BACHELOR THESIS

Zen and the smartphone

How an increasingly connected world affects IT-professionals' experiences of technostress

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Preamble & Acknowledgements

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Preamble

> ‘‘Nothing has such power to broaden the mind as the ability to investigate systematically and truly all that comes under thy observation in life.’’
>
> **-- Marcus Aurelius**

To approach life with a scientific mind, and to strive always towards a better understanding of this world and of the wonders of the universe, that is the duty of all people. In this, we chip away at a mountain of ignorance, until all that remains are pebbles and dust.

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Abstract

Mobile computing, on the current scale, is a relatively new concept and it is unclear how it affects the balance between work time and spare time. Burnout itself is a known and well-studied concept, and science is aware of the concept “technostress”, but little has been done by way of studying how they interact and how use of mobile ICT affects them. Burnout has a high organizational and individual cost, and we do well to better understand how to reduce and prevent it.

In this thesis work, we have surveyed IT-professionals and asked questions about their work habits, their separation between work time and spare time, and their experiences of burnout indicators. We have attempted a multifaceted study in order for us to understand how various factors are correlated with work habits and burnout.

To understand burnout and technostress, we have primarily relied on the works by Maslach et al. (1996) and Ragu-Nathan et al. (2008), respectively. Their works have informed our fact-finding process and helped create a lens through which to understand our results.

Our results indicate that burnout and technostress are correlated to use of mobile ICT, but not overly so. We have also found that individual differences are correlated with the level of burnout experienced; age positively correlated, education and general computer knowledge negatively correlated, and women experiencing more burnout than men do.

Keywords: Maslach Burnout Inventory, Work-life Balance, Technostress, Information- and communication technologies, Mobile ICT, Employees work habits

Sammanfattning

Mobil datoranvändning, på nuvarande skala, är ett relativt nytt koncept och det är oklart hur det påverkar balansen mellan arbetstid och fritid. Utbrändhet i sig själv är ett känt och välstuderat koncept och vetenskapen är bekant med konceptet “teknostress”, men få studier har genomförts för att undersöka hur de interagerar med, och hur de påverkas av mobil IKT. Utbrändhet har höga organisatoriska och individuella kostnader och det vore oss väl att bättre förstå hur man kan reducera och förhindra det.

I denna C-uppsats har vi undersökt anställda inom IT-branschen och ställt dem frågor om deras arbetsvanor, deras separation mellan arbetstid och fritid, och vilka utbrändhetsindikatorer de upplever. Vi har försökt genomföra en mångfacetterad studie för att förstå hur ett flertal faktorer är korrelerade med arbetsvanor och utbrändhet.

För att förstå utbrändhet och teknostress har vi primärt förlitat oss på arbeten av Maslach et al. (1996) och Ragu-Nathan et al. (2008), respektive. Deras arbeten har informerat vårt sökande efter fakta och hjälpt oss skapa en lins genom vilken vi kan studera våra resultat.

Våra resultat indikerar att utbrändhet och teknostress är korrelerade med användande av mobil IKT, men att korrelationen är svag. Vi har även funnit att individuella skillnader är korrelerade med upplevd utbrändhet: ålder positivt korrelerad, utbildning och generell datorvanor negativt korrelerad, och att kvinnor upplever mer utbrändhet än män.

Nyckelord: Maslach Burnout Inventory, Work-life Balance, Teknostress, Informations- och Kommunikationsteknologier, Mobil IKT, Employee work habits

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1 Introduction

Smart phones and tablets have relatively recently been made available to the public at large, and they have begun to invade the workplace en masse. However, there is reason to believe that this invasion has not only been a force for good, and that the new work flows and the increased pressures of availability and connectivity have had a human cost.

This thesis will examine some of these hidden costs by asking IT-professionals to answer questionnaires designed to quantify their use of mobile computing and correlate it to their experiences in stress and burnout indicators. For the purpose of this study, we have defined IT-professionals as consultants, system designers or administrators, developers or IT-managers.

1.1 Nomenclature

As with most research, there are some domain-specific words or phrases that need further explanation. There are also words that already have a general meaning that have been appropriated to describe more specific phenomena. This section will attempt to briefly explain these concepts.

Table 1 - Nomenclature

Agency	The capacity, condition, or state of acting or of exerting power (or control).
Burnout	A state of physical, mental or emotional exhaustion. (See subsection Burnout for more information).
Information and Communication Technology (ICT)	A collection of technologies, hardware as well as software, that enable, facilitate or simplify the act if transferring information or communicating.
Maslach Burnout Inventory	A formal method of measuring and detecting burnout indicators in a population
Mobile ICT	Technologies covered under ICT, but also portable and wireless and may be used “on the go”. More specifically, tablets and smart phones.
Stress	The negative effects (i.e., distress) of stress responses
Stressor	Stressful stimuli as experienced by an individual
Technostress	Stress or burnout in response to use of, or demands by, technology.

2 Background problem

The use of mobile ICT is a very recent trend and has yet to be the subject of exhaustive studies. While smart phone-like products have existed since early to mid-1990ies[1], it was not until the release of the Android operating system and the 2nd generation iPhone in 2008 that the smart phone revolution began in earnest. Similarly, while tablet computers have been available since the late 1990ies, it was not until 2010, when the so called Post-PC tablets were launched that the tablet truly entered the mainstream.

