



**UHASSELT**

KNOWLEDGE IN ACTION

## Faculty of Business Economics

Master of Management

### **Master's thesis**

***How are techno-stressors associated with mental health and work outcomes?***

**Jean-Michel Hoebregs**

Thesis presented in fulfillment of the requirements for the degree of Master of Management, specialization Business Process Management

### **SUPERVISOR :**

Prof. dr. Joke OPDENACKER



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[www.uhasselt.be](http://www.uhasselt.be)  
Universiteit Hasselt  
Campus Hasselt:  
Martelarenlaan 42 | 3500 Hasselt  
Campus Diepenbeek:  
Agoralaan Gebouw D | 3590 Diepenbeek

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# Preface

The master's dissertation was the only challenge left in my educational career. After trying and failing Applied Economics at Hasselt University in 2015 I had to recover myself from this mental defeat. I fought back by obtaining a bachelor's degree in marketing at PXL University to make myself eligible for the preparation programme of Master of Management at the Hasselt University. Here I am, eight years later writing my master's dissertation while working full time at one of the biggest IT-consultancy companies in Belgium. If that is not enough, I have also been active on (semi-)professional level in football since I was sixteen. During my whole educational career, I had to maintain balance in playing football every day, following classes, and studying, where the past year also working as an IT-consultant had to be taken into account. These eight busy years have been mentally rough, but I never gave up. Therefore, it was an easy choice when the list of master's dissertation subjects was published. Mental health was something I struggled with for years but always came out on top successfully. Since I was working in an IT-consultancy company, had my part in mental challenges over the years, and till this day have a remarkably busy schedule, the choice of researching how techno-stressors is associated with mental health and work outcomes was an easy one. I have come along with some interesting findings concerning mental health which I will also be able to use in my future professional career. This dissertation is the icing on the cake for all the hard work and I will benefit from it for the rest of my life.

The accomplishment of writing the dissertation would not be possible without the help of the people in my environment. Therefore, I would love to thank some people who helped me in obtaining this milestone. First of all, my promotor Prof. Dr. Joke Opdenacker, she helped me throughout the process by being very understanding and empathic. My situation did not make it easy to supervise, but she was always open for conversation. By mutual agreement we came to the conclusion that it was best to work towards the re-sit exam deadlines of August 2023. This means that she would have to be available during the summer months, for which I cannot thank her enough. Also, the feedback and information she gave me was always clear and fast, without her input I would not have been able to accomplish this challenge. Next, I would like to thank my girlfriend, Lara, who has been with me for the past 10 years. Despite only having on average one free day per week during the last 8 years, she still stood by my side through thick and thin. Last but not least, my family, especially my dad, mom, and grandmother. They had to fight quite often against my bad mood during these mentally rough years. I thank them for being empathic and educating me to never give up.

# Introduction

Over the last four decades, technology evolved rapidly which caused humans to adapt and follow the technological train. Not only their private life but also their professional environments were affected. The way of communicating, working, learning, and interacting is continuously changing by the growth of information and communication technologies (ICTs). ICT permits people to access information quickly and easily thanks to telecommunications such as the internet, phones, wireless networks, and other communication tools. Additionally, ICT brings several benefits to the workplace, with increased productivity and facilitating communication being the most important ones (Berg-Beckhoff et al., 2017). But everything comes with a price, the emergence of new stressors due to ICT impacts work outcomes and employee well-being. These stressors are known as techno-stressors. They arise from the use of technology and refer to one's inability to cope with that technology. The discomposure, tenseness, fear, and anxiety when learning and using technology will contribute to technostress.

There are many creators of technostress, but the theoretical framework of Tarafdar et al. (2007) provides a good overview of the five most important technostress creators. Techno-overload is created by ICT which obligates employees to perform longer working hours and do their work faster. Also, the urge of being constantly connected, reachable, and available at any given time of the day brings additional stress to employees, this is seen as a techno-invasion. Additionally, the phenomenon of techno-complexity is another stress creator. It requires employees to permanently battle against the complexity of the technological train which pushes them to constantly develop their technology skills. In that way, they can overcome the feeling of being inadequate and suppress the techno-complexity stressor. Next, techno-insecurity refers to workers feeling threatened by other, more competent employees. Also, the constantly evolving technology landscape creates uncertainty in employees' minds not knowing what the new technology will bring, this causes techno-uncertainty. This stress creator requires workers to frequently educate themselves due to continuous updates and upgrades in the ICT world (Berg-Beckhoff et al., 2017).

Too much exposure to technostress can result in psychological and emotional challenges. Job burnout is one of those challenges. It is a condition caused by extended exposure to stressful work-related situations. It mentally, physically, and emotionally drains employees pushing them into exhaustion (Lubbadeh, 2020). Neutralizing the technostress creators is therefore an interesting challenge, especially for companies.

People can perform several actions to cope with technostress. These actions can be classified into two key groups. The adaptive coping strategies are problem-focused and where functional actions are taken, and the maladaptive coping strategies focus more on inaction, denial, and disengagement. Adaptive coping strategies have been proven to reduce techno-stressors (Gaudioso et al., 2017) while maladaptive coping strategies are perceived as dysfunctional since they do not solve stressful problems (Hauk et al., 2019). Not only do coping strategies play a significant role in the relationship between techno-stressors and (mental) health, but also age.

Older people experience greater difficulties handling technology because the use of ICT is often more threatening to them compared to younger people (Hauk et al., 2019). Deterioration in vision, hearing, and motor skills are more present in older people but are essential skills to have while working with ICT. That does not mean that age is always positively related to techno-stressors because older people also have more experience which can help to actively cope with stress. Active coping is a challenge, and it demands high motivation, strong problem-solving skills, and task-related knowledge if employees want to use it optimally.

Empirical studies have proven that older employees use more active coping in work-related stress situations. The importance of age on the technostress and mental health relationship is worth investigating (Hauk et al., 2019). The impact of techno-stressors on employee well-being and work outcomes has become a growing concern for companies worldwide. This quantitative study seeks to examine the association between techno-stressors and burnout among young and middle-aged Belgian IT consultants with age and coping strategies being important moderators. IT consultants represent a highly technology-oriented workforce that is at increased risk of exposure to techno-stressors due to their dependence on technology in their day-to-day work activities. This study will therefore fill the gap by looking at the relationship between technostress and job burnout in combination with the impact of coping strategies and age. In addition to that, scientific burnout studies in an IT environment are not commonly found, especially not in Belgium. The findings may help organizations develop coping and age-related strategies to mitigate techno-stressors and promote employee well-being and productivity in the workplace.

# Literature Review and Hypothesis Development

## Techno-stressors

In today's society technology has become an essential element of everyone's private and professional life. Work can be completed in a shorter amount of time which also means that more work can be done within a certain timeframe (Kumar et al., 2017). To translate it into consultancy terminology, analysing the business processes of a company can be done within a day, whereas in the past this would have taken weeks or months. Every company within the industry is linked to each other via technology together with all the activities they are performing. Technology changed the business culture and pace in every work environment (Kumar et al., 2017). But everything comes with a cost, not only the cost of acquiring new technology but also the cost of worker satisfaction and health (Borle et al., 2021). Working faster and performing more work also means more (techno)stress. This is a kind of stress experienced by an employee due to inadequacy to live up to the expectations of technology use in a healthy way. It is the feeling of being incapable of adapting to frequent changes in the technology world in a positive way (Kumar et al., 2017). Literature has proven that technostress is not a recent issue. Technostress is a term that came to light in the 1980s where Brod (1982) described it as "the inability to adapt or cope with new ICTs in a healthy manner". Over the years the definition changed and the most up-to-date definition in today's literature is "an IT user's experience of stress when using technologies" (Ragu-Nathan et al., 2008; La Torre et al., 2019).

Empirical studies have proven that technostress is associated with lower performance, lower job satisfaction, and higher strain. Technostress research has primarily been focusing on the negative side of work-related ICT use. But there are also positive aspects, for example, mobile devices allow remote workers to perform professional activities anywhere at any time. But again, it is how you put it into perspective because being able to work anywhere, anytime can be exhausting for employees (Borle et al., 2021).

*H1: Perceived techno-stressors lead to a higher level of job burnout.*

## Different components

Technostress is often researched by investigating the impact of five techno-stressors on strain and workplace outcomes (Galluch et al., 2015; Ragu-Nathan et al., 2008; Tarafdar et al., 2017). These five techno-stressors, which were first described by Tarafdar et al. (2007), are the different components of technostress and are widely accepted in the scientific literature (La Torre et al., 2019; Califf and Brooks, 2020). The five domains are;

- Techno-overload

- Techno-invasion
- Techno-complexity
- Techno-insecurity
- Techno-uncertainty

Techno-overload is a stressor that refers to how technology can potentially drive an individual to work longer and faster, and the stressful situations that come with it. An example can be receiving persistent messages on multiple devices. Techno-invasion is the potential of ICT to overtake an individual's personal life since they can be reached at any given time of the day. It gives an employee the indirect urge to be constantly connected which will disrupt their work-life balance, for example, a manager that wants you to solve a high-priority problem outside the office hours. Techno-complexity is where the complexity of ICT gives employees the feeling of being incompetent about their technical skills and therefore must spend more time and effort on comprehending technology. An example can be using new complex software after you have been using the old one for a decade. Techno-insecurity refers to stressful situations that give employees the feeling of being threatened with losing their job to new technology or other more technologically competent people replacing them, for example, Gen Z who are way more IT-minded and can adapt quickly which is interesting for employers to cut costs. Techno-uncertainty addresses the continuous change and upgrades technology is going through, which may impose stress on employees because they need to constantly learn and educate themselves concerning (new) technologies, for example, the rising of ChatGPT that is capable of replacing an individual's work (Tarafdar et al., 2007; La Torre et al., 2019; Califf and Brooks, 2020).

## **Antecedents**

Techno-stressors can be triggered by several factors which cause an increase in technostress levels. These factors can influence and amplify the effect of technostress which affects individuals' health. When it comes to work-related technostress, mainly age, gender, education, and job-related and technology-related factors such as role ambiguity and information overload, are the main antecedents. Age for example has been proven to have a significant positive relationship with technostress levels, which means that the higher the age, the higher the level of technostress. When computer self-efficacy, the belief of an individual having adequate computer capabilities, is highly present then the employee will have a lower level of technostress. On the other hand, individuals who have a higher computer-related technology dependence also experience higher levels of technostress (Shu et al., 2011).

Looking at gender, Riedl (2013) has proven that males developed a higher level of stress than women, especially when it comes to achieving things in life. A conclusion that can also be drawn when it comes to technostress. Male employees experience more technostress than female employees (Riedl, 2013). Ragu-Nathan et al. (2008) confirm Riedl's (2013) finding that males experience more stress. But Ragu-Nathan et al. (2008) also stated that there is a negative relationship between technostress and age, a finding that differs from Shu et al. (2011). Also, technostress levels will decline when education and computer confidence increase (Ragu-Nathan et

al., 2008). Another individual feature that influences technostress is personal resistance against the inevitable digitalization (Maier et al., 2012).

Environmental and professional factors also play their part in the amount of technostress employees experience. The most outspoken positively influential factors are task complexity, ICT-mediated communication networks, professional work-environment role, centralization of power, and tendency towards innovation which are causing the most technostress damage (Wang et al., 2008; Koo and Wati, 2011; Schelhammer and Haines, 2013; Rasiene and Jonusauskas 2015; Jonušauskas and Rasiene 2016).

## **Associations with Health Outcomes**

Techno-stressors can have several different health outcomes. The most common findings in studies concerning techno-stressors are burnout, work exhaustion, negative emotion and anxiety, strain and stress, and poor self-rated health. Borle et al. (2021) investigated several studies, with different samples, around techno-stressors. Twenty-one studies were researched where fourteen out of twenty-one have shown at least one of the five different health outcomes mentioned above. The conclusion that Borle et al. (2021) have drawn, was that all techno-stressors combined were linked to an increase in burnout. This means that when research takes the five components of techno-stressors into account, that burnout is positively correlated with technostress. It is important to keep in mind that individual assessments of techno-stressors can have different outcomes. When Borle et al. (2021) were looking at techno-stressors as a whole compared to individual analysis of a techno-stressor, they noticed that outcomes could differ. For example, the effects of techno-overload and techno-insecurity were no longer significant while the composite score had proven that there were effects.

## **Associations with Work Outcomes**

Alongside health outcomes, technostress also has an impact on work outcomes. The most seen outcomes in studies are job satisfaction, productivity or performance, and work engagement. Overall, techno-stressors have a negative association with job satisfaction. That is eligible for the techno-stressors as a whole, but also every individual component. This means that employees who experience technostress will also have reduced job satisfaction. Next to job satisfaction, productivity or performance are impacted negatively by techno-stressors. When looking into detail, it can be stated that all techno-stressor components are negatively associated with productivity and performance. It does not matter if we look at the association including all the techno-stressors or separately. When it comes to work engagement, a positive conclusion can be drawn. When an employee has overall exposure to all techno-stressors, an increase in work engagement is established. The higher the technostress, the more work engagement an employee has. A possible explanation can be that employees might look at technostress creators as a challenge or opportunity that needs to be overcome (Borle et al. 2021).

The statements made by Borle et al. (2021) are confirmed by La Torre et al. (2019). La Torre et al. (2019) stated that a wide range of consequences are linked to technostress, both in

professional and private contexts. The most outspoken and investigated work-related outcomes are job performance, job satisfaction, productivity, and organizational commitment. Technostress will lead to a reduction of job satisfaction, job performance, and organizational commitment together with enhancing negative feelings, for example, negative self-view, anxiety, worry, self-criticism, and increasing risk of developing work-family conflicts (Ragu-Nathan et al. 2008; Jena 2015b; Tarafdar et al. 2007, 2011; La Torre et al., 2019).

## **Dealing with techno-stress (inhibitors)**

Regarding job-related technostress, moderators are factors that can help in dealing with technostress by reducing its impact and consequences. Ragu-Nathan et al. (2008) investigated the most significant moderators of work-related technostress in a cross-sectional study. Moderators can be classified into three main categories. Technical support provision which implies activities that reduce the effects of technostress by solving the ICT-related problems the end-user encounters. In other words, provision of sufficient support for end-users. Next, literacy facilitation refers to mechanisms that encounter age and encourage ICT-related knowledge sharing within and across organizations. Lastly, involvement facilitation indicates the need for information so users are kept informed about why the new technology is implemented which will be accomplished by educating themselves about the effects and fostering them to use and experiment with new ICTs.

