014). Other research has found that TASW and work-related cell phone use could impair employees' psychological wellbeing (Gombert, Rivkin & Kleinsorge, 2018; Lanaj et al., 2014). It is possible that employees engage in TASW and similar activity without realizing that this activity may tax their private lives (Diaz et al., 2011), suggesting that management should be cautious when encouraging employees to engage in TASW.

Conversely, hypothesis 6 was rejected. This means that TASW did not have significant positive relationship with work engagement. Even though previous research has found that TASW can be positive in terms of increased flexibility and organizational satisfaction (Ragsdale & Hoover, 2016; Fenner & Renn, 2010), TASW is linked to preventing recovery, thus it is not surprising that TASW does not have a significant positive relationship with work engagement. TASW and similar activity has been associated to being unable to detach from work, and not being able to recover from work (Lanaj et al., 2014; Demerouti et al., 2007). Being able to detach psychologically from work is essential recover from demanding and stressful days at work (Sonnentag, 2001; Sonnentag & Bayer, 2005). Sonnentag (2008) stated that the balance between high engagement at work and high disengagement from work during non-work time is highly relevant for protecting employees' well-being. In addition, Sonnentag (2003) found that recovery is essential to work engagement; stating that "individuals who

feel that they sufficiently recover during leisure time experience a higher level of work engagement during the subsequent work day” (p. 525). Derks and colleagues (2014) found that smartphone users had a hard time unwinding and recovering from work. This is also supported by Sonnentag and Krueger (2006) who stated that job related work phone calls would make nearly impossible to psychologically detach from work, thus making recovery hard. As previously discussed, individuals who are attached to their devices and use them intensively experience positive side effects of the usage. Thus, the average user of cell phones and other devices may not experience these positive side effects as they are not as attached to their device. This means that the average user may be prone to experiencing the more negative side effects of TASW such as increased sensations of stress and WHI (Derks & Bakker, 2014).

We will now move onto discussing the moderating role of TASW in the JD-R model, meaning the relationship between job demands, job resources, burnout and work engagement. While there is a considerable amount of research on how technology-assisted supplemental work and technology usage can affect work-life conflict, work-home interference and recovery (Derks & Bakker, 2014; Fenner & Renn, 2010; Derks et al., 2014), there is little research on the relationship between technology-assisted supplemental work, job demands, job resources, burnout and work engagement. As shown in the results, hypothesis 7 and 10 are rejected. In other words, TASW does not have a significant moderating role in the relationship between job demands and burnout, nor in the relationship between job resources and burnout. This is surprising as there is extensive research in the field that suggests that TASW and similar activity has a detrimental effect on individuals, such as increased burnout and increased perceptions of work life conflict (Wright et al., 2014; Boswell & Olson-Buchanan, 2007). In addition, previous research suggests that smartphone use is positively related to work-home interference and intensive smartphone usage experienced significantly more exhaustion than less intensive smartphone users (Derks & Bakker, 2014).

Boswell and Boswell-Buchanan (2007) found that engaged employees would greater engage in TASW. Engaged employees become absorbed and can lose track of time, and they often see their work as an energy gain (Bakker & Demerouti, 2008; Bakker & Leiter, 2010). Engaged employees are often happy, and happy people are more enthusiastic to new opportunities at work (Cropanzano

& Wright, 2001). As one can see in Table 1, the mean for work engagement is at 5,33 on a Likert-scale from 1 to 7. This number is relatively high; thus, one can postulate that our respondents are engaged at work. This can help to explain why hypotheses 7 and 10 are rejected, as engaged employees would greater engage in TASW and they might view the activity as positive as it can be seen as an opportunity (Boswell & Buchanan, 2007; Cropanzano & Wright, 2001). However, TASW is still a detrimental activity even though you are an engaged employee (Sonnentag, 2003), it is only the more attached cell phone user who will experience cell phone usage and similar activity as an effective resource (Ragsdale & Hoover, 2016). The average cell phone user can experience the usage as draining as it interferes with recovery, can cause work-family conflict and increase emotional exhaustion, a known dimension in burnout (Ragsdale & Hoover, 2016). As this thesis has not researched cell phone attachment it is not clear what relationship our respondents have to their devices, thus, cell phone attachment should be included as a parameter in future research so one can see how it influences TASW.