As this revolution is so relatively new, even from a computing standpoint, it presents us with a unique opportunity to study early attitudes and stress-responses to a new way of working. With the advent of the smart phone and the tablet, and the rapid increase in availability of cheap and fast mobile Internet, mobile ICT has exploded in recent time. Only 5-10 years ago, *being connected* was something that happened at work or at home, whereas these days it is entirely possible (and sometimes expected) to be connected almost everywhere.

Lindström (2003) argues that mobile ICT is one of the best tools to promote a more efficient workplace, and that it supports the economy, the environment and the general welfare significantly. Reasonable use of mobile ICT may promote a reduction in perceived stress. However, too much use may lead to technostress, as IT-professionals feel a need to constantly be connected and available, and end up working too much as a consequence.

Increase in mobile ICT use is not something that is unequivocally good or bad; while it may increase specific workers' agency in their workplace by allowing them greater control of when and where they do their work, it is also a portal through which the work-life may invade even their most private moments.

This has the potential to create positive and negative outcomes, entirely depending on how an individual chooses to act. Crooker, et al. (2002) argues that increased complexity may have a negative impact on how an individual experiences their work-life balance. A users approach and attitudes towards mobile ICT may be a source of increased complexity, and thus something in need of further study.

Due to its relatively recent emergence, there is a substantial knowledge gap with regard to how this affects the multidimensional business sphere. There are several dimensions that must be taken into consideration: how the business views mobile ICT, how it affects employee productivity and morale, how it blurs the division between work time and private time, etc. There is a wealth of knowledge to be gleaned from this trend, not only from a technological standpoint, but also knowledge about how it affects people on a more human level.

This makes it a rich subject for study, but also presents a need to find a way to accurately quantify and study the impact of smart phone and tablet technology. The richness also means that there is a need to strictly delimit the intended area of research and to be careful not to stray beyond the scope of the thesis.

[1] http://en.wikipedia.org/wiki/Smart_phone#Early_years

3 Purpose & Research Topic

This section will further explain why performing the proposed study is worthwhile, and will go on to explain what we intend to study and how. The why, what and how will also be described further as the report progresses.

3.1 Purpose

The purpose of this study is to collect quantitative data on the habits and attitudes in the target population. Using this data, it is our intent to establish what, if any, correlation there is between use of mobile ICT and experiences of stress and burnout indicators, or vice versa.

We will only set out to identify whether or not a correlation exists, we will not propose any solutions or changes. We hope that our initial work may indicate whether or not such problems exist and that we may be able to recommend further research.

3.2 Research Topic

Thus, our topic of research can be summarized with "What correlation can be found between use of mobile ICT and experiences of burnout in Swedish IT-professionals?" Burnout, as defined by the theoretical basis for this study, encompasses experiences of stress but also deals with workload, workplace satisfaction and other aspects. It is a much broader question than simply focusing on stress, and without straying from the purpose, allows us a multidimensional view of how mobile computing affects IT-professionals.

We have chosen to rely on Maslach, Jackson, & Leiter's (1996) definition of burnout, as it encompasses a broader spectrum of experiences than what is defined in the tenth revision of the global International Statistical Classification of Diseases and Related Health Problems (WHO, 2008), or its Swedish counterpart, ICD-10-SE (Socialstyrelsen, 2010). We feel that it is important to highlight increases in burnout indicators even in situations where the person is not so burned out that they are unable to function.

Furthermore, to better inform us on how use of mobile ICT may affect stress, we have chosen to study Ragu-Nathan, Monideepa, & Ragu-Nathan's (2008) ideas on technostress. We have taken a particlar interest in how individual variances may come in play and affect experiences of burnout indicators.

This topic requires us to gather a wealth of information about what is presently known about stress and ICT and to examine how it relates to technostress and burnout. It is of great interest to examine and attempt to understand whatever links we may find, as the use of ICT at work is not something that is merely a passing fad, but something that will dominate the work landscape for the rest of the future.

3.3 Delimitation

The delimitation of a thesis is an important tool to make sure that the focus is narrow enough to study the subject with sufficient **depth** and to avoid digressing to topics that are tangentially relevant to, but not of interest, the actual research topic. It assures both that the final report remains cohesive and that the conclusions directly answer the proposed problem.

This study will be delimited within several scopes: temporally, geographically as well as contextually. These delimitations will make sure that the scope is narrow enough for the intended research goal, as well as for the overarching goals of a thesis of this magnitude.

The temporal limitation is present time, which is simply due to the time constraints inherent in the semester long course; there is not enough time to perform a meaningful longitudinal study.

Geographically, we have decided to limit ourselves to Sweden. The reason for this choice is twofold:

1. We do not have to translate our questionnaire to other languages and risk language confusion.
2. A culturally homogenous pool of respondents increases cohesion of response variance.

Finally, contextually, our delimitation is IT-professionals, which is another to method to reach individuals with reasonably similar personalities and thus increase the chance that any correlations found are due to actual correlations and not due to differences in demographics.

While the underlying theoretical framework is applicable to various types of ICT, our questionnaire and subsequent analysis thereof will be limited to our definition of mobile ICT.