Wang and Shu (2006) defined an additional inhibitor to Ragu-Nathan et al. (2008) findings. Innovation support has also been identified as a moderator. A healthy balance between good training, learning of new technologies, and employee workload will significantly impact the moderation of technostress (Wang and Shu, 2006). For example, Tarafdar et al. (2011) stated that mechanisms which facilitate user involvement and foster users to learn and experiment, can reduce the effects of technostress, and even increase satisfaction.

There are also other moderators which have been studied but they are not so scientifically strong. Innovation culture (Koo and Wati, 2011), refers to being comfortable with social media, which allows one to deal with overload, invasion, and uncertainty (Bucher et al, 2013). Next, pro-activity is anticipating and being entrepreneurial can reduce communication overload (Hung et al., 2015). Also, technology self-efficacy (Tarafdar et al., 2015) which is an employee's belief in his/her ability to execute tasks successfully. Lastly, technical and social support from peers (Joo, 2016).

*H2: Adaptive coping strategies lead to a lower level of perceived techno-stressors*

*H3: Maladaptive coping strategies lead to a higher level of perceived techno-stressors*

## **Mental health**

Mental health plays a crucial part in an individual's overall health. It can be defined as a state in which an individual can obtain and reach optimal performance of their functions. It is an ability to get the most out of available opportunities while keeping a balance in family, workplace,

community, and peers. It includes forging and maintaining bonds with others, fulfilling the social roles an individual encounters in their daily activities, and being able to manage and adapt to changes while keeping their emotions and way of communicating under control. Mental health makes an individual feel worthy of their existence which will translate into optimal performances in a professional environment but also in the day-to-day activities of their private life. Maintaining that healthy level of mental health is a challenge in today's society. A lot of vulnerabilities are around the corner and can be divided into internal and external segments. Internal refers to the individual itself, external is concerning an individual's environment. Examples of internal factors are poor social status, isolation, bad level of emotional resilience, and poor integration. External factors also play an important role, examples can be unemployment, abuse or discrimination, and bad social conditions (Bhugra et al., 2013).

Scientific population-based studies have proven that a correlation between mental health and burnout exists. Peterson et al. (2008) did research on a sample of service workers in Sweden. Individuals who were undergoing burnout had an increase in anxiety, depression, sleeping issues, impaired memory, back and neck pain, and increased alcohol consumption (Morse et al., 2012). Burnout causes mental dysfunction and triggers negative effects in terms of mental health (Maslach et al., 2001).

The correlation between burnout and mental health is also translated into the professional life of an individual. The so-called workplace mental health gained attention after the COVID-19 pandemic. Every year workplace mental health is becoming more important. With that comes a greater awareness of workplace factors that can influence workplace mental health. More initiatives are taking place, by employees and employers, in corporate environments. Examples are mental health days and weeks, four-day workweeks, counselling benefits, and mental health applications. Having mentally healthy workplaces is a challenge. It requires a corporate culture change where employers try to adapt the culture to a sustainable and mentally healthy environment. It must be a collective priority of a company and not rely on the fact it is an employee's responsibility to solve mental health issues through self-care, providing mental health days, or employee benefits.

Changing the corporate culture is both a top-down and bottom-up mission. Therefore, employers must see workplace mental health as an organizational priority that should not be managed only by the Human Resources department. The goal is to create a transparent environment where leaders are allies instead of enemies who share personal experiences. This will shift the culture to a stigma-free culture where there is no place for fear and shame. Secondly, companies must train the leaders, managers, and employees on how to manage mental health at the workplace, encourage having (difficult) conversations and create a supportive workplace where managers are the go-to person in case of doubt. Having psychological safety is crucial for a stigma-free corporate culture, and mental health policies, practices, benefits, and other resources must be present and communicated often (Greenwood & Anas, 2021).

Next to a culture change, companies need to provide more sustainable ways of working. For example, by providing flexibility in how employees perform their activities. If possible, the

possibility to work remotely is important since a study has shown that employees returning to the office after the COVID-19 pandemic, were having a mentally rough time. The fear of having a bad work-life balance was one of the top reasons for that negative impact. Also, promoting autonomy, establishing boundaries, and creating norms around communications, responsiveness, and urgency will help in providing a sustainable work environment. Examples of ideas that can contribute to a healthy and sustainable work environment are no emails after work hours, no-meeting days, and focused work time (Greenwood & Anas, 2021).

Additionally, creating deeper connections at the workplace will also help companies in creating sustainable ways of working. Everyone in the company must regularly check how one another is doing, regarding someone's role inside the company. The simple question of "How are you" at the coffee machine can create a healthy work environment with healthy work relationships where meaningful interactions take place. The employer must provide and promote these connection moments. Executives can even go a step further with the follow-up question "How can I help you". This creates a level of empathy and authenticity that allow you to connect easier and deeper with your colleagues (Greenwood & Anas, 2021).

If employers try to perform a culture change, encourage more sustainable ways of working, and try to stimulate deeper connections in the workplace, then a huge step is taken towards a mentally healthy workplace. That will not only benefit employees but also employers. Employees are less likely to underperform and miss work and will have higher job satisfaction, there will be better employee retention, and employees will spread positivity in- and outside the company (Greenwood & Anas, 2021). People who have a good level of mental health are also better at dealing with stress and therefore are less prone to burnout. A study on people who work in interpersonally demanding jobs (e.g., emotionally draining helper roles in stressful situations) has shown that mentally healthy employees were more likely to enter and remain active in the sector. They also manifest greater involvement and satisfaction with the job. The result of the study also stated that this was applicable to employees who were in their adolescence and early adulthood (Maslach et al, 2001).

## **Burnout**

### **What is burnout?**

#### **Job burnout**

Burnout was a term that came to life in the early 1970s when Freudenberger (1974) introduced the concept of burnout (Rakovec-Felser, 2011). Job burnout and burnout are interchangeable terms used throughout all scientific research (Swider & Zimmerman, 2010). It can be defined as a psychological stress syndrome where chronic emotional and interpersonal stressors are experienced in a work environment (Cordes & Dougherty, 1993; Maslach, 2003; Maslach & Jackson, 1981; Maslach & Leiter, 2008; Swider & Zimmerman, 2010).

Maslach and Jackson's (1981) definition of burnout is one of the most cited and used definitions of burnout in scientific literature. They describe it as a three-dimensional syndrome where emotional exhaustion, depersonalization of others, and a feeling of diminished personal accomplishment occurs, (Lee & Ashforth, 1990) and something that exclusively arises in occupational groups where professionals must deal with people (Rakovec-Felser, 2011). This enforces the statement of Maslach et al. (2001) that burnout is an individual experience that is specifically linked to the work context.

The first key dimension of burnout is emotional exhaustion which is the feeling of being emotionally drained by the work an individual must perform. Employees' emotional resources are exhausted and have a feeling that they no longer can give everything for the job on a psychological level. The second key dimension, which is also related to emotional exhaustion, is depersonalization. A cold-hearted impersonal approach towards clients and co-workers. Depersonalized personnel hold their work environment accountable for their negative approach and acting. The last key dimension is a reduced sense of personal accomplishment which can be seen as a loss of personal efficacy. It is a self-perception where individuals constantly evaluate themselves negatively, especially in client-related work. The individuals have a permanent feeling of unhappiness and dissatisfaction according to their accomplishments on the job (Rakovec-Felser, 2011).

Although much research about burnout has been focussing on client-based jobs, Maslach et al. (2001) discovered that autonomous professions (e.g., IT consultants) also experience burnout. In the further stage of this research, conclusions will be able to be drawn to strengthen this discovery.

## **Antecedents of burnout**

Burnout is dependent on several factors and occurs when the job, occupational, and organizational characteristics do not fit the individual. When looking at job characteristics we can conclude that studies have proven that quantitative job demands (e.g., jobs where there is too much work for the available time) cause overload. This overload has a positive relationship with burnout. The time pressure and workload an individual encounters daily are strongly related to burnout. Qualitative job studies have proven that role conflict and role ambiguity strengthen burnout. Role conflict arises when conflicting requests, by other individuals in the work environment, have to be fulfilled. Role ambiguity occurs when there is too little information at their disposal to perform the job as expected. The absence of job resources also provides an excellent foundation for burnout. By job resources, we mean a lack of social support, information, and control. Providing feedback, increasing participation in decision-making, and encouraging autonomy are essential in evading burnout (Maslach et al., 2001; Sabagh et al., 2018).

Occupational characteristics also impact the relationship of an individual with burnout. The initial burnout studies were mainly focusing on the human service and education sectors. Both have a high level of client-related stressors that are caused by interaction with clients. These emotional stressors of people-work are related to burnout. Research expanded and has proven that not client-related stressors have the highest correlation with burnout, but job-related stressors do.

High workload, time pressure, or role conflicts are examples of such job-related stressors. Burnout syndrome is therefore applicable in a wide range of occupations but has the highest impact on jobs where the job stressors are present (Maslach et al., 2001; Sabagh et al., 2018).

Lastly, the organizational characteristics, working in a large organization where hierarchies, operating rules, resources, and space distribution are important, have a significant impact on burnout. Especially when an individual feels that his fairness and equity are endangered. Next to that, the values of an organization are important for workers to develop an emotional and cognitive relationship with the company. Organizations that frequently undergo changes such as downsizing or merging, are not ideal either. Employees are expected to put in more time, effort, skills, and flexibility but get fewer career opportunities, lifetime employment, job security, et cetera in return. This is called the violation of the psychological contract which erodes the notion of reciprocity and is disastrous for the well-being and burnout level of an employee (Maslach et al., 2001; Sabagh et al., 2018).

Next, researchers have put a lot of effort into understanding the causes of burnout. It is generally characterized as a state of long-term exhaustion in combination with diminishing interest and performance. Exhaustion is therefore the main cause of burnout. Employees get exhausted by the daily work they have to perform and/or due to the use of IT. Studies have proven that overall work-related stressors and daily use of work-related information technology (IT) contribute to work- and techno-exhaustion. Techno-stressors contribute to techno-exhaustion and work stressors, which both increase work-exhaustion. Employees who experience work-exhaustion result in lower job satisfaction and organizational commitment, as well as high turnover intention (Maier et al., 2015).

Burnout is associated with work and personality factors. Studies have proven that several job factors can cause or increase burnout among employees (Maslach et al., 2001. p. 414; Maslach and Leiter, 2016; Lubbaddeh, 2020). The workload is one of the most obvious and investigated ones when it comes to burnout since it is connected with exhaustion. Exhaustion is one of the largest contributing dimensions. Examples can be emotional-, work-, and techno-exhaustion. Exhaustion takes place when an employee has a lot of work and responsibilities in combination with a lack of resources. Control is also a job factor that has an impact, it is the amount of autonomy an employee has over their work. The feeling of not having an impact and being constrained since they do not get enough responsibility will lead to burnout. But receiving sufficient control will increase job engagement. Next, the reward is referring to positive feedback and recognition. It increases people's vulnerability to burnout when not enough recognition and feedback is given. Community, which is personal relationships and teamwork interaction with colleagues, managers, and clients. When the relationships lack support, trust, and unresolved conflict, then the chances of burnout increase. On the contrary, having a good community increases job engagement. Also, fairness is the level of respect, trust, and openness on the work floor. The decisions that are made in the work environment need to be perceived as fair and equitable. Cynicism, anger, and hostility will arise when people are not treated fairly with respect. Lastly, values also play an important role, this refers to an employee's motivation, aspirations, and ideals while performing their job. The company's and individual's values must match since values

are the ideals and motivations that made the connection with the job. If there is a gap, then individuals will trade off between the work they want to do and the work they have to do which increases burnout risk.

If an individual has an imbalance (the absence of) with these job factors, this may increase the occurrence of burnout. On the other hand, if the employee can fit into the company taking into account the job factors, there will be a higher possibility of engagement (Maslach et al., 2001; Maslach and Leiter, 2016; Lubbadah, 2020).

The mismatch between the person and the job factors can increase the risk of burnout, but also personal traits of the employees may add to that increase. The personality of an individual will define how they cope with stress and potential burnout. An example of such a personality trait is the hardiness of a person, the more hardiness the more resistant against stressful situations (Kobasa et al., 1982; Ghorpade et al., 2007; Maslach and Leiter, 2016; Lubbadah, 2020).

## **Consequences**

Job burnout brings several consequences which are proven to have a negative impact on the work environment. Burnout employees are much more likely to be absent (Bakker et al., 2003; Borritz et al., 2006), the turnover rate increases (Maslach, 2006; Maslach and Leiter, 2016b; Wright and Cropanzano, 1998), and job attitude (Moore, 2000) and job performance (Halbesleben and Buckley, 2004; Keijsers et al., 1995; Wright and Bonett, 1997) will reach rock bottom.

According to Maslach (2006), relationships at work will be affected negatively by the personal strife and disruption of the workflow that burnout employees bring with them. Burnout can be contagious and spreads through social interactions in the workplace (Maslach and Leiter, 2016). This assessment is strengthened by Bakker et al. (2005) who have proven that the three burnout dimensions, which are emotional exhaustion, depersonalization, and reduced personal accomplishment, are prone to contagions (Maslach and Leiter, 2016; Lubbadah, 2020)

Next to that, job burnout has also been associated with adverse effects on the mental and physical health of individuals (Burke and Deszca, 1986; Cordes and Dougherty, 1993; Halbesleben and Buckley, 2004; Maslach, 2000; Maslach and Leiter, 2016b; Ozturk and Ay, 2018). Poor health contributes to burnout and burnout contributes to poor health. Research has proven that a one-unit increase in burnout is associated with a 1.4-unit increase in risk for hospital admission for mental health problems (Maslach and Leiter, 2016). The exhaustion dimension of burnout is the most predictive in stress-related health and mental health since exhaustion is the most related to the traditional stress variable. Exhaustion can lead to stress symptoms such as headaches, chronic fatigue, gastrointestinal disorders, muscle tension, hypertension, cold/ flu episodes, and sleep disturbances (Maslach and Leiter, 2016; Lubbadah, 2020).