As presented in the results, hypothesis 8 and 9 are rejected. This means that TASW does not have a significant moderating role in the relationship between job resources and work engagement, nor the relationship between job demands and work engagement. This is also surprising as there is extensive research that argues for the positive side effects of TASW. Although research about TASW and use of communication technology is predominantly leaning to the negative side effects, alternative research suggests that TASW and use of communication technology beyond regular working hours relate to increased productivity, flexibility, organizational satisfaction and commitment (Diaz et al., 2011; Ragsdale & Hoover, 2016). Ragsdale and Hoover (2016) found that cell phone users who were more attached to their cell phones experienced fewer negative effects of work-related cell phone use as they had a broader integration of mobile technology into their lives. They also suggest that employees who are more attached to their cell phones might also adapt better to work-related demands when they are facilitated by their phones due to this integration. This is also supported by Day, Scott and Kelloway (2010) who found that more attached cell phone users may have access to job resources through their phones or may feel that they have more control over job demands from their phones. In addition, previous research suggests that users of TASW and information technology after

hours experienced a decreased sense of work life conflict as the users saw the usage as practical and convenient (Wright et al., 2014). This is also supported by Fenner and Renn (2010) who found that employees often engage in TASW to show that they are willing to go the extra mile for the company, a possible sign of work engagement. In addition, Boswell & Olson-Buchanan (2007) found that employees engage in TASW for themselves and their work and their career aspirations, not because they have an affective attachment to their job. It is important to note that these effects are exclusive to those who are attached to their phones. TASW and similar activity such work related cell phone use is still detrimental to one's well-being, just less so for those who are more attached to their devices (Ragsdale & Hoover, 2016). Our study has not researched cell phone attachment or intensive usage; thus, it is not clear what relationship our respondents have to their devices. The degree of cell phone attachment and usage should be included as a parameter in future research so one can see how it influences TASW.

These results suggest that the relationship between TASW and the JD-R model is more complex than what we hypothesized. Thus, it will require further research and attention to determine what effect TASW has on employee's health and well-being; an important area for employers to focus on if they wish to decrease burnout and other negative implications of TASW in the future.

Limitations and Future Research

In addition to our findings, the limitation of this study warrants consideration. The thesis may have a potential selection bias due to the choice of convenience sampling. It is likely that our sample mainly consists of students or employees from one of the authors' workplace as the survey was distributed through social media, and it has a high percentage of women. Convenience sampling is known to have low external validity as one is not able to sample from the whole population, thus one cannot use the study to generalize beyond the sample. Future research could improve upon this by applying probability sampling to the data collection. In addition, we cannot draw causal inferences as the data was only collected at one point in time. Future research could draw upon this, and possibly use a cross-sectional design or similar design to enable the possibility of high internal validity.

This thesis has focused on TASW; therefore, the thesis cannot present how individual technology or devices such as smartphones influences burnout or work engagement. To do so, one needs a measurement that is intended to measure only this and longitudinal data, meaning data collected over time. To our knowledge, there are no measures that are appropriate or adequate to measure the effects of individual technologies.

The results did not support hypothesis 7-10, that TASW moderates the relationship between job demands, job resources, burnout and work engagement. These results oppose current research in the field that suggests that these hypotheses should be confirmed. It is possible that weaknesses in the research design and not controlling for variables like work-home-interference (WHI), work-home-conflict (WHC) or lack of recovery may have limited the validity of TASW in this thesis. As TASW is known to influence WHI and WHC, it is possible that they can have a spurious effect on our data. To improve upon this, one can include measures on WHI and/or WHC, so one can use it as a control variable or similar.

It is also worth mentioning that technology, and the usage of it, has changed tremendously since the terminology TASW was created in 2004. Thus, it might have lost some its relevance, and should be updated to match today's usage and attitudes towards technology in 2018. The possible lack of relevance can possibly explain why our research yielded non-significant results.

Practical Implications

This thesis has explored TASW and how this activity interacts with burnout and work engagement. The thesis confirms previous research which suggests that TASW may be detrimental to one's health by confirming that TASW has a positive relationship with burnout. This suggests that one needs to practice caution when engaging in TASW and similar activity.

Although the hypotheses related to TASW's moderating role were found not significant, our thesis and other research suggests that TASW is detrimental to one's health. Unless employees are heavily attached to their devices and have plenty of available job resources as a buffer (Day et al., 2010; Ragsdale & Hoover, 2016), TASW is not a positive or advantageous activity. Thus, managers should be cautious when encouraging employees to engage in TASW as it can

potentially have more adverse effects than what the employer foresaw, due to the lack of detachment and recovery from work.

Conclusion

Previous research has suggested that TASW and similar usage of communication technology after hours are becoming an issue for employees as it can increase stress, work-home conflict and possibly increase sensations of burnout (Wright et al., 2014; Derks & Bakker, 2012). At the same time, research also suggests that TASW and similar activity can increase work satisfaction and work engagement (Diaz et al., 2011), thus posing as a double-edged sword.

This thesis has explored the moderating role of TASW on the relationship between job demands and resources, burnout and job engagement. As our hypotheses related to TASW were found not significant, we can unfortunately not draw any conclusions as to the side effects of TASW. As people are more connected than ever (Boswell & Buchanan, 2007), the prevalence of TASW is only going to grow in the future, continuing to blur the lines between work and free time, future research is needed to further delve into the effects of TASW as it can possibly be a double-edged sword.

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