4 Theory

The theoretical foundation is what any scientific undertaking rests on, and it will permeate the entire work from start to finish. Without a solid theoretical understanding, it will be very hard to conduct research that meets the basic standards of scientific rigor. The theory informs our world view and shapes our observation of a given problem, and is of utmost importance when we wish to understand what we see.

4.1 Mobile ICT

Today's IT-professionals have to deal with a constant flow of information, from internal as well as external sources. It stems from mobile communication tools, such as laptops, smart phones and tablets (Ragu-Nathan et al., 2008). Mobile communication tools are part of the larger concept Information and Communication Technology, which refers to technologies that facilitate and enable the transmission information (Çoklar & Şahin, 2011). However, this study will be limited to the effects of the use of smart phones and tablet and will not touch on the broader effects of all use of ICT.

4.2 Stress

Nationalencyklopedin defines stress as a reaction to physical or emotional trials (also known as stressors), that endanger people's well-being[2]. Though, one should remember that stress is a multifaceted concept and when people colloquially talk about stress, they generally refer to *distress*, which is stress that negatively affects an individual.

Pastorino and Doyle-Portillo (2009) note that stressors in and of themselves are harmless, and that the individual's perception of how well they are able to cope with these stressors is what eventually controls the stress response. Generally speaking, the less control an individual has over a situation, the more likely they are to respond with feelings of anxiety or of being overwhelmed.

These stressors may be an increased workload, increased responsibility, decrease in "downtime" or other secondary factors, unrelated to the person's work situation. Holmes & Rahe (1967) listed several events and their relative stressfulness in the Social Readjustment Rating Scale. The scale rates, on a scale of 0 to 100, a variety of events.

Among those, some are relevant for this study: Business readjustment (39), Change in responsibilities at work (29), Trouble with boss (23), and Change in work hours and conditions (20). While they are relatively low on the scale (in comparison, Divorce is rated at 73), the factors are additive and their combined effect may severely affect an individual.

However, as psychologists have discovered, there is another side to stress: *eustress*. Eustress is considered "good" stress, and while the physiological reactions are somewhat similar (i.e., activation of the sympathetic nervous system and increased arousal), eustress leads to increased efficiency and a feeling of well-being (Seyle, 1975), as modeled by the Yerkes-Dodson law (Yerkes & Dodson, 1908). Even so, once a person has reached or passed peak performance, any further arousal will only serve to diminish performance.

It is then not entirely inconceivable that use of mobile technology may increase both distress and eustress; this study will focus on the distress part, but will make sure to take eustress into account.

[2] http://www.ne.se/lang/stress

4.2.1.1 Transaction-based model of stress

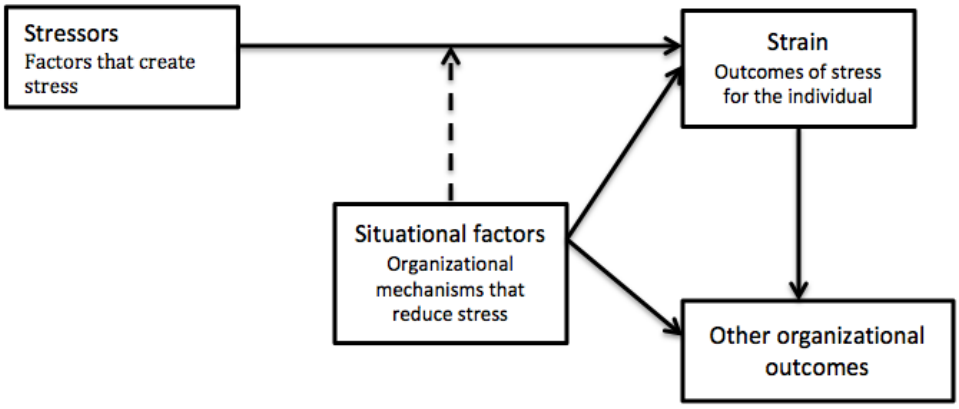

Figure 1 - Transaction-based model of stress

Ragu-Nathan et al. (2008) have created a model that involves understanding of the theoretical perspective of stress. The main components of the model are stressors, situational factors, strain and other organizational outcomes.

As previously mentioned, stressors are factors or conditions that create stress. Strains represent the outcome of the stress, which can have psychological, behavioral or somatic characteristics. The relationship between stressors and strains is affected by situational variables, which are the organizational mechanisms that may reduce the degree of stress experienced (Ragu-Nathan et al, 2008; Tarafdar et al., 2011).

Dealing with stress in the organization is a twofold problem; both the organization and the employee have methods of dealing. In reference to individuals, it is common to talk about coping mechanisms, which Dewe, Cox and Ferguson (1993) defined as "cognitions and behaviors adopted by the individual following the recognition of a stressful encounter, that are in some ways designed to deal with that encounter or its consequences" (p. 7).

In accordance to the transactional model of stress (Lazarus & Folkeman, 1984; Ragu-Nathan et al., 2008), there are 4 main components in coping:

1. Perceiving the threat
2. Identifying possible coping strategies
3. Implementing chosen strategy
4. Evaluation of strategy efficacy

Steps 1 and 2 identify what, if any, impact the event might have, and what can be done to mitigate the effects.