It is worrying that burnout is active in many job types since the outcome can be disastrous for individuals and organizations. Physical illness, sleep disturbances, work/family conflicts, and substance abuse are all examples of negative burnout outcomes for individuals (Bacharach, Bamberger, & Conley, 1991; Belcastro & Gold, 1983; Jackson & Maslach, 1982; Maslach & Jackson, 1981; Swider & Zimmerman, 2010).

Also, organizations suffer from burnout outcomes because of increased turnover, absenteeism, decreased co-worker and client interactions, and reduced job performance which negatively influence the operational excellence of an organization (Jackson, Schwab, & Schuler, 1986; Maslach et al., 2001; Parker & Kulik, 1995; Wright & Cropanzano, 1998; Swider & Zimmerman, 2010). These outcomes will decrease the productivity and effectiveness of employees at work which will eventually lead to lower job satisfaction and commitment towards organizations. Also, burnout employees give rise to personal conflicts and disrupt job tasks. This negativity is contagious and will spread through interactions with everyone encountered in the work environment (Maslach et al., 2001; Rakovec-Felser, 2011).

## **Dealing with burnout**

Burnout can be prevented in several ways. But there are two primary types of burnout interventions: the individual and organizational interventions. Individual-level intervention strategies refer to the ability to cope with workplace stressors. Organizational-level intervention strategies focus more on overcoming or reducing organizational mismatch and stressors.

Individual-level strategies focus on reducing signs of burnout before the employee is already in burnout-state. Maslach and Goldberg (1998) provided researchers with recommendations to prevent job burnout. The first one is changing job patterns which can be for example, working less, taking more breaks et cetera. Another recommendation is developing coping skills such as better time management. Also, securing social resources resulting from interactions with colleagues, supervisors, and even family, will strengthen an employee's relationship with his work. Further, focusing on making an individual adaptable to work stressors is also emphasized to tackle job burnout. This can be done through leisure strategies, empowering good health, and self-analysis/understanding (Maslach & Goldberg, 1998). There are also other strategies used to reduce the negative impact of burnout: relaxation techniques, cognitive-behavioural techniques, and promoting healthy lifestyles are the leading examples. Research on individual-level strategies has a high percentage of being well established (Le Blanc & Schaufeli, 2008; Lubbadah, 2020).

Incorporating individual and organizational intervention strategies is to be expected the most successful formula to reduce or overcome job burnout. An example of such organizational intervention is creating an atmosphere where employees feel valued for their work or where they have the impression of doing something important. This will create a greater tolerance with employees when it comes to workload. Organizational variables have a stronger influence on burnout than individual ones, but they have not been the main priority of researchers (Maslach et al., 2001). That is because changing organizations is a much bigger and more costly challenge than changing individuals (Maslach et al., 2001; Maslach & Goldberg, 1998) and requires more time and financial resources. Burnout in the organizational context is gaining attention since there is growing recognition that reducing and overcoming burnout in a work environment is essential (Schaufeli & Buunk, 2003). There must be a balance between the individual and the organization, especially within the six organizational factors: overload, control, reward, community, fairness, and values (Lubbadah, 2020).

## Prevalence

Burnout has been measured in many different countries and sectors. Schaufeli et al. (2020) provided a Burnout Assessment Tool (BAT) guide with explanations of how to use the tool and which benchmarks to use. They did research concerning burnout in Belgium and the Netherlands to develop benchmarking limits where other research can make use of. To do that they had to perform research with a representative sample. According to the representative sample of 1500 employees in Flanders the following burnout percentages for BAT-12, the shortened version, have been found:

- High percentage of burnout: 19.3%
- Very high percentage of burnout: 5.7%

These percentages resulting from the representative sample can be used as a benchmark (Schaufeli et al., 2020).

According to the report by the Sociaal-Economische Raad van Vlaanderen/Stichting Innovatie & Arbeid (2022) where the Flemish government conducted a study in 2019 concerning burnout, has shown that 13.6% of the employees in Flanders (n = 13160) have burnout symptoms, an equivalent of 320 000 Flemish employees. This is an increase of 3.4% compared to the first study in 2004. The age category that has the lowest share of burnout symptoms is employees under the age of thirty. From 30 years of age until 55+ the percentage of burnout symptoms is roughly the same, ranging from 13% to 14.9%. Looking at the different sectors according to burnout symptoms in Figure 1, we see that the highest percentage is assigned to the education sector (19%), followed by the postal- and telecommunication sector (17.4%). The textile (8.6%) and construction (9.9%) sectors have the lowest percentage (Sociaal-Economische Raad van Vlaanderen/Stichting Innovatie & Arbeid, 2022).

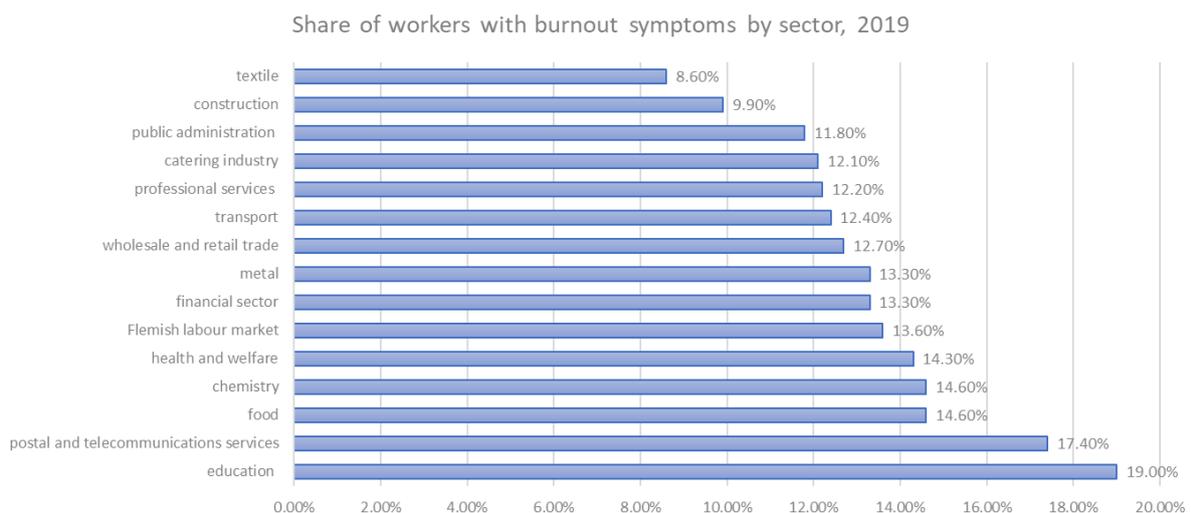


Figure 1, Share of workers with burnout symptoms by sector in 2019, Rapport van de Sociaal-Economische Raad van Vlaanderen/Stichting Innovatie & Arbeid [Report], 2022

# Relationship between techno-stressors and job burnout

The transactional model of stress in support of empirical evidence coming from technostress studies has proven that techno-stressors pilot psychological disruption including job burnout (Lazarus and Folkman, 1984; Maier et al., 2019; Srivastava et al., 2015). Scientific literature validated that techno-stressors can cause job burnout and exhaustion (Ayyagari et al., 2011; Srivastava et al., 2015; Maier et al., 2019).

Employees that are dealing with techno-stressors have their energy levels drained together with the price they have to pay mentally, physically, and financially, which will eventually lead to exhaustion and an increased risk of job burnout. Employees that experience techno-overload constantly feel pressure to work at a faster pace due to technology. This will eventually lead to exhaustion. When perceiving techno-invasion, employees are permanently connected to their work environment due to information systems. There is no more separation between working hours and free time. This will cause exhaustion since employees are not able anymore to fully recover during the spare time they have. Techno-complexity is when an employee is feeling inadequate in their abilities to cope with new technology. This gap, between the know-how they have and what the technology demands, will overwhelm them which will cause an increase in exhaustion. Employees that are perceiving techno-insecurity have the constant feeling of being replaced by someone better. Due to that, they will invest their valuable time and energy in keeping up with new technologies. Lastly, techno-uncertainty is where employees constantly need to learn and adapt to technology changes and updates. This brings constant pressure and drains energy which will add to job burnout (Pflügner et al., 2021).

Employees can challenge techno-stressors, and potential burnout, with the help of coping strategies. These strategies serve as gatekeepers for mentally healthy employees. It prevents employees from translating techno-stressors into adverse work outcomes (Gaudioso et al., 2017). These adverse work outcomes are the perfect climate for burnout to thrive. Coping strategies can play a mediating role in the relationship between techno-stressors and job burnout. Gaudioso et al. (2017) have proven that adaptive coping strategies are neutralizing the conversion of technostress into job burnout, in contrast with maladaptive coping strategies which are the driving force of the conversion. It is important to first minimize the use of maladaptive coping strategies before adaptive coping strategies have optimal efficiency. An efficient way for organizations to accomplish this is by training their employees to use adaptive coping strategies (Gaudioso et al., 2017).

Since the literature is emphasizing that there is a relationship between techno-stressors and job burnout we are going to test if that can be confirmed in this study with the help of the following hypothesis:

*H1: Perceived techno-stressors lead to a higher level of job burnout.*

# Coping strategies

When people are experiencing stress, they try to cope with these stressful situations in several ways by performing, consciously or unconsciously, particular actions. These actions can be classified into two main groups based on their efficacy in and focus on solving stress-related problems. The first group contains problem-focused and functional (adaptive) coping strategies. The second group is characterized by strategies that focus on inaction, denial, and disengagement, which is known as dysfunctional (maladaptive) coping because it does not actually solve a problem (Gaudioso et al., 2017).

With adaptive coping strategies, the individual tries to improve the person-environment relationship by changing elements of the environment that are causing the stressful situation(s). An example can be, challenging a person or situation that is perceived as the root cause of the stress. In techno-stressor terminology this means that an employee would directly deal with the problem by, for example, learning outside the working hours how to deal with a new technological feature that has been used in the company. But also, asking for technical support from colleagues when needed in combination with defining a plan of approach on how they can collectively deal with these (techno-)stressors is important. Taking these actions is defined as active coping, which characterizes adaptive coping strategies. On the other side, there are dysfunctional (maladaptive) coping strategies. Peculiar to these strategies is that individuals ignore the stressors by disengagement and denying that there are stress-creators (Carver, Scheier, & Weintraub, 1989). These maladaptive strategies will not solve the issue, but they will make the individual feel temporarily healthier (Monat & Lazarus, 1991). When translated into the techno-stressor world, these maladaptive strategies include the suppression of thoughts according to the inability to deal with new work technologies (Gaudioso et al., 2017).

Both types of coping strategies are often combined when dealing with stressful situations, there is no predefined, dominant strategy (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004). The mix that people chose is often defined by contextual factors and the magnitude of the problem (Roth & Cohen, 1986). So, it is reasonable to say that technology-related stressors in a work environment will be dealt with by a mix of active and passive coping strategies (Gaudioso et al., 2017).

Gaudioso et al. (2017) state that adaptive coping strategies decrease work exhaustion while maladaptive ones are causing an increase in work exhaustion in combination with the need for additional mental resources. In other words, adaptive coping strategies block the conversion of technostress into work exhaustion while maladaptive coping is driving it. Since maladaptive strategies have a greater influence on work exhaustion than adaptive ones, it is important for individuals and organizations to choose and stimulate adaptive coping strategies. Organizations that train their employees to focus on adaptive coping may minimize the negative effects of technostress. Next to training their employees to make use of adaptive coping strategies, it is important that organizations and their employees first try to eradicate maladaptive coping strategies and then increase the usage of adaptive ones. This elimination of maladaptive coping

can be achieved by providing training modules where techno-stressors are explained, which coping strategies are commonly used when these strategies are used best, and in which situations they thrive. In order to help employees make aware of choosing the right advantageous coping choice, training, peer pressure, job design, and reward mechanisms need to be in place. For example, rewarding employees who use adaptive coping strategies (e.g., learning to make use of new software and teaching it to your colleagues). Coping behaviours are trainable (Bala & Venkatesh, 2016) but keep in mind that before adaptive coping can be used optimally, organizations also need to train employees to minimize the use of maladaptive coping. To conclude, organizations need to make adaptive coping more feasible which can be done by for example foreseeing technical support when needed.

Coping strategies will impact the work exhaustion that employees feel. Problem-focused coping is an efficient way to change stressful situations. Engagement in coping strategies, hence active coping, will restore an employee's ability to diminish work exhaustion. On the other hand, disengagement, hence maladaptive coping, and ignoring techno-stressors require more mental effort from employees which may result in reducing an employee's wellbeing. Maladaptive coping strategies tend to be dysfunctional and can create a snowball effect that increases job burnout. The reason is that employees will have the feeling that their resources to cope with stress are limited because they now utilize maladaptive coping as a resource to suppress thoughts and emotions to deal with techno-stressors (Carver et al., 1989; Lazarus & Folkman, 1984; Lazarus, 1996; D'Arcy et al., 2014; Gaudioso et al., 2017). Therefore, we hypothesize that:

*H2: Adaptive coping strategies lead to a lower level of perceived techno-stressors*

*H3: Maladaptive coping strategies lead to a higher level of perceived techno-stressors*

*H4: Adaptive coping strategies moderate the effect of perceived techno-stressors on job burnout, such that users with higher levels of adaptive coping strategies who perceive techno-stressors show lower levels of job burnout.*

*H5: Maladaptive coping strategies moderate the effect of perceived techno-stressors on job burnout, such that users with higher levels of maladaptive coping strategies who perceive techno-stressors show higher levels of job burnout.*

Since we know that techno-stressors and job burnout have a relationship and that coping strategies reduce techno-stressors (Gaudioso et al., 2017), we also want to know if techno-stressors mediate the effect of coping strategies on job burnout. Pflügner et al. (2021) stated that mindfulness can help to reduce job burnout (Luken and Sammons, 2016). We built on that statement by changing mindfulness with coping strategies because we know that there is an indirect relationship between technostress and burnout where coping strategies have an impact on technostress. Gaudioso et al. (2017) even stated that coping strategies are known for reducing techno-stressors. So theoretically impacting coping strategies would impact the indirect relationship between technostress and job burnout which will be investigated in hypotheses 2 until 5. Therefore, we also want to investigate the indirect relationship between coping strategies and job burnout and see which mediating role technostress can have. This would mean that a higher

coping level would result in a lower level of technostress which then would reduce job burnout. In that way, we will be able to expand the understanding of the interplay between these variables and determine causal pathways. Also, it will help to provide a coherent story to see if these interrelated variables are impacting each other through moderation and/or mediation, and which variable needs to get attention in order to reduce job burnout. Therefore, we hypothesize that:

*H6: Techno-stressors mediate the effect of adaptive coping strategies on job burnout.*

*H7: Techno-stressors mediate the effect of maladaptive coping strategies on job burnout.*

## **Age associated with burnout and (techno)stress**

Age is a variable that has been the most consistent in relation to burnout. Younger employees endure higher levels of burnout compared to 30- or 40-year-old employees. Age is confounded with work experience which means that burnout occurs more frequently in the early stages of someone's career (Maslach et al., 2001). When looking at techno-stressors, Hauk et al. (2019) stated that there is no significant relationship between age and the level of techno-stressors in an ICT-dependent work setting. That means that higher age is not always related to an increase in technostress when the ICT-demanding job exceeds the employee's abilities.