Strategies fall within two broad categories, problem or emotional focused behaviors. Problem focused behaviors aim to remove or nullify the stressor, whereas emotional focus relies in minimizing the emotional effects of the stressor. The success-rate of either strategy is heavily reliant on the kind of stressor it is used to counter (O'Driscoll & Cooper, 2002).

Organizational stress management can be applied on organizational or individual basis, and in varying levels. Murphy (1988) has identified three levels of stress intervention:

1. Stressor reduction
2. Individual help with coping with stressors
3. Support for people already suffering from burnout or persistent strain

There are several ways to go about applying interventions in all layers, and the section on burnout explains in detail what organizational factors may contribute to burnout. In particular, reducing workload and role ambiguity seems to have noticeable effect, while the efficacy of secondary approaches is ambiguous at best (O'Driscoll & Cooper, 2002).

4.3 Burnout

On occasion, prolonged stress or emotionally demanding situations may result in a "state of physical, emotional, and mental exhaustion" (Harrison, 1999, p. 25). While scholars have created well over 30 different definitions of burnout, Christina Maslach and Michael Leiter's definition have gained the most traction (Friberg, 2006). Maslach et al. (1996) classified burnout as being a confluence of three core components: emotional exhaustion, depersonalization and personal accomplishments. These factors collaborate to create a state of burnout.

- Emotional exhaustion refers to a feeling of being emotionally drained and a general feeling of malaise and fatigue.
- Secondly, depersonalization is a phenomenon that causes an individual to lose sight of the humanity of people around them.
- Personal accomplishments reflect feelings of personal competence and faltering here may cause an individual to evaluate themselves negatively and to doubt their accomplishments. (Ghorpade et al., 2007)

Burnout itself is measured in three dimensions: exhaustion, cynicism and inefficacy, and stands antithetical to engagement (energy, involvement and efficacy). It will present with problematic psychological phenomena, such as depression or generalized anxiety disorder. (Maslach et al., 1996)

Burnout presents not only with psychological symptoms, but with organizational and psychosomatic symptoms as well; not only will a person suffering from burnout experience a decrease in job function, but will also experience an increase in stress hormones. This, in turn, will put the individual at greater risk for diseases of the heart or the circulatory system (ibid.).

Maslach et al. (1996) argue that burnout should not be seen as a discrete state of being, but rather as a continuum of experience. Broadly speaking, there are six domains that predict burnout in the work force: too much work, too little control, insufficient rewards, lack of/breakdown in community, lack of fairness and conflicting values. Primarily, we see the risk that mobile computing may negatively affect how much work a person has to perform, as well as having a negative effect on the person's amount of control and sense of being rewarded.

Arguing about the causality of the domains and burnout itself, Maslach and Leiter (1997) expand on the three primary domains, and explain in greater detail:

4.3.1 Work overload

Every professional will have some level of workload; it is inevitable in organizational life. However, one must strike a balance between the need for productivity (workload as seen from the organization) and time & energy (workload as seen from the individual), as there is a risk that an individual may find themselves pushed beyond a sustainable workload.

"Work smarter, not harder" is an old adage often touted in businesses, but sometimes it means that fewer people will have to handle more work. This may seem "smarter" from the organization's viewpoint, for the people involved, it may seem like working longer and harder. The idea here, as with extensive use of mobile computing, is to work more efficiently with better workflows, less busy work and enable a smaller workforce to attain the same results with equal or less actual work performed.

Maslach and Leiter (1997) however argue that this is rarely the case, and that instead increased productivity is attained by employees working harder and longer hours. This, in turn, often means that it is harder to find any sort of relief at work; each new demand comes before the last has passed and there is no time to power down. People can resist this pressure only for so long, eventually the exhaustion will build up and lead to burnout.

This was a problem well before the advent of mobile computing, but mobile computing adds a different dimension to the concept of work overload. There is the upside, when previously wasted time (e.g., waiting for a train/flight, or travel) can be used to perform work that would otherwise eat into one's private time. There is also a downside, that the expectation of continuous and perpetual connectivity blurs the lines of work and private life and leaves one with a feeling of always being at work.

4.3.2 Lack of control

Control, in the traditional sense, refers to the ability to set one's own agenda, to select priorities and to make decisions about resource allocation. Things that interfere with this ability, be they policies or anything else, often serve to reduce an individual's work involvement. This feeling of lack of autonomy spreads and creates a sense that the employees lack control over important factors and inhibits their ability to address issues as they see fit. This in turn may lead to a feeling that time is being wasted and the employees are unable to effect change.

Though, as Maslach and Leiter (1997) points out, nobody has complete control in an organization, not even the CEO. Despite being able to assert more control than most, they are still only able to control small parts of the organization. This is due to shared control, or collaborative control, which emerges when several people, all with different motives and goals, are forced to work together towards a common goal. They may each have different ideas of how control should be asserted and these clashes will always reduce the amount of control any one person may assert. Maslasch and Leiter (1997) thus seem to ask the hypothetical question: if not even the CEO of an organization is able to assert enough control to stave off burnout, what chance would a low-rung employee stand?

Furthermore, the challenges and obstacles in working life may be unpredictable and appear without warning. These kinds of factors are inherently outside of anyone's control, though that is not necessarily a bad thing. Complete control of a task is only possible if the task is so trivial that it becomes boring and uninteresting. Thus, there is a need to balance control with unpredictability, one step too far in either direction will directly hurt productivity (ibid.).

From the viewpoint of this study, however, control (and lack thereof) takes on a different dimension; it is the constant connectivity that presents a balancing act between being controlled or being in control. We believe that it is not a stretch to see how mobile computing may present an opportunity for personnel to work in a more free manner, i.e., they may chose to move work outside of normal work hours and outside of the normal workplace. Where unforeseen consequences may previously have forced an employee to work late in the office to catch up, mobile computing allows them to perform the same work in their homes, perhaps over a weekend.

This represents an increase in control and a higher quality of life through better response to change, but that is not the only effect mobile computing may have on control. It is also entirely possible that employees feel that they are required to be constantly connected and that they dare never leave their smart phones behind or simply disconnect from work. As such, they may feel that they are never quite allowed rest or recreation and that they never feel like they get to "power down".

4.3.3 Insufficient reward

Everyone wants to be rewarded commensurate to their performance, but not all organizations are willing or capable of doing so. While people hope that their efforts will be rewarded with monetary compensation or recognition, this is not always the case. A lack of extrinsic motivation means that intrinsic motivators may also suffer, and their combined effects are significant contributors to incidences of burnout (Maslach & Leiter, 1997).

When the economy is slumping, as it is prone to do from time to time, employees are sometimes denied raises or even asked to accept pay cuts. The specter of outsourcing looms as a threat, and "forces" employees to yield in salary negotiations. Corporations use the guise of economic doom and gloom to shift some of their costs onto their employees, and severely disrupt their sense of being appropriately rewarded.

The trifecta of reduction in rewards, increase in workload and an inability to easily look for better work has a very powerful effect on employee burnout, as it forces them to remain in jobs with insufficient rewards. Even if the rewards stay the same, the effect of inflation and tax increases results in a net loss in reward.

Simultaneously, another aspect of work reward is diminished: career advancement. Fewer people are expected to perform the same out of work as before, as well as the tasks of the downsized former colleagues. So, not only is there no room for advancement as it is, but the people who do have jobs are unwilling to risk the uncertainty of the job market and cling on to their position (ibid).

In Maslach and Leiter's (1997) view, most severe of all is the damage done to intrinsic motivators; people who are good at their jobs find that doing the job is its own reward. Complex and challenging situations (as seen in the previous segment, Lack of control) are not treated as obstacles but more like technological puzzles that are both stimulating and interesting to solve. There is no reward that is more motivating that this mindset and the loss thereof is catastrophic in the long run.

Oftentimes, it seems to us, that the reward for work well done is more work. That is the tip of the iceberg of the confluence of these three factors. If a person is feeling overwhelmed due to work overload, and in response gives up some of their control to work during their off-time, and the organization's response is to simply hand out more work, it is not hard to understand just how adversely this may affect productivity and work satisfaction.

However, it should be noted, as by Frederick Herzberg (1968), that money is not the only reward and that it is in fact a rather poor reward mechanism. Instead, he identified that achievement and recognition are significantly more important as a motivator. Thus, it is suggested that one attempts to find a reward system that works by highlighting workers as individuals and give them recognition for their contribution.

4.3.4 Gender

The Swedish Social Security Administration (2012) reported, that out of the 13 896 people on sick leave for "Neurotic, stress-related or somatic syndrome" in the last quarter of 2005, 10 202 (73 % were women). As such, it is reasonable to expect a measurable difference in burnout between men and women.

However, one should take note that "Neurotic, stress-related and somatic syndrome" is an umbrella phrase that covers far more than just stress and burnout, and it is likely not to be as pronounced as the national statistics indicate.

It has been noted that neuroticism is highly correlated with burnout and that women on average score higher than men on neuroticism, so the assumption remains valid (Müller & Schwieren, 2011).

4.4 Technostress

The computerization and contribute to a development of technostress have affected the individuals' personality, behavior and relationships (Brod, 1988; Çoklar & Şahin, 2011). According to Weil and Rosen (1997), technostress is a subset of normal stress as experienced by people. It has been shown to be a contributing factor in incidences of burnout and job dissatisfaction (ibid; Ragu-Nathan et al., 2008). Technostress and ICT are correlated when there is an increased reliance on ICT and the resulting change in work environment and culture (Ragu-Nathan et al., 2008).

4.4.1 Conceptual model for understanding technostress

The following model was created by Ragu-Nathan et al. (2008) to briefly explain some of the relevant factors in incidences of technostress. It is based on the same model as shown in figure 1 and it visualizes how inhibitors and activators interact and balance the experience of technostress.