The relationship between age and technostress is quite complex. Although older employees have to endure cognitive and physical decline, research has proven that younger workers, compared to their older counterparts, experience similar or higher levels of technostress (Hauk et al., 2019). To confirm the statement of Hauk et al. (2019) an analysis of another study (Kluge et al., 2019) has been conducted. Kluge et al. (2019) did a study according to technostress related to age. They used a sample of 507 German working participants aged between 19 and 66 years divided into three age groups; young professionals (18-35), experienced workers (36-55) and silver workers (56-66) where men and women were equally divided. When we look at the four dimensions of technostress we can conclude that techno-overload is more or less the same between the three age groups. That is because technology allows employees to process more work in a shorter amount of time, something that is perceived as an equal amount of stress by every age group. But also, here the younger individuals have the highest score. There is a more significant difference between younger professionals and older workers when it comes to techno-invasion. Younger professionals perceive a higher techno-invasion level because the boundary between work and professional life is thin due to the intense(r) use of modern technologies. When it comes to techno-insecurity the younger professionals are also more sensitive. That is because younger people are worried about not being good enough compared to their competitors or worry that they will lose their job. The techno-complexity is the only dimension where the older aged employees score the highest because younger people are more IT-minded since they are born in an era where technology was consistently present during their whole life (Kluge et al., 2019). And so, Kluge et al. (2019) concluded that the group of silver workers perceive significantly lower technostress than

young professionals. This result aligns with the study of Tarafdar et al. (2011) where they assumed that older employees are in a better position to deal with technological innovations and changes because of their harness consisting of knowledge and experience (Kluge et al., 2019; Tarafdar et al., 2011).

To conclude, age is one of the most important antecedents of technostress. According to La Torre et al. (2019), in well-conducted cross-sectional studies, there is proven that age has a significant positive relationship with technostress levels. The higher the age, the higher the level of technostress (Shu et al., 2011; La Torre et al., 2019). Additionally, we know that technostress impacts job burnout (Ayyagari et al., 2011; Srivastava et al., 2015; Maier et al., 2019) and therefore we hypothesize that:

*H8: Age moderates the effect of techno-stressors on job burnout, such that users with a higher age who perceive techno-stressors show lower levels of job burnout.*

# Methodology

## Procedure and sample

The goal of this research was to investigate technostress and burnout levels within a sample where IT-related activities were performed. Since the researcher was actively employed in a Belgian IT consultancy company during this research, the choice of focusing on Belgian IT consultants was obvious. After some research within the company and questioning colleagues about their technostress and burnout experiences, some essential preliminary information was gathered already. Even the HR department got involved because they had plans to investigate the burnout topic themselves. Quite quickly it was noticeable that burnout had a significant presence within the company. The company employs over 4700 people worldwide, in Belgium around 1600. A wide variety of employees with an age ranging from 23 to 65. An ideal target group which would be the perfect sample. The sample answers all the criteria needed to investigate properly; IT-related work, IT environment, high-pressure and demanding work, age range, different genders, and variety of degrees.

The company is a global company that delivers advanced ICT solutions and services while guiding customers through business and digital transformations. Its main focus lies on implementing Enterprise Resource Planning (ERP) systems such as SAP, Microsoft Dynamics, Salesforce, and OpenText and everything that comes with it. They deliver the whole package which means that a lot of variety in workforces are present, for example purely IT jobs, Operations, Finance, Sales, Marketing & Service, and People. Therefore, the sample consists of 100% of people who perform an IT-related job for at least 7.6 hours on a daily basis. The company makes use of the newest technologies to work and communicate, both on the phone and laptop. And since it is a global company, employees from all over the world are working together. An ideal climate for technostressors to thrive. The sample that participated ensured that they were experiencing a form of (techno)stress since it was explicitly asked before answering the survey. People who did not encounter (techno)stress were asked to ignore the survey. Every respondent is also residing in Belgium.

Survey data was gathered via an online questionnaire that was sent through the internal forms of the company the researcher was employed at. The so-called social wall allowed to post a post with a QR code and a link to the survey. It was an easy way to reach the target group without violating the GDPR and privacy policy of the company. Also, direct mailing was being used to a selected group of colleagues who gave their permission to send the survey through internal mailing. Next, Microsoft Teams chat was another option to reach respondents. During the breaks and after work hours (9 am-5 pm) co-workers were asked to fill in the survey if they wanted to. Only people who experienced a form of (techno)-stress were asked to fill in the survey. Respondents were also informed about confidentiality by stating that the survey is completely anonymous.

The program used for the questionnaire was Qualtrics. Qualtrics was chosen because it is compatible with SPSS, the analysis software that has been used. Also, Qualtrics is web-based which means the tool could be used anywhere at any given time, useful for follow-up. Next, it has several distribution options such as a QR code, link, and mail which makes it easy to reach the sample.

The questionnaire, in English, consisted of several blocks of questions where each block represented a variable. First, we had the personal questions, then technostress, burnout, and coping strategies. Each question was marked as mandatory which means that respondents had to provide an answer before they could continue. This was done to ensure no one could skip questions which contributes to an optimal analysis with a strong answer quality.

The survey was active for two months, from the beginning of March 2023 until the end of April. In that time frame, 161 respondents filled in the survey. That was narrowed down to 117 after deleting all survey answers who had a completion percentage of less than 100%.

## **Measurements**

### **Burnout**

Burnout has been measured by the shortened and work-related version of the Burnout Assessment Tool (BAT). The Burnout Assessment Tool (BAT) is a new conceptualization of burnout and an associated measure. Research has proven that BAT is reliable and valid to use as a measuring instrument for burnout. Its counterpart, the Maslach Burnout Inventory (MBI), has three flaws which can be disruptive in research. There are problems with the conceptualization of burnout, the MBI also suffers from technical, and psychometric shortcomings, and the practical applicability for assessing burnout individually is mediocre. To overcome these flaws Schaufeli et al. (2020) developed a novel burnout measuring instrument that is applicable for group- and individual-based assessment of burnout. This instrument has two aims, the first one is formulating an alternative conceptualization of burnout which can be comprehended by nature, and which covers all relevant elements linked to burnout. Secondly, developing a questionnaire (BAT) that is psychometrically sound and can be used practically to usefully assess burnout.

The Burnout Assessment Tool (BAT) is a viable alternative for measuring burnout which assesses the burnout syndrome by looking at a total score while also taking into account the core components and secondary symptoms of burnout. This allows burnout researchers to strengthen their research, helping them in assessing burnout in practice and ultimately better understand burnout (Schaufeli et al., 2020).

Four core dimensions, exhaustion, mental distance, cognitive impairment, and emotional impairment are measured in the BAT that can be analysed individually or as a whole. In the shortened version twelve theses are presented instead of the twenty-three in the complete BAT version. The two secondary dimensions, mental tension complaints and psychosomatic tension complaints were left out of the survey since we only wanted to measure the degree of burnout.

Surveying the four core dimensions is enough to measure burnout according to Schaufeli et al. (2019). The psychometric features of the shortened BAT are similar to the ones of the complete BAT. Also, we are interested in the total score of the BAT per respondent, the breakdown of each core dimension is not relevant to this research, and therefore the shortened version is sufficient (Schaufeli et al., 2019). We are investigating job burnout which led to the choice of taking the work-related BAT version.

The scoring categories for each of the questions are: 1 'never', 2 'rarely', 3 'sometimes', 4 'often', and 5 'always'. The average total scores per respondent are going to be interpreted based on the standards defined by Schaufeli et al. (2019). We have chosen standards since we want to compare the scores with the average Flemish working population. Working with standards also allows us to determine if a respondent has a low, average, or high score. Furthermore, standards are interesting because they give information on how the score of an individual is performing compared to a particular reference group (Schaufeli et al., 2019). Schaufeli et al. 2019 provided an overview of the standard scores for working people in Flanders. These scores are going to be used to compare the average total scores of our sample:

- Green: score is lower than 2.53 – no sign of burnout
- Orange: score is higher or equal to 2.54 and smaller than 2.96 – there is a sign of potential risk for burnout
- Red: score is higher or equal to 2.96 – there is a high probability of burnout

## **Technostress**

Technostress has been surveyed and measured with the use of the technostress questionnaire. The technostress questionnaire is developed by Ragu-Nathan (2008) and in this research, a copy of twenty-three questions have been used in the survey. Ragu-Nathan's technostress questionnaire consists of twenty-three questions divided over the five technostress components: techno-overload (5), techno-invasion (4), techno-complexity (5), techno-insecurity (5), techno-uncertainty (4). Every question has been measured based on the five-point Likert scale where '1' is equal to "completely disagree" and '5' as "fully agree". The respondents were asked to select the answer to which they could relate the most. For each individual, the mean of the total scores was taken to use them in the analysis as independent variables. In this case, the summation of the twenty-three questions is divided by twenty-three. The higher the score the more technostress respondents experience.

The participants of this survey were informed to only take the survey if they already experienced a form of (techno)stress in their white-collar career as IT consultants. The questionnaire can be retrieved in the appendix of this document.

## **Age & gender**

Respondents were asked to share their age in an open textbox question. We did not work with age ranges in the question since the correct age would allow the research to be more detailed. Also,

age is an important (control) variable where previous research have proven that it significantly affects the strength of the relationship between burnout and technostress. Knowing the specific age would then allow the researcher to draw better conclusions.

The gender was also surveyed by a closed question where the options were male, female, or X. In that way conclusions could be made based on the genders.

## Coping strategies

After inspecting the literature about coping strategies, Gaudioso et al. (2017) provided an overview of adaptive and maladaptive coping strategies with their appropriate questions which had been used by them during their research in "*The mediating roles of strain facets and coping strategies in translating techno-stressors into adverse job outcomes*". Gaudioso et al. (2017) structured the coping strategies as follows to analyse their sample of IT-using employees;

- Adaptive coping strategies:
  - (1) Active coping
    - I have been concentrating my efforts on doing something about the stressful technologies.
    - I have been taking action to try to make the stressful technologies situation better.
  - (2) Use of instrumental support
    - I have been getting help and instrumental support from other people regarding dealing with stressful technologies.
    - I have been trying to get instrumental support or help from other people about what to do regarding stressful technologies.
  - (3) Planning
    - I have been trying to come up with a strategy about what to do regarding stressful technologies.
    - I have been thinking hard about what steps to take regarding stressful technologies.
- Maladaptive coping strategies:
  - (1) Denial
    - I have been refusing to believe that this technology mess has happened.
  - (2) Behavioural disengagement
    - I have been giving up trying to deal with technology related stress.
    - I have been giving up the attempt to cope with technology related stress.

These questions were copied and used to survey the respondents about their way of coping with technostress. The first six questions were concerning adaptive coping strategies, the second part were three questions about maladaptive coping strategies. Same as with burnout and technostress, a five-point Likert scale had been used where '1' represents "*completely disagree*" and '5' "*fully agree*". For every individual, the summation of scores was performed and the mean was taken. The mean of each total score was then used to analyse the data and draw conclusions.

Interpretation of the scores were similar to burnout and technostress, where the higher the score the more an individual uses or experiences it.

The division between adaptive and maladaptive coping strategies is necessary to see which impact each strategy will have on the relationship between technostress and burnout.

## **Data-analysis**

### **Preparing data**

To analyse the data collected from the surveys several analysis techniques have been used. As mentioned before the data from the surveys have been exported from Qualtrics. The data was extracted directly into SPSS where data was cleaned and made ready to use for analysis. The clean-up process involved removing redundant and adding necessary data such as removing duplicates and incomplete surveys, deleting excess columns, changing variable names, changing measure types, and creating means of the total scores. The extra added columns were mainly the means of the total scores concerning burnout, technostress, and coping strategies. For example, the burnout section had twelve questions where each respondent had to provide an answer scaling from 1 to 5. The summation was made, and that total score was then divided by twelve. This mean of the total score would then represent the variable that was used for analysis. The same was done for the technostress and coping strategies section.

### **Descriptive analysis**

The first analysis that was performed was a descriptive one where the descriptive statistics were extracted from the survey data. The variables used within the descriptive statistics were the means of the total scores from burnout, technostress, and coping strategies. Also, the control variable age was added to provide an overview of the different age ranges that participated in the survey. The descriptives provide an overview of the minimum, maximum, mean, standard deviation, and variance of the variables. To provide information about another control variable, gender, and frequency descriptive statistics were performed. Since burnout is an important topic of this research, the burnout scores from the survey were compared to the burnout standards of the working people in Flanders. These standards were taken from the official Burnout Assessment Tool (BAT) guide of Schaufeli et al. (2018). In that way, conclusions could be made if the sample, which was coming from employees in one IT company, were prone to burnout or not. In addition to the descriptive statistics, a reliability analysis was performed for the critical variables of this research. In that way, an assessment of the reliability or consistency of the variables could be performed. This was done by looking at Cronbach's alpha which estimates to which extent the variables in a scale are interrelated. A Cronbach's alpha value always ranges between 0 and 1 where a higher value confirms that there is a greater internal consistency between the questions and that they all measure the same construct. Next, a bivariate correlation analysis was conducted to show how strongly the essential variables are related to each other. The variables used to investigate the correlation were burnout, technostress, coping strategies, and age.