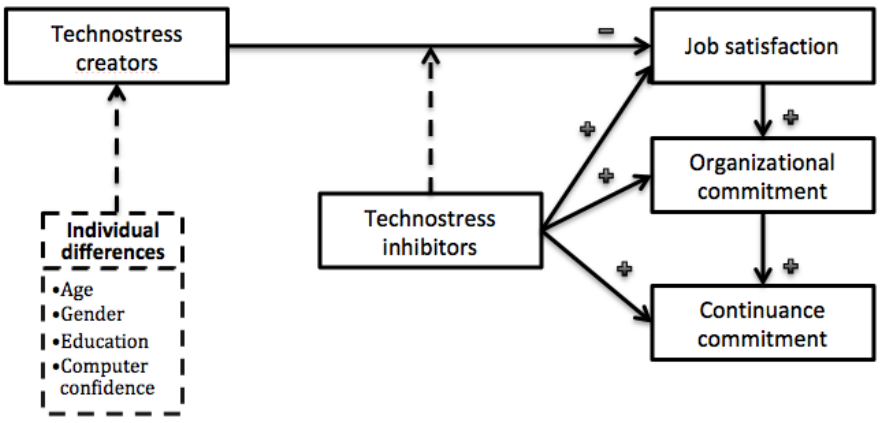

Figure 2 - Conceptual model for understanding technostress

Technostress creators are factors that serve as the initial trigger and may continually work as activators. Technostress is strongly influenced by the users' perception of their computer experience, but also by factors such as age, gender, level of education and computer confidence. Conversely, factors such as job satisfaction may serve as inhibitors and counter the level of experienced technostress (ibid.).

Ragu-Nathan et al. (2008) argue that there are several technostress creators that stem from the use of ICT: Constant connectivity, constant information flow, competitive pressures, rapid change and

multitasking. These result in the five conditions: techno-overload, techno-invasion, techno-complexity, techno-insecurity and techno-uncertainty, that work together to cause technostress.

- Techno-overload means that the ICT users constantly work more efficiently and that the pace increases.
- Techno-invasion describes how technology pervades the users' lives through constant connectivity and how the line between personal and work-life blur.
- Techno-complexity describes how the user is forced to spend time and energy on learning to use ICT to perform their work.
- Techno-insecurity manifests in the perceived threat of losing one's job, if one does not stay at the top of one's game with regard to the use of ICT.
- Techno-uncertainty means that the user is concerned about keeping up with learning about the new changes and upgrades in ICT (Tarafdar et al., 2011).

Table 2 - Common stressors in technostress

Stressor category	Possible stressors

Characteristics of job	• Physical
	  ○ Noise
	  ○ Temperature
	  ○ Vibration
	• Task related
	  ○ Work overload
	  ○ Work hours
	  ○ Exposure to risks and hazards

Role characteristics	• Role ambiguity • Role conflict • Role overload
Relationships within organization	• Interpersonal relationships • Leadership style
Career issues	• Job insecurity • Career advancement
Organizational factors	• Climate • Structure
Work-home interface	• Work-home conflict
Invasion of privacy	• Invasion of privacy

Much like in the study where the previous table originated, we will also be forced to assess what factors are most interesting and most relevant to our area of research. Ayyagari et al. (2011) chose to disregard factors focused solely on the organization, and so will we. We will also put very little emphasis on career issues and mainly focus on the right now and seek answers to questions about the present.

More interesting than most, will be the work-home interface, as conflicts in the work-home gap can easily make it abundantly clear whether or not a person's connectivity has reached the point where it is, or has started to become, harmful to their private life.

Obviously, understanding how ICT affects task related job characteristics, in particular with regards to work overload and work hours will be of great interest to us, and will allow us to correlate exces-

sive use of ICT to incidences of stress and burnout. However, we must be careful to acknowledge that there are other sources of stress than ICT, and to account for them properly.

Other sources, like Çoklar and Şahin (2011) and Tarafdar et al. (2011), talk about similar factors. These factors form a basic understanding in how technostress is induced and how it affects IT-professionals.

Ayyagari et al. (2011) state that it may be tempting to have employees adopt as much ICT as they possibly can, and to have employees be available 24/7, even when they are strictly speaking not working. However, as seen in this article and others, there are risks associated with demanding constant connectivity and e-presence.

They muse over the colloquialism "CrackBerry" to describe BlackBerries, and how it is indicative of how some people become "hooked" on certain types of ICT and the uninterrupted access to electronic communication. They also observe that while this phenomenon was initially limited to the use of BlackBerries, the increased availability of smart phones will only increase the incidence rate.

While this area has not been extensively studied, the studies that have been performed have linked technostress with lower productivity and job satisfaction, as well as a decrease in organizational commitment (Ragu-Nathan et al. 2008; Tarafdar et al. 2007). However, due to the lack of research, it is hard to pinpoint exactly what it is about technology that causes stress. One has to be aware that while the use of ICT in and of itself may be a stress factor, stress can also be affected by the new workflows created by an increase in ICT availability.

There is also another consideration to keep in mind, and a distinction that must be made. While IT-professionals are certain to experience stress and ICT may be a source of stress, not all stress is because of, or even related to the use of ICT. When we attempt to examine ICT's role in stress and burnout, we have to make sure to tailor our research to take into account the expected, baseline, level of stress.

People who are techno-centric have a tendency to adopt a machine-like approach to ICT. They wish to streamline their work with ICT, but the end result is often a loss in creativity and that they are less mindful of the work they do perform (Brod, 2008).

4.5 Employees work habits

Porter (2004) argues that while some employees readily accept an increased workload, it should not necessarily be seen as the ideal, not for the individual nor for the organization. However, understanding the how and the why of employees' responses to an increase in workload is imperative. Some people feel compelled to work to excess, but it may have detrimental effects to the employee and to the working environment.