## Regression

To answer the hypotheses different analysis techniques have been used. A linear regression was conducted to answer if the perceived techno-stressors lead to a higher level of job burnout. The dependent variable in this regression was burnout, the independent variable was technostress where also the control variables age and gender were added to the independent variable block. The second and third hypothesis, which investigates if coping strategies lead to a lower level of perceived techno-stressors, was also analysed with a linear regression. The dependent variable was technostress, and the coping strategies with control variables age and gender, were defined in the independent variable block.

## Moderation

To investigate the moderation of age and technostress on the relationship between technostress and burnout, and to see if techno-stressors mediate the coping strategies for burnout, the PROCESS macro of Hayes (2017) was used. The Process Macro is a bootstrapping statistical computer tool invented by Hayes (2017) as an expansion for SPSS and SAS software. It is an analysis tool that is used to investigate the effect of one or several moderating or mediating variables on relationships among dependent and independent variables. The macro analyses the direct, indirect, and total effects of the predictor on the outcome variable as well as (un)standardized regression coefficients, standard errors, and other interesting statistics such as R squared, p and t values. The Process Macro can save the researcher a lot of time and effort since mediation and moderation effects are centralized within one macro. Also, the bootstrapping procedure that is linked to the Process Macro is perceived as more powerful and more accurate than alternatives such as the Sobel test. The Process Macro is freely downloadable and can be added as an extension to the regression analysis section in SPSS (Hayes, 2017).

The fourth and fifth hypothesis, which researches if the (mal)adaptive coping strategies moderate the effect of perceived techno-stressors on job burnout, and hypothesis eight, which researches if age moderates, is analysed with the help of the Process Macro of Hayes (2017). The dependent variable is burnout, the independent technostress, and the moderator variables are (mal)adaptive coping strategies and age. Additionally in the Process Macro, the investigator has to define the model number he wants to use. Hayes (2017) has seventy-four models linked to the Process Macro, each model represents a type of analysis which can be moderation, mediation, or conditional. During this research, model 1 has been used to conduct the moderation analysis for hypothesis eight. The reason for that is that we only have one moderator variable which is age. Model 1 (figure 2) is the Moderated Regression Analysis model which is used when you have one independent variable, one dependent, and one moderator variable. It provides insights to see if the relationship between the dependent and independent variables is moderated by the moderator variable. Model 2 (figure 3) in the Process Macro has been used to investigate the impact of two moderator variables, adaptive and maladaptive coping, at once. In that way, we only had to conduct one analysis to test hypotheses four and five instead of separating them into two analyses.

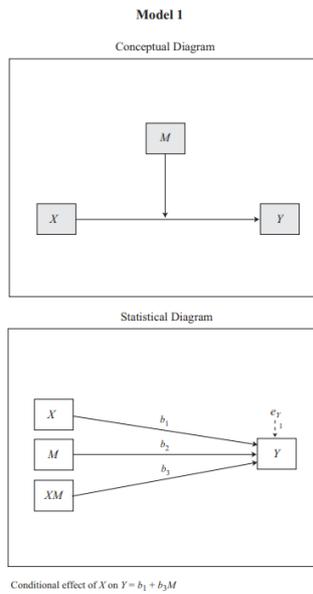


Figure 2, Model 1 moderation analysis with one moderator, Hayes, 2017

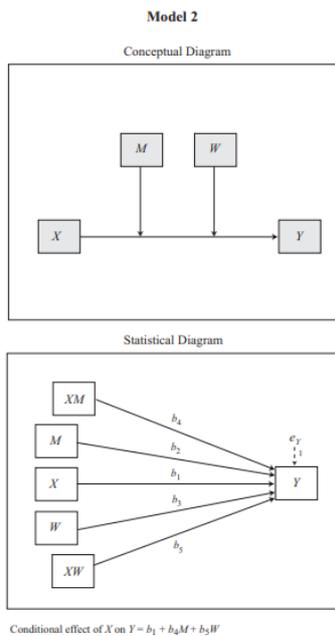


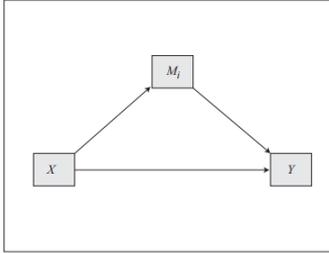
Figure 3, Model 2 moderation analysis with two moderators simultaneously, Hayes, 2017

## Mediation

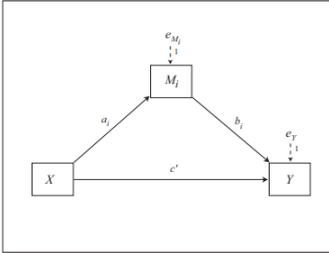
The Process Macro is also used to research if techno-stressors mediate the effect of coping strategies on burnout. The difference here is that we want to check the mediating effect. Therefore, we changed the model number in the Process Macro to number 4 (figure 4), the Simple Mediation Analysis model. This model is used when there is one independent variable, one dependent variable, and one mediating variable. It assesses whether the mediating variable defines the relationship between the dependent and independent variable. In other words, assessing if the techno-stressors mediate the effect of (mal)adaptive coping strategies on burnout.

**Model 4**

Conceptual Diagram



Statistical Diagram



Indirect effect of X on Y through M<sub>i</sub> = a<sub>i</sub> b<sub>i</sub>  
Direct effect of X on Y = c'

\*Model 4 allows up to 10 mediators operating in parallel

Fig 4, Model 4 mediation analysis with one mediator, Hayes, 2017

# Results

## Descriptive analysis

When looking at table 1 an overview of the control variable gender has been provided. It includes the frequencies of men and women who participated in absolute values and in percentage. The respondents had the option to select a third answer option (gender X) if they did not identify as a man or woman. After checking the data in SPSS every respondent of the 117-sample selected man or woman, the option X was never selected. Looking at the data, we can see that there is an uneven ratio where 79 out 117 respondents are men and 38 are women. According to the percentages we can state that around  $\frac{2}{3}$  (67,5%) of the sample consists of men and around  $\frac{1}{3}$  (32,5%) out of women.

Table 1. Frequency sample

	Frequency	Percent	Valid Percent
Man	79	67.5	67.5
Woman	38	32.5	32.5
Total	117	100	100

Table 2 gives more information about the descriptive statistics. The variables used are the means of the total scores for burnout, technostress, and coping strategies where also the control variable age is taken into account in the descriptives. The outputs that have been chosen are the minimum and maximum scores, mean, standard deviation, and variance.

For burnout it is remarkable that the minimum score is 1 which means that certain respondents have never been in contact with burnout experiences. The maximum score for burnout is 3.58 where we see that it is remarkably higher than the mean of 2.19. The standard deviation shows that on average the individual burnout scores deviate from the mean by more or less 0.51 which indicates the majority of the values are relatively close to the burnout mean of 2.19. This is also translated in the variance output of 0.263 which is a small value clarifying that the data points are close to the mean.

For technostress, the minimum value is 1.48 which indicates that every respondent has never selected a value of 1 throughout all the twenty-three questions asked. That means that every respondent encountered a form of technostress. The maximum value is 3.96 which is relatively high since the maximum score attainable is 5. The mean is 2.73 which is slightly above the standardized mean of 2.5. We see a smaller standard deviation (SD = 0.48) and variance (Var. = 0.235) than the burnout scores which informs us that the data points are relatively close to the mean and have a small spread.

The adaptive coping strategies have a minimum value of 1 which indicates that there were respondents who never applied adaptive coping strategies, potential explanations can be that they

never encountered technostress and/or burnout. The maximum score of 4.33 is relatively high taking into account the potential maximum score is 5. The mean is 2.65 which indicates that on average respondents determined 'Neither agree nor disagree' as answer to the coping strategy questions. The standard deviation (SD = 0.86) and variance (Var. = 0.746) are larger than the burnout and technostress scores which means that the values are less close to the mean and differ more from the average.

The maladaptive coping strategies have a minimum value of 1 which indicates that there were respondents who never applied maladaptive coping strategies. The maximum score of 4.33 is relatively high taking into account the potential maximum score is 5. The mean is 2.35 which indicates that on average respondents determined 'Neither agree nor disagree' as answer to the coping strategy questions. The standard deviation (SD = 0.83) and variance (Var. = 0.688).

The control variable age was also examined which helps to identify who were the youngest (minimum = 22) and oldest (maximum = 63) respondent, and the average age (mean = 37.86) of the respondents.

Table 2. Descriptives

	Minimum	Maximum	Mean	Std Deviation	Variance
Burnout	1.00	3.58	2.19	0.51	0.26
Technostress	1.48	3.96	2.73	0.48	0.23
Adaptive coping	1.00	4.33	2.65	0.86	0.75
Maladaptive coping	1.00	4.33	2.35	0.83	0.69
Age	22	63	37.86	12.39	153.48

Figures 5 and 6 show the official norms for the total score and individual component scores concerning the shortened version of the BAT questionnaire which has been translated in table 3 in regard to our sample. Figure 5 shows the ranges for each burnout component which can help to identify where the burnout problems lie if there is one. In this research the total BAT score will be taken into account as a variable, but we can also take a closer look at the individual burnout component scores to identify which one is critical. In figure 6 and table 3 we can see that the norms for working people in Flanders get assigned a green score when the total burnout score is equal or lower to 2.53, this means there is no sign of burnout. An orange score is assigned when the burnout score is equal or larger than 2.54 and smaller than 2.96, this means there is potential risk for burnout. The burnout score is interpreted as problematic when it is equal or higher than 2.96, a red colour is assigned which indicates that there is a large probability of burnout. Table 3 shows the burnout scores for each individual of the sample. When taking into account the ranges developed in table 3 and 4 by Schaufeli et al. (2018) concerning burnout, then we state that 93 individuals are having a green score since their scores are lower than 2.54 and therefore not experiencing burnout. Fifteen respondents are having a potential risk for burnout since their scores are ranging between 2.54 and 2.96, and nine respondents have a high probability of already being in a state of burnout since their scores are equal or higher than 2.96. Translated in percentages,

79.5% is safe from burnout, 12.82% has a potential risk, and 7,69% has a high probability of already having a burnout.

Table 3. Burnout standards (total)

		Frequency	Percent
No burnout	< 2.54	93	79.5
Risk of burnout	>= 2.54 and < 2.96	15	12.82
Burnout	>=2.96	9	7.69

## Correlations

In table 4 the correlations are displayed statistically. The variables chosen to investigate if they correlate with each other are burnout, technostress, adaptive & maladaptive coping strategies, and control variable age. When looking at table 4 we can derive that burnout correlates negatively with age ( $r = -0.227$ ) which is significant since the p value of 0.014 is lower than 0.05. Also, burnout has a high significance positive correlation with technostress ( $r = 0.418$ ,  $p < 0.01$ ), a positive correlation with adaptive coping strategies ( $r = 0.226$ ,  $p < 0.05$ ) and a high significance positive correlation with maladaptive coping strategies ( $r = 0.243$ ,  $p < 0.01$ ). Technostress positively correlates at a high significance level with burnout ( $r = 0.418$ ,  $p < 0.01$ ) and adaptive coping strategies ( $r = 0.373$ ,  $p = < 0.001$ ). Adaptive coping strategies correlate positively at a high significance level with technostress ( $r = 0.373$ ,  $p = < 0.001$ ) and burnout ( $r = 0.226$ ,  $p < 0.05$ ). Maladaptive coping strategies correlate positively at a high significance level with burnout ( $r = 0.243$ ,  $p < 0.01$ ). We can confirm that there is only one negative correlation that is significant which is age and burnout. Other remarkable findings are that age has no significant results in correlating with technostress and coping strategies. Also, that burnout has a significant correlation with all the other variables and that technostress only has positive correlations.

Table 4. Correlations

		Burnout	Technostress	Adaptive coping	Maladaptive coping	Age
Burnout	Pearson correlation	1	0.418**	0.226*	0.243**	-0.227*
	p-value		<0.001	0.014	0.008	0.014
Technostress	Pearson correlation	0.418**	1	0.373**	0.145	0.042
	p-value	<0.001		<0.001	0.118	0.656
Adaptive coping	Pearson correlation	0.226*	0.373**	1	0.135	
	p-value	0.014	<0.001		0.147	
Maladaptive coping	Pearson correlation	0.243**	0.145	0.135	1	-0.116
	p-value	0.008	0.118	0.147		0.213
Age	Pearson correlation	-0.227*	0.042	-0.062	-0.116	1
	p-value	0.14	0.656	0.504	0.213	

\* Correlation is significant at the 0.05 level

\* Correlation is significant at the 0.01 level

## Reliability statistics

The reliability statistics in table 5 provided Cronbach's alpha value for each set of questions for every critical variable of this research. When looking at the general Cronbach's alpha value for burnout (Cronbach's alpha = 0.872) we can state that the twelve different burnout questions are highly reliable, interrelated, and measuring the same construct. This makes sense since the questions are taken from the official Burnout Assessment Tool (BAT) from Schaufeli et al. (2018) which has been the driving force for burnout research. Also, for technostress (Cronbach's alpha = 0.869), adaptive (Cronbach's alpha = 0.898) and maladaptive (Cronbach's alpha = 0.894) coping strategies the Cronbach's alpha values were high which indicate that they too had questions who are reliable, interrelated, and measuring the same construct.

Table 5. Reliability Cronbach's Alpha

	Cronbach's Alpha	N of items
Burnout	0.872	12
Technostress	0.869	23
Adaptive coping strategies	0.898	6
Maladaptive coping strategies	0.894	3

## Hypothesis testing

To test the hypothesis several analysing techniques were conducted. To test the first two hypotheses a linear regression analysis was performed. For moderating and mediating testing the Process Macro of Hayes was being used with their respective model 1 and 2 for measuring moderation and model 4 for measuring mediation.

### **H1: Perceived techno-stressors lead to a higher level of job burnout**

The first hypothesis includes linear regression where job burnout is the dependent variable, technostress the independent variable where also control variables age and gender were added to the independent block. Table 6 displays the R-values where R-squared is equal to 0.238 which indicates that 23.8% of the variance in the dependent variable burnout can be determined by technostress. When looking at the coefficients individually in table 7 we can notice that burnout has a significance value ( $p = <0.001$ ) which is lower than the predetermined significance level of 0.05. Same for technostress where the significance value ( $p = <0.001$ ) is smaller than 0.05 which implies that there is a statistically significant relationship between technostress and burnout. Age has a significance value ( $p = 0.004$ ) that is smaller than 0.05 which explains that age is also statistically significant in relation with burnout. Looking at the t-values we can declare that the largest absolute t-value is the one from technostress ( $t = 5.241$ ) which indicates that there is a

stronger relationship between technostress and burnout than between age and burnout ( $t = -2.918$ ). This t-value is positive which indicates that there is a positive relationship between technostress and burnout. Looking at the t-value of age we notice a negative value ( $t = -2.918$ ) which indicates that age has a negative relationship with burnout. Gender has no significant relationship with burnout ( $p = 0.538$ ) and has a small, positive t-value ( $t = 0.617$ ) which indicates a positive and weak relationship with burnout. To conclude, we can confirm this hypothesis since there is a positive significant relation between technostress and job burnout.

Table 6. R-values relation technostress and job burnout

R	R Square	Adjusted R Square	Std. Error of Estimate
0.487	0.238	0.217	0.454

Table 7. Individual coefficients relation technostress and job burnout

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients B	t	p
Burnout	1.241	0.306		4.051	<0.001
Technostress	0.458	0.087	0.432	5.241	<0.001
Age	-0.010	0.003	-0.241	-2.918	0.004
Gender	0.056	0.090	0.051	0.617	0.538

## **H2: Adaptive coping strategies lead to a lower level of perceived techno-stressors**

## **H3: Maladaptive coping strategies lead to a higher level of perceived techno-stressors**

The second and third hypothesis includes a linear regression where technostress is the dependent variable, adaptive coping and maladaptive coping strategies are the independent variable where also control variables age and gender were added to the independent block. The R-squared (table 8) is equal to 0.409 which indicates that 40,9% of the variance in the dependent variable technostress can be determined by (mal)adaptive coping strategies, age, and gender. When looking at the coefficients individually in table 9 we can notice that technostress has a significance value ( $p = <0.001$ ) which is lower than the predetermined significance level of 0.05. Same for adaptive coping strategies where the significance value ( $p = <0.001$ ) is smaller than 0.05 which implies that there is a statistically significant relationship between adaptive coping strategies and technostress. Maladaptive coping is not statistically significant ( $p = 0.271$ ) which indicates that maladaptive coping individually does not directly impact technostress. Age has a significance value ( $p = 0.449$ ) that is larger than 0.05 which explains that age is not statistically significant in relation to technostress. The same for the other control variable gender where no significant relationship with technostress can be declared ( $p = 0.184$ ). Looking at the t-values we can declare that adaptive coping strategies have an absolute t-value ( $t = 4.325$ ) which indicates that there is a

strong and positive relationship between coping strategies and technostress. Maladaptive coping has a t-value of 1.105 which indicates a weaker positive relationship compared to adaptive coping. Looking at the t-value of age we notice a small, positive value ( $t = 0.759$ ). Gender has no significant relationship with technostress ( $p = 0.184$ ) and has a negative t-value ( $t = -1.336$ ) which indicates a negative and weak relationship with technostress. To conclude, adaptive coping has an impact on technostress since it is statistically significant, but it has a positive relation which indicates that adaptive coping increases technostress. This does not align with the expected result of the hypothesis. Maladaptive coping has no impact at all on technostress which does not allow us to confirm that it increases technostress. Therefore hypotheses 2 and 3 are rejected.

Table 8. R-values (mal)adaptive coping and technostress

R	R Square	Adjusted R Square	Std. Error of Estimate
0.409	0.167	0.137	0.450

Table 9. Individual coefficients (mal)adaptive coping and technostress

	Unstandardized B	Coefficients Std. Error	Standardized Coefficients B	t	p
Technostress	2.092	0.254		8.221	<0.001
Adaptive coping	0.214	0.049	0.381	4.325	<0.001
Maladaptive coping	0.057	0.051	0.097	1.105	0.271
Age	0.003	0.003	0.066	0.759	0.449
Gender	-0.121	0.090	-0.117	-1.336	0.184

**H4: Adaptive coping strategies moderate the effect of perceived techno-stressors on job burnout, such that users with higher levels of adaptive coping strategies who perceive techno-stressors show lower levels of job burnout**

**H5: Maladaptive coping strategies moderate the effect of perceived techno-stressors on job burnout, such that users with higher levels of maladaptive coping strategies who perceive techno-stressors show higher levels of job burnout**

To test hypotheses 4 and 5 the Process Macro from Hayes for SPSS has been used. Model 2 of Hayes has been defined in the Process Macro since it allows us to test the impact of two moderators simultaneously on the relationship between the independent and dependent variable. The dependent variable is burnout, independent variable is technostress, and the moderating variables are adaptive and maladaptive coping strategies. Gender and age are added as covariates in the analysis. When looking at the output data in table 10 we notice that 29.58% (R-squared = 0.2108) of the variability in burnout can be devoted to technostress and (mal)adaptive coping strategies. This means that the collection of technostress, (mal)adaptive coping strategies, and the interaction of these variables have a modest effect in explaining the variance in burnout. The R-squared is not statistically significant ( $p = 0.000$ ) but it is not far off the predetermined significance level of 0.05. When examining the coefficients individually in table 11 it is noticeable that only technostress ( $p = 0.0247$ ) and age ( $p = 0.0278$ ) are statistically significant. This means that in this analysis only technostress and age have an impact on burnout. Both adaptive coping and maladaptive coping are not statistically significant and therefore do not have an impact on burnout. Also, their interactions (Technostress \* Adaptive coping; Technostress \* Maladaptive coping) are not significant. So, this data output proves that (mal)adaptive coping strategies and their interactions do not impact job burnout which allows us to conclude that there is no moderating effect of coping strategies on the relationship between technostress and job burnout. Therefore, we reject both hypotheses of (mal)adaptive coping strategies as moderating variables since no impact is measured we could also not confirm the direction of the relationship.

Table 10. R-values (mal)adaptive coping as moderators in relation technostress and burnout

R	R Square	MSE	F	p
0.5439	0.2958	0.2382	6.5420	0.00

Table 11. Individual coefficients (mal)adaptive coping as moderator

	Coefficient	se	t	p	LLCI	ULCI
Burnout	0.3194	0.9097	0.3511	0.7261	-1.48	2.12

Technostress	0.7298	0.3205	2.2773	0.0247	0.09	1.36
Adaptive coping (AC)	0.4466	0.2747	1.6260	0.1068	-0.09	0.99
<b>TS * AC</b>	-0.1456	0.0942	-1.5457	0.1251	-0.33	0.04
Maladaptive coping (MAC)	-0.0574	0.3064	-0.1873	0.8518	-0.66	0.55
<b>TS * MAC</b>	0.0500	0.1045	0.4792	0.6328	-0.16	0.26
Gender	0.0423	0.0992	0.4269	0.6703	-0.15	0.24
Age	-0.0085	0.0038	-2.2304	0.0278	-0.02	-0.0009

## H6: Techno-stressors mediate the effect of adaptive coping strategies on job burnout

To test this hypothesis the Process Macro from Hayes for SPSS has been used. Model 4 of Hayes has been defined in the Process Macro since it assesses whether the mediating variable explains the relationship between the independent variable and the dependent variable. The dependent variable is burnout, independent variable is adaptive coping strategies, and the mediating variable is technostress. Looking at the coefficients of the first model in the analysis in table 12, adaptive coping strategies have a positive t-value ( $t = 4.3062$ ) which implies a positive relationship but not statistically significant ( $p = 0.000$ ). Looking at the second model (table 13) where burnout is the outcome variable, and where adaptive coping strategies and technostress are the predictors, we can conclude that adaptive coping strategies ( $t = 0.8876$ ) and technostress ( $t = 4.2480$ ) have a positive relationship with burnout where technostress has the much stronger relation ( $4.2480 > 0.8876$ ). But the findings are irrelevant since they both do not have statistical significance.

When looking at the direct effect of coping strategies on burnout in table 14 it is noticeable that the effect is small (effect = 0.0482) and that coping strategies have a small, positive relationship ( $t = 0.8876$ ) with burnout. These findings are dismissible since the direct effect is not statistically significant ( $p = 0.3766$ ). Looking at the indirect effect (or mediation effect) in table 15, we notice that there is a small positive effect (effect = 0.0860) which implies the strength and direction of the indirect relation between coping strategies and burnout with technostress as mediator. The indirect effect is statistically significant since the confidence interval does not include zero and is positive, lower limit (BOOTLLCI) is 0.0339 and upper limit (BootULCI) is 0.1461. We can state that adaptive coping strategies have an impact on burnout through technostress. The confidence interval ranging from 0.0339 (BootLLCI) to 0.1461 (BootULCI) also indicates that the mediating effect of technostress is statistically significant and not by random chance. The direction of the effect is positive, which implies that an increase in technostress would cause an increase in adaptive coping and job burnout.

Table 12. Impact effect of adaptive coping on technostress

	Coefficient	se	t	p	LLCI	ULCI
Technostress	2.1759	0.1353	16.08	0.00	1.91	2.44
Adaptive coping	0.2091	0.0486	4.3062	0.00	0.11	0.31

Table 13. Impact of adaptive coping and technostress on burnout

	Coefficient	se	t	p	LLCI	ULCI
Burnout	0.9356	0.2531	3.6963	0.0003	0.43	1.44
Adaptive coping	0.0482	0.0543	0.8876	0.3766	-0.06	0.16
Technostress	0.4411	0.0968	4.2480	0.00	0.2194	0.60

Table 14. Direct effect adaptive coping on burnout

	Effect	se	t	p	LLCI	ULCI
Direct effect	0.0482	0.0543	0.8876	0.3766	-0.06	0.16

Table 15. Indirect effect adaptive coping on burnout through technostress (mediation)

	Effect	BootSE	BootLLCI	BootULCI
Technostress	0.0860	0.0290	0.0339	0.1461

## H7: Techno-stressors mediate the effect of maladaptive coping strategies on job burnout

To test this hypothesis the Process Macro from Hayes for SPSS has been used. Model 4 of Hayes has been defined in the Process Macro. The dependent variable is burnout, independent variable is maladaptive coping strategies, and the mediating variable is technostress. When looking at the data output (table 16) in the first model where technostress is the outcome variable, no interesting conclusions can be drawn. Looking at the second model (table 17) where burnout is the outcome variable, and where maladaptive coping strategies and technostress are the predictors, we can conclude that maladaptive coping strategies ( $p = 0.0294$ ) has a statistical significance which allows us to confirm that it has a positive relation with burnout ( $t = 2.2057$ ). When looking at the direct effect of maladaptive coping strategies on burnout in table 18 it is noticeable that there is a positive effect (effect = 0.1149) which is statistically significant ( $p = 0.0294$ ). This means that there is a significant direct effect or relationship between maladaptive coping strategies and job burnout. Looking at the indirect effect (or mediation effect) in table 19, we notice that there is a small positive effect (effect = 0.0352) which implies the strength and direction of the indirect relation between maladaptive coping strategies and burnout with

technostress as mediator. But since the confidence interval of the indirect effect is ranging from -0.0122 (BootLLCI) to 0.0823 (BootULCI) the indirect effect is not statistically significant because the interval includes zero. Therefore, techno-stressors do not behave as a mediator between maladaptive coping and job burnout.

Table 16. Impact effect of maladaptive coping on technostress

	Coefficient	se	t	p	LLCI	ULCI
Technostress	2.5305	0.1344	18.83	0.00	2.26	2.80
Maladaptive coping	0.0848	0.0539	1.5747	0.1181	-0.02	0.19

Table 17. Impact of maladaptive coping and technostress on burnout

	Coefficient	se	t	p	LLCI	ULCI
Burnout	0.7837	0.2598	3.0167	0.0032	0.27	1.30
Maladaptive coping	0.1149	0.0521	2.2057	0.0294	0.01	0.22
Technostress	0.4146	0.0892	4.6472	0.00	0.24	0.59

Table 18. Direct effect adaptive coping on burnout

	Effect	se	t	p	LLCI	ULCI
Direct effect	0.1149	0.0521	2.2057	0.0294	0.01	0.22

Table 19. Indirect effect adaptive coping on burnout through technostress (mediation)

	Effect	BootSE	BootLLCI	BootULCI
Technostress	0.0352	0.0238	-0.01	0.08

## **H8: Age moderates the effect of techno-stressors on job burnout, such that users with a higher age who perceive techno-stressors show lower levels of job burnout**

To test this hypothesis the Process Macro from Hayes for SPSS has been used. Model 1 of Hayes has been defined in the Process Macro since it assesses whether the relationship between the independent variable and the dependent variable is moderated by the moderator variable. The dependent variable is burnout, independent variable is technostress, and the moderating variable is age. When looking at the output data in table 20 we notice that 24.68% (R-squared = 0.2468) of the variability in burnout can be devoted to technostress and coping strategies. This means that the collection of technostress, age, and the interaction of these variables have a modest effect in explaining the variance in burnout. The R-squared is not statistically significant ( $p = 0.000$ ) but it is not far off the predetermined significance level of 0.05. When examining the coefficients individually (table 21) it is noticeable that technostress ( $p = 0.7887$ ), age ( $p = 0.0682$ ), and the interaction ( $p = 0.1863$ ) of age and technostress are not statistically significant. This means that no variable has an impact on burnout in this analysis. Looking at the t-values we can derive that technostress ( $t = 0.2686$ ) and the interaction of age and technostress ( $t = 1.3298$ ) have a small positive relationship with burnout. Age on the other hand has a negative relationship with burnout ( $t = -1.8415$ ). Also, when examining the conditional effects, we can conclude that the interaction between technostress and age ( $X*W$ ) has a small R-squared value (R-squared = 0.0118) which means that there is not a good fit between burnout and the interaction effect of age and technostress. The p-value ( $p = 0.1863$ ) of the interaction is not statistically significant which suggests that age does not moderate the effect of technostress on burnout.