In 1992, Juliet Schor observed that the average American worker, if present trend would continue, would spend as much time in the workplace as they did in 1920. She also noted that although there is an impetus to work smarter and more efficiently, American companies still put large emphasis on the time investment of the work force. This means that while advances may result in work being done more quickly, the reward is most often more work, and fosters the idea that fewer people can perform the same amount of work.

Schor (1992) and Ciulla (2000) were both concerned with the same issue, that work has had a tendency to creep into all aspects of a person's life; where a person might have previously felt validated

in their family, friends or leisure-time activities, they now identify with their job. Their status on the market, and as consumers, becomes the whole of who they are and either being overworked or unemployed becomes dangerous threats to their sense of self. Work becomes such an integral part of one's own identity, that loss of work equals a loss of self.

The end result is an endless churning machine of capitalistic supply and demand, where people work increasingly harder and harder in a desperate attempt to clutch onto what precious little they have managed to eke out for the future. With marketplace volatility as a very real and threatening specter, they feel obliged to work more, work harder and work longer in an effort to avoid getting left behind (Porter, 2004).

The increased reliance on technology is further complicating the situation; moments that would have otherwise been natural downtime are now expected to be utilized fully. Desktops, laptops and handheld devices have escaped the work domain and infiltrated the private spheres, and with them came an expectation of constant availability (ibid.).

The mobile employees of today have a workplace that is flexible and the context is in constant flux. It is necessary to identify some factors that affect the mental workload in both performing and managing mobile, multi-locational work (Vartiainen & Hyrkkänen, 2010). Employees have moved their workplace, by working "on the move" with virtual technologies, from the office and into their homes.

There are four types of work spaces (ibid.):

- Physical space: The actual, concrete workplace, which in turn is divided into five categories.
    1. Home
    2. Main office
    3. Modes of transport
    4. Secondary workplaces
    5. Tertiary workplaces (hotels, cafés, etc.)
- Virtual space: An environment created by devices, communication tools, applications, etc.
- Social space: The social context in which physical networking takes place
- Mental space: Cognitive states & thoughts, beliefs and values that are either individual or shared

These kinds of spaces exist as a multidimensional continuum, and the mobile, multi-locational workers move fluently and transparently between them. They are a property of the nature of this kind of work and emanate naturally as a consequence thereof.

New ways to improve efficiency in a wide variety of tasks have led to an increase in workload and complexity. Employee well-being has been affected by this, and organizations have attempted to compensate by increasing flexibility through mobile work and attempting to encourage a balance between work and private life. In spite of this, intrusions into the various physical spaces have a noticeable effect on employee mentality (ibid.).

4.6 Summary

The connection between stress and burnout is fairly clear and well-known; stressed people are much more likely to suffer from burnout as many of the same factors that induce stress are known to induce burnout. Stress in and of itself it not necessarily enough to induce burnout, but it is an artifact of factors that do. In particular, stress can induce feelings of "there is never enough time to get everything done", which directly tie into the work overload factor of burnout.

Based on the theory, figure 3 was developed and adapted to fit our purpose and our study. The original model, figure 2, was created by Ragu-Nathan et al. (2008) to describe technostress. Using this

model the reader will be able to follow our line of thinking and understand the conceptual research model.

To recap, there are three primary domains to predicting burnout: work overload, lack of control and insufficient reward. There are direct links to the 5 conditions of technostress to these domains. There is a sufficient overlap to feel confident in that they are related and that technostress and indicators of burnout ought to coincide. The most obvious example is between work overload and techno-overload. The user feels that it is expected of him or her to use ICT and perform more and better work while at the same time utilizing fewer and less resources. Similarly, techno-invasion may adversely affect work overload; by allowing ICT to blur the work-life divide it may become harder for the users to ever feel like they are allowed to power down. This affects the sense of control they have over their life, but also adds to existing work overload.

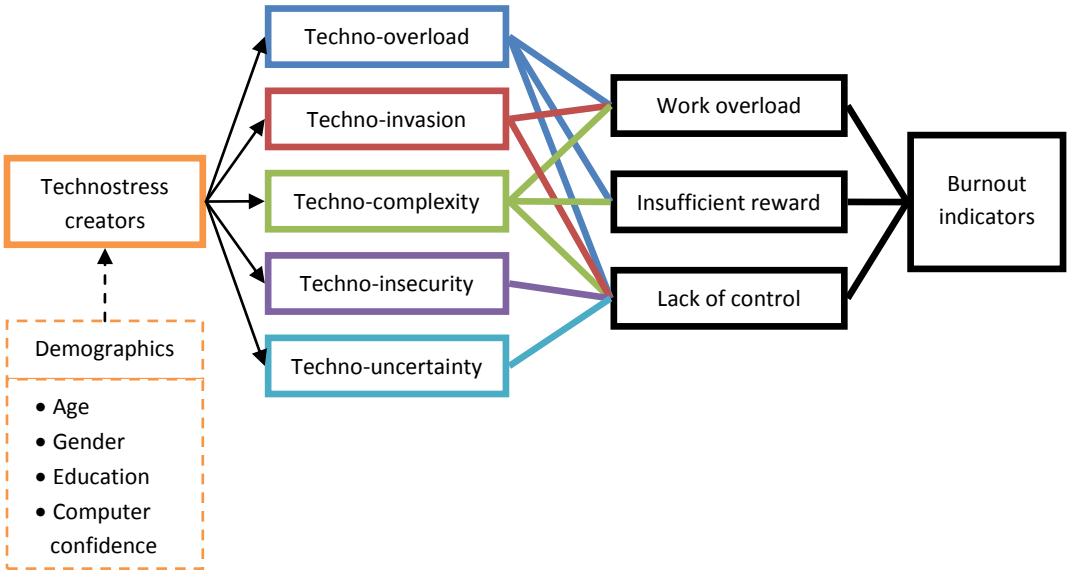

Figure 3 - Research model

The above model factors in which facets of technostress that may be mapped to the three primary burnout domains. It is important to note that this is not a definitive or exhaustive list and that further research in this area may be required.