Table 20. R-values Age as moderator

R	R Square	MSE	F	p
0.4968	0.2468	0.2037	12.34	0.00

Table 21. Individual coefficient and interaction age moderator

	Coefficient	se	t	p	LLCI	ULCI
Burnout	2.3450	0.8080	2.9023	0.0045	0.74	3.95
Technostress	0.0792	0.2948	0.2686	0.7887	-0.50	0.66
Age	-0.0351	0.0191	-1.8415	0.0682	-0.07	0.0027
<b>TS * Age</b>	0.0092	0.0069	1.3298	0.1863	-0.0045	0.0229

# Discussion

## Findings

The goal of this research was to find how technostress is related to burnout and how coping strategies and age can impact that relationship. Burnout is an important outcome variable in many studies. When looking at the results of our sample (n = 117) of Belgian IT consultants and comparing them to the official BAT standards for working people in Belgium, we can state that 79.5% (n = 93) are safe from burnout, 12.9% (n = 15) has a potential risk for burnout, and 7.6% (n = 9) has a high probability of already having a burnout. These results can be used to define if the organization is happy with its burnout figures or not. In an ideal world, you would like to have them all in the green zone which is a burnout score of less than 2.53. But we can notice that 9 out of 117 people are potentially in a burnout state which should be a signal to anticipate or intervene already.

As an introduction to the hypotheses testing and discussion, the correlation between the main variables is investigated. In that way, we can already provide some interesting insights upfront. Deriving from the literature we know that there is a relationship between age, technostress, and job burnout (Maslach et al. 2001; Hauk et al., 2019; Kluge et al., 2019). In our correlation analysis, we can state that age has a negative significant relationship with burnout but that it does not correlate with technostress and coping strategies. The literature also provided evidence that technostress has a significant relationship with burnout (Maier et al., 2015; Gaudioso et al., 2017). Looking at our correlation data we notice that burnout has positively significant correlations with technostress, adaptive, and maladaptive coping strategies. Looking at the technostress correlations we notice that technostress only correlates positively and significantly with job burnout and adaptive coping strategies. Gaudioso et al. (2017) have proven in the literature that adaptive coping strategies neutralize techno-stressors, and maladaptive coping strategies drive them. In our correlations where adaptive coping strategy is the constant variable, we notice that adaptive coping correlates positively and significantly with burnout and technostress. The maladaptive coping strategies only correlate positively and significantly with job burnout. This means that Gaudioso et al. (2017) statements do not apply to our correlations since adaptive coping has a positive significant correlation with techno-stressors. We see that maladaptive coping strategies have a positive significant correlation with burnout which makes it interesting to analyse if maladaptive coping impacts the relationship between technostress and job burnout, this will be explained in the hypotheses section of the discussion.

Looking at hypothesis 1, where we investigated if the perceived techno-stressors led to a higher level of burnout, we could confirm that it does. When performing the regression analysis, where burnout was the outcome variable and technostress the independent, we could see that the data output provided that techno-stressors have a positive significant relationship. In other words, techno-stressors lead to a higher level of burnout. These findings are aligned with the literature. Ayyagari et al. (2011), Maier et al. (2019), and Srivastava et al. (2015) validated that techno-

stressors can cause job burnout. Their transactional models in support of empirical evidence have proven that techno-stressors pilot psychological disruption including job burnout. Also, Borle et al. (2021) stated that the combination of all techno-stressors is linked to an increase in job burnout. For organizations to tackle burnout, they should focus on reducing technostress with their employees. According to Riedl (2013), males develop a higher level of stress than women. This finding is confirmed by Ragu-Nathan et al. (2008). But also, environmental factors play an important role. The most outspoken positively influential factors are task complexity, ICT-mediated communication networks, professional work-environment role, centralization of power, and tendency towards innovation which are causing the most technostress damage (Wang et al., 2008; Koo and Wati, 2011; Schelhammer and Haines, 2013; Raisiene and Jonusauskas 2015; Jonušauskas and Raisiene 2016). These findings can also help in addressing the burnout problem within the company.

Hypothesis 2, which focused on investigating if adaptive coping strategies lead to a lower level of perceived techno-stressors, provided data output that was statistically significant. We can state that there is a regression effect. This means that adaptive coping strategies impact the technostress levels. When looking at the coefficients individually, adaptive coping strategies have a positive significant relationship with technostress. This means that there is an impact and influence of adaptive coping strategies on technostress. But since the direction of the relationship is positive the hypothesis cannot be confirmed. An increase in adaptive coping strategies would cause an increase in technostress, so this hypothesis is rejected. Compared to the literature our findings do not align. Gaudioso et al. (2017) defined that adaptive coping strategies block the conversion of technostress into work exhaustion. So, we would have expected that adaptive coping strategies would have a negative statistically significant relationship, if that were the case we could have confirmed this hypothesis. A possible explanation why coping strategies do not lead to a lower level of technostress can be that the most impactful influential factors of technostress such as task complexity, ICT-mediated communication networks, professional work-environment role, centralization of power, and tendency towards innovation are so present within the company that the amount of adaptive coping puts more pressure on employees. They are aware that there are techno-stressors but the environmental and professional factors (e.g., workload, budget, deadlines) do not allow them to actively cope with them which will increase the amount of technostress.

Hypothesis 3 which investigates if maladaptive coping strategies lead to a higher level of perceived techno-stressors, does not provide the expected output. Looking at the coefficient individually we can state that there is a positive effect of maladaptive coping on techno-stressors, but it is not statistically significant. Therefore, we have to reject this hypothesis. Looking at the literature, Gaudioso et al. (2017) stated that maladaptive coping strategies are causing an increase in work exhaustion and technostress. It is important to minimize the use of maladaptive coping strategies since their influence on technostress is larger than adaptive coping strategies. Therefore, it is essential to eradicate the maladaptive coping strategies before organizations try to implement and train adaptive coping strategies (Gaudioso et al., 2017). We can confirm that there is a positive regression in our data output, but an insignificant result will not allow us to confirm that. A

possible explanation why this hypothesis cannot be confirmed can be the small sample size, that we included too many respondents that did not use enough maladaptive coping strategies.

Hypothesis 4 studied if adaptive coping strategies moderate the effect of perceived techno-stressors on job burnout. The data output provided by the Process Macro of Hayes (2018) has statistically proven that adaptive coping strategies do not moderate the relationship. The coefficient and t-values of the interaction (Adaptive coping strategies \* Technostress) were negative, indicating a negative relationship, but since they were statistically insignificant values the results cannot be confirmed. Additionally, looking at the impact of adaptive coping individually on burnout we can state that there is no statistically significant result which differs from hypothesis 2 where there was a significant result. Based on the data output we have to reject this hypothesis because the interaction effect (TS \* AC) is not a statistically significant result although the negative direction is what we expected. This means that techno-stressors cannot be reduced with the help of adaptive coping and therefore job burnout cannot be neutralized. A finding that does not align with the literature since Gaudioso et al. (2017) stated that adaptive coping leads to a lower level of technostress and exhaustion. Since hypothesis 1 allows us to state that technostress and job burnout have a positive significant relationship, and Gaudioso has proven that adaptive coping leads to a lower level of technostress, we would have expected that adaptive coping strategies would moderate the relationship and reduce job burnout. The explanation is already partly explained in hypothesis 2, this hypothesis already confirmed that there is no impact between adaptive coping and technostress. The interaction of adaptive coping and technostress in this analysis is negative, which implies that it would reduce burnout but since it was statistically insignificant we cannot use it as valuable output to confirm our hypothesis.

Hypothesis 5, checking if maladaptive coping strategies moderate the effect of perceived techno-stressors on job burnout. Also, this hypothesis can be rejected since it is not statistically significant. The data output has shown that there is no statistically significant result in the interaction between technostress and maladaptive coping on job burnout. This implies that maladaptive coping does not moderate the effect of perceived techno-stressors on job burnout. Gaudioso et al (2017) confirmed that there is a positive relationship between the variables mentioned above. Maladaptive coping strategies are the driver behind technostress and burnout. Also, its impact is larger than adaptive coping strategies which makes it important for organizations to first neutralize the use of maladaptive coping strategies before adaptive coping strategies are trained and implemented. According to the literature we expected that this hypothesis could have been confirmed because maladaptive coping leads to higher technostress levels and therefore to a higher level of burnout. A possible explanation could be that employees do not know the difference between adaptive and maladaptive coping. They just look at it as a general way of coping, which is not wrong since literature has proven that both ways of coping are used, but what employees do not realize is that maladaptive coping increases technostress. Maybe the used sample for this study was unaware of the differences between the two coping strategies.

Looking at the data output of hypothesis 6 where techno-stressors are analysed as a mediator between adaptive coping and job burnout, we would expect it to do so. We know from previous analysis that there is a regression effect of technostress on job burnout. In hypotheses 4 and 5 we

tested, without success, if there is a statistically significant positive effect of adaptive coping strategies on technostress. As stated in the literature review we wanted to investigate the indirect relationship between coping strategies and job burnout and see which mediating role technostress has. In that way, we would be able to expand the understanding of the interplay between burnout, technostress, and coping strategies and determine causal pathways. Also, it would help to provide a coherent story to see if these interrelated variables are impacting each other through moderation and/or mediation, and which variable needs to get attention in order to reduce job burnout. Since both coping strategies are not moderating the relationship between technostress and job burnout we wanted to see if coping strategies can indirectly impact job burnout while playing with the technostress variable. We expected that it would mediate the relationship since it was proven in hypothesis 1 that technostress has an impact on job burnout. Literature has also proven that coping strategies impact technostress, which would make it interesting to see if technostress mediates the indirect relationship between coping strategies and job burnout. Relating to the literature we would expect that techno-stressors will behave as a mediator in the relationship between adaptive coping and job burnout. This is also confirmed by the data output of the indirect effect in the Process Macro of Hayes model 4 where we had a positive confidence interval that did not include zero. Techno-stressors act as partial mediator in the relationship. It is not a complete mediation since the direct effect of adaptive coping on job burnout was not statistically significant. This finding makes sense since both in the literature and our previous findings we can state that techno-stressors increase job burnout. The literature has proven that adaptive coping strategies reduce techno-stressors (Gaudioso et al., 2017). This implies that if we attack techno-stressors with the right active coping strategy, that job burnout will decline. A statement that is valid since in our data output of hypothesis 6 it was proven that the indirect effect of techno-stressors on the relationship between adaptive coping and job burnout was statistically significant. To conclude, there is a mediation effect which allows us to confirm this hypothesis but in order to have the ideal finding we would have expected that the indirect effect of techno-stressors on job burnout via coping strategies would have been negative. The indirect effect and direct effect are both positive which means that in the first-place technostress is only a partial mediator, and in the second place an increase in adaptive coping would cause an increase in technostress which eventually result in a higher job burnout. Therefore, the impact can be confirmed, but the direction is not correct.

The counterpart of hypothesis 6, which is analysed in hypothesis 7, is measuring whether techno-stressors will mediate the relationship between maladaptive coping and job burnout. We would expect that it does since maladaptive coping is part of the overall coping solutions to deal with stress and burnout. From the literature, we know that maladaptive coping strategies are detrimental to techno-stressors and burnout. It is a way of coping but not a beneficial way of coping since maladaptive strategies are the driving force behind technostress and burnout (Gaudioso et al., 2017). Looking at the data output in our analysis results we can conclude that techno-stressors do not mediate the relationship between maladaptive coping and job burnout. The indirect effect that was measured was not statistically significant since the value zero was located in the confidence interval. Our findings did not confirm the expectations we had. Maladaptive coping is still a way of coping with stress and burnout, so we would expect that techno-stressors would mediate that effect because maladaptive coping is the driving force behind

techno-stressors, especially techno-exhaustion. To conclude, we can state that job burnout is not impacted by maladaptive coping strategies when technostress is the mediator.

Age is a variable that has been the most consistent in relation to job burnout and one of the most important antecedents. According to Maslach et al. (2001), age is closely related to work experience which indicates that burnout is experienced more frequently in the early stages of a career. In addition to that, Hauk et al. (2019) stated that there is no significant relationship between age and techno-stressors. This means that higher age is not always related to a higher level of technostress. Hauk et al. (2019) have proven that younger workers experience similar or even higher levels of technostress. Older workers need to endure cognitive and physical decline (Hauk et al., 2019) which would imply that technostress levels will be higher. These statements by Hauk et al. (2019) are confirmed by Kluge et al. (2019) who performed a study according to technostress related to age. In addition to the findings above, La Torre et al. (2019) did succeed in proving that age has a significant positive relationship with technostress levels. They did that via well-conducted cross-sectional studies. The literature has not provided a consistent answer to see how age is impacting technostress and job burnout. Maslach et al (2001) stated that there is a close direct relationship between age and burnout, Hauk et al. (2019) stated that there is no significant relationship between age and techno-stressors, and La Torre et al. (2019) state that there is a significant positive relationship between age and technostress. In our findings, age was consistently added as a control variable in the analyses. In hypothesis 1 we can notice that age had a significant negative relationship with job burnout. In hypotheses 2 and 3, where technostress was the outcome variable, age had no effect at all. In hypotheses 4 and 5, where job burnout was the outcome variable, age also had a negative statistically significant effect. In hypothesis 8, where age was measured as a moderator variable in the relationship between technostress and burnout, age was close to being negatively statistically significant ( $p = 0.0682$ ). These results allow us to conclude that age has a significant effect on job burnout but not on techno-stressors.

From hypothesis 1 and the literature, we know that there is a significant positive relationship between technostress and job burnout. Hypothesis 8 provided answers to see if the strength and/or direction of technostress and job burnout are impacted by age. The literature failed to provide a consistent answer to see if techno-stressors are impacted by age, Hauk et al. (2019) defined that it does not, and La Torre et al. (2019) stated it does. Also, Maslach et al. (2001) stated that age is related to job burnout. Therefore, it was interesting to analyse the moderating role of age in the relationship between technostress and job burnout. A possible explanation for the inconsistent findings in the literature is that an increase in age would come with an increase in experience. More experienced people tend to have less stress since they rely on their experience in order to deal with stress or they can solve complex issues based on their experience and knowledge built over time. On the other hand, we are living in a constantly evolving digital era where you continuously need to adapt to modern technology. Older workers may not be that technology-minded since they are coming from an era where phones and computers were luxuries. The younger generations have been growing up with technology, for example, phones, tablets, and laptops. This means that technology is in their veins, and they will have it easy to adapt to new

technologies. But these younger workers do not have the experience that older workers have. The younger generation is more versatile for stress but can work better with information technology. Older people are less IT-minded or learn new technologies slower, but they are more resistant to stress thanks to their experience. The inconsistency in the literature may be dedicated to the fact that growing up with/without technology and having more/less experience balance each other out. There are some interesting findings when looking at the data output provided in the results to whether age moderates the relationship between technostress and job burnout. The overall model is not statistically significant but when looking at the coefficients and interaction separately we can confirm which researcher in the literature was right. This can also be confirmed by the interaction effect data where we notice that the interaction (Technostress \* Age) on job burnout is not statistically significant. Looking at the age and technostress coefficients individually, it is noticeable that both variables do not have a significant relationship with job burnout. This hypothesis is completely rejected which allows us to confirm that age does not impact the strength or relationship between techno-stressors and job burnout.

## Limitations

One of the potential shortcomings of this study is the sample size ( $n = 117$ ) which was mainly extracted from a smaller population of one IT- consultancy company. The population of the company consists of +/- 4600 individuals worldwide representing the IT company. In this study, the sample was merely coming from the Belgian employees which are fluctuating around 1500 people. In order to generalize the results for the whole Belgian IT sector a greater sample was needed. According to the sample size calculator, a sample of 924 employees was needed for Belgium to be representative. The sample size needed to represent the whole company is 1578. Data was collected only via an online survey tool called Qualtrics. This means there was no human interaction with the respondent which does not allow to explain the content of the survey properly. Within the survey subsections explanations, definitions, and instructions were given if the respondent was not fully aware of definitions and what needed to happen. A physical survey would allow the surveyor to react to potential extra questions from the respondents.

The data represented several variables but only three control variables were used which were age, gender and marital status where marital status was left out of the research since it did not have all the statuses (for example, domestic partnership). Examples of missing control variables are education, personality traits, work experience, health, and environmental factors. Especially the environmental factors within the organization could have had an impact on experiencing technostress, burnout, and coping strategies. The variables used were burnout, technostress, coping strategies, and age.

For burnout, the shortened version of the Burnout Assessment Tool (BAT) has been used. According to Schaufeli et al. (2019), there is no difference between the full version and the shortened version when burnout should be measured in a group of people. For individual diagnosis and screening of burnout, the full version of the BAT should be used. To measure technostress only twenty-three out of the twenty-five potential technostress questions were used since these

were the twenty-three questions used in other scientific studies. Furthermore, techno-stressors change continuously which causes the need to constantly include new phenomena (Borle et al., 2021). Coping strategies have been measured by nine questions representing adaptive coping (6) and maladaptive coping (3). These were based on the measurements and questions used by Gaudioso et al. (2017) to measure the mediating roles of strain facets and coping strategies in translating techno-stressors into adverse job outcomes. In order to have a balance between the two strategies there should have been six questions for each strategy (or more). The confounding variables are mainly control variables. As mentioned before, the essential control variables that are missing are education, personality traits, work experience, health, and environmental factors. The time constraint also played a vital role, the whole research including surveying was performed for one year which allowed us to collect only a limited amount of data.

Within the research a cross-sectional study has been conducted which defines we only gathered information from the Belgian IT consultants at a specific point in time which was from March until April 2023. This may have influenced the interpretation of the data that has been used to build our statements. A snapshot of the sample's characteristics, behaviours, or conditions at a specific point in time has been taken without taking any follow-up or consideration of changes over time. Conducting the same study in for example the winter months may change the output since those months are known for being the more stressful and darker months of the year.

Coping strategies have been proven in the literature that they reduce techno-stressors. Adding to that, techno-stressors have been proven to increase job burnout. Although we tested the impact of coping strategies thoroughly on the relationship between techno-stressors and job burnout, we did not come to the statistical conclusion that we expected. Coping strategies, both adaptive and maladaptive, did not impact techno-stressors and job burnout correctly. By that, we mean that it does not reduce techno-stress, or job burnout. This is a limitation in our research since it does not add evidence to the existing literature.

## **Future research**

For future research, more control variables can be used to see how they influence the relationship between technostress and burnout and how coping strategies are affected. This will allow us to draw more narrowed-down conclusions to see by which type of people the relationships are impacted (in)directly. Adding more control variables also allows you to define more details about who is experiencing burnout and technostress which can help you to tackle the cases more effectively. Additionally, a larger sample can be used which will allow you to generalize the results and conclusions. Based on the results and conclusions of this study, future research can investigate which specific actions can be taken to address the critical points of the relationships, for example investigating which are the best actions taken to tackle work-exhaustion, which is the most critical component of burnout. Same for coping strategies, investigating which specific active coping options can be used to reduce technostress and burnout. Next, perform the same study but in a longitudinal context to explore the relationships between burnout, technostress, coping strategies, and age over a larger amount of time in combination with capturing changes in the

variables that come with it. In that way, future research can study the causal mechanisms behind burnout, technostress, and coping strategies. A Cross-Cultural version of this study can also be conducted in order to explore how the findings may differ across other sectors and/or countries since this study is performed in one Belgian IT company.

The findings of this study did not prove what we expected deriving from the literature, namely that (mal)adaptive coping strategies and age would impact and reduce or increase technostress and burnout. That means that coping strategies are not the ideal solution to deal with technostress and burnout. In future research, it may be feasible to investigate this on a larger sample to see if it has the expected impact we thought it would have. Additionally, there may be other variables that are influencing coping strategies, for example, professional and environmental factors, which have not been taken into consideration in this study. It may be feasible to investigate those professional and environmental factors more since they have a direct impact on the relationships between coping strategies, technostress, and burnout. The sample's personality and private life are also not taken into account in this study. There may be respondents that are influenced by their bad work-life balance or are going through rough times in their private life which will also impact their professional career. According to the respondents' personalities, nothing has been measured, for example, the impact of education background which can impact the way of dealing with technostress and burnout based on the knowledge they obtained during their education.

## **Recommendations**

Employers can take specific actions when it comes to techno-stressors. Technostress has been proven to increase job burnout which implies that technostress is one of the elements that add to the job burnout challenge organizations are encountering. Coping strategies did not prove in this study that it impacts technostress and job burnout although literature confirmed that it does. Based on the literature we would recommend organizations to mainly focus on training their employees to minimize the use of maladaptive coping strategies before they start training the adaptive coping strategies. Maladaptive coping strategies are also a way of coping with stress, but they are detrimental to job burnout. That is why the focus has to lie on reducing the use of maladaptive coping before training employees to use adaptive coping. Additionally, professional, and environmental factors (e.g., centralization of power, task complexity) are important antecedents of technostress. Organizations can try to change these factors in a way that they decrease technostress and therefore also job burnout. Also, gender is an important antecedent of technostress, in our findings gender did not have any statistically significant result but literature has proven that males develop more stress than females. It may be beneficial to focus on emphasizing technostress reduction with male employees rather than female employees if you want to reduce technostress within the company.

Age has been proven to be a crucial factor for technostress and job burnout. In the findings of this study that has been proven too. Age does affect job burnout, but not on technostress. If companies want to reduce job burnout by tackling technostress then it is feasible to look at other elements than age, for example, professional and environmental factors. But when job burnout

wants to be reduced, it is worth taking into account age. In our findings, age has a negative relationship with burnout which implies that older people encounter less job burnout than younger ones. Since age does not impact technostress according to our findings it may be interesting to focus on hiring older people. Of course, this is only applicable when you want to reduce job burnout in your company. This conclusion may be controversial because we are living in a digital era where the younger generation is more adapted to (new) technologies than the older generations. On the other hand, older employees have more experience which will help them in dealing with challenges such as job burnout. So, we recommend focusing on hiring individuals who are born in the digital era and who already have some experience. In that way, you combine the best of both worlds.

These recommendations are based on the findings of this study and the literature that has been used. Technostress is the main point of interest, that's why recommendations are merely based on technostress. If you want to reduce job burnout in general, we suggest diving deeper into job burnout literature since a lot of elements have an impact on job burnout. Deriving from this study we know that technostress is one of those factors and that it is worth minimizing technostress creators.

## **Conclusion**

Techno-stressors and job burnout have a significant relationship without a doubt. The literature and our findings have proven that. That means that neutralizing technostress with employees must be one of the objectives of both employer and employees. If technostress can be tackled then the risk of experiencing burnout will decrease which is beneficial for all parties involved in a work environment. There are several ways to decrease technostress and burnout, but it is important that you can cope with it. Workers will use adaptive and maladaptive coping strategies to cope with technostress and burnout.

Looking at the hypothesis testing, adaptive coping did impact techno-stressors but in the wrong direction. Our findings have proven that adaptive coping increased technostress. Maladaptive coping did not have an impact at all, although deriving from the literature it should increase technostress. Additionally, both coping strategies did not moderate the relationship between technostress and burnout. Since hypothesis 1 confirmed a relationship between technostress and job burnout and literature has proven that coping strategies reduce or increase technostress, the indirect impact of coping strategies on job burnout with technostress as a mediator was also evaluated. Adaptive coping had an indirect effect on job burnout through techno-stressors that was statistically significant but since it was a positive impact it did not answer the expected result of reducing job burnout. Maladaptive coping had no impact at all on job burnout through the technostress mediation.

The relationship between age and technostress has been inconsistent in the literature. In the present study, there was no significant effect of age on technostress. Furthermore, the interaction

between age and technostress was not statistically significant which means that age will not impact the direction or strength of technostress related to job burnout.

To conclude, this study has proven that there is a positive impact of technostress on job burnout, that adaptive coping strategies do impact technostress positively, and that maladaptive coping strategies do not impact techno-stressors at all. Age does not impact techno-stressors and it is no moderator in the relationship between technostress and job burnout although it does impact job burnout directly. Since there is an explicit positive relation between technostress and job burnout it is essential to tackle technostress creators. Additionally, there is no clear effect of coping strategies or age on technostress which indicates that the focus to address technostress must be sought elsewhere.

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# Appendix

## Questionnaire

Questionnaire thesis 2023 Techno-stressors English

Dear,

As part of a master's thesis at Hasselt University, we are conducting a study on the impact of work-related techno-stressors on your mental health and how you cope with them.

What is technostress? Technostress is experiencing stress through the use of digital communication tools, such as computers, tablets, and smartphones. It is a modern illness experienced by workers when they feel unable to adapt to new computer technologies in a healthy way.

This survey will help us find the necessary answers to whether techno-stressors are impacting your work and personal life.

The survey is completely anonymous, and the answers will be used for scientific purposes only, completing the survey will take a +/- 10 minutes

Thank you in advance for your time and effort.

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**Q1:** Gender (man, woman, X)

**Q2:** Age (open text field)

**Q3:** Marital status (Single, Married, Divorced, Separated, Widowed, Never married, Don't want to share)

**Q4 Technostress:** *The following statements relate to the stress experienced through technology use. Please indicate the answer you are most related to. The term "this technology" refers to the daily computer-based applications you use during your job, such as e-mail, processing systems, database systems, and development tools.*

Answers ranging from 1 to 5 (Completely disagree = 1, Disagree = 2, Neither agree nor disagree = 3, Agree = 4, Fully agree = 5)

- 1) I am forced by this technology to work much faster
- 2) I am forced by this technology to do more than I can handle
- 3) I am forced by this technology to work with very tight time schedules
- 4) I am forced to change my work habits to adapt to new technologies
- 5) I have a higher workload because of increased technology complexity
- 6) I spend less time with my family
- 7) I have to be in touch with my work even during my vacation due to this technology
- 8) I have to sacrifice my vacation and weekend time to keep current on new technologies
- 9) I feel my personal life is being invaded by this technology

- 10) I do not know enough about this technology to handle my job satisfactory
- 11) I need a long time to understand and use new technologies
- 12) I do not find enough time to study and upgrade my technology skills
- 13) I find new recruits to this organization know more about computer technology
- 14) I often find it too complex for me to understand and use new technologies
- 15) I feel constant threat to my job security due to new technologies
- 16) I have to constantly update my skills to avoid being replaced
- 17) I am threatened by coworkers with newer technology skills
- 18) I do not share my knowledge with my coworkers for fear of being replaced
- 19) I feel there is less sharing of knowledge among coworkers for fear of being replaced
- 20) There are always new developments in the technologies we use in our organization
- 21) There are constant changes in computer software in our organization
- 22) There are constant changes in computer hardware in our organization
- 23) There are frequent upgrades in computer networks in our organization

**Q5 Burnout:** *The following statements are related to your work situation and how you experience this situation. Please state how often each statement applies to you.*

Answers ranging from 1 to 5 (Never= 1, Rarely = 2, Sometimes = 3, Often = 4, Always= 5)

- 1) At work, I feel mentally exhausted
- 2) After a day at work, I find it hard to recover my energy
- 3) At work, I feel physically exhausted
- 4) I struggle to find any enthusiasm for my work
- 5) I feel a strong aversion towards my job
- 6) I'm cynical about what my work means to others
- 7) At work, I have trouble staying focused
- 8) When I'm working, I have trouble concentrating
- 9) I make mistakes in my work because I have my mind on other things
- 10) At work, I feel unable to control my emotions
- 11) I do not recognize myself in the way I react emotionally at work
- 12) At work I may overreact unintentionally

**Q6 Coping strategies:** *The following statements relate to how you deal with technostress. Please always indicate the answer you agree with the most. What is technostress? Technostress is experiencing stress through the use of digital communication devices, such as computers, tablets and smartphones. It is a modern illness experienced by workers when they feel unable to adapt to new computer technologies in a healthy way.*

Answers ranging from 1 to 5 (Completely disagree = 1, Disagree = 2, Neither agree nor disagree = 3, Agree = 4, Fully agree = 5)

- 1) I have been concentrating my efforts on doing something about the stressful technologies
- 2) I have been taking action to try to make the stressful technologies situation better
- 3) I have been getting help and instrumental support from other people regarding dealing with stressful technologies
- 4) I have been trying to get instrumental support or help from other people about what to do regarding stressful technologies
- 5) I have been trying to come up with a strategy about what to do regarding stressful technologies

- 6) I have been thinking hard about what steps to take regarding stressful technologies
  - 7) I have been refusing to believe that this technology mess has happened
  - 8) I have been giving up trying to deal with technology-related stress
  - 9) I have been giving up the attempt to cope with technology-related stress
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