Finally, by factoring in employee work habits we can move the argument from the abstract to the concrete. Studies have shown that workers readily accept an increased workload, and that companies happily contribute to it, without much regard to long-term effects. This affects all three domains: workers are expected to work more, are given less opportunity to control their own work days and are often given the same amount of pay for an increase in work and responsibility.

Even without the explicit pressures from the workplace, employees still allow for work or work-related tasks to creep into their homes and their social lives. This may seemingly be benign at first and can easily be motivated by getting minor things out of the way. However, it has a tendency to expand and soon encompass larger or more complex tasks and all of a sudden workers are expected to maintain a level of productivity which is impossible by working only the normal 8 hours a day.

4.7 Hypotheses

Based on the theoretical foundation, we posit the following hypotheses:

- Hypothesis 1: There is a correlation between high use of mobile ICT and burnout indicators.
- Hypothesis 2: There is a correlation between demographic variables, such as gender, level of education, age, computer confidence and technostress. (Based on the work by Ragu-Nathan et al. (2008), technostress creators and inhibitors).
    - Sub hypothesis 1: Gender affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 2: Level of education affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 3: Age affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 4: General computer knowledge (confidence) affects the correlation between mobile ICT and burnout indicators.

5 Method

Herein we will explain our choice in method and our use thereof. While a proper examination and understanding of available theory is of utmost importance, one must carefully consider what methodology to employ for the main body of the study itself. Through the theoretical lens, the method will directly determine how data is gathered and how it is understood. Thus, it is important to be studious and thorough in evaluating all available methods and selecting one that fits the intended goal.

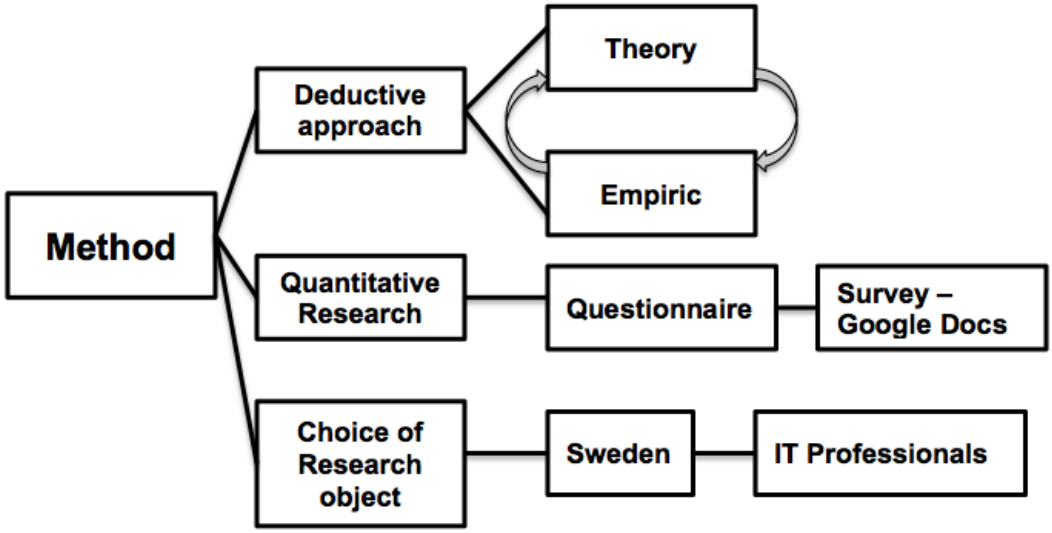

Figure 4 - General overview of the method chapter

5.1 Selection of method

We have chosen to employ deductive reasoning and will be using an analytical approach to investigate the correlation between IT-professionals' use of mobile computing and stress responses. Our intent is to develop an empirical study based on our previous knowledge, in combination with the existing theoretical foundation, and use it to investigate our area of research.

Bryman (2009) argues that the theory and the area of research should be deductively defined initially, and then used to inform the data collection process. Traditionally, the deductive approach is associated with quantitative research methods, such as questionnaires (ibid.).

The deductive approach does not require sequential execution order of the planned process (Bryman, 2009). Figure 4, below, describes the process of our chosen method and outlines our plans for working in a deductive approach.

The analytical approach allows us to create an integrated simulacrum of objective reality, independent of individual variation, and an understanding of the subsets of the main study may add up to a deeper understanding of the unified whole (Holme & Solvang, 1991).

5.1.1 Approach

As seen in the figure below, our chosen approach is to find a theoretical framework relevant to our research topic and then formulating one or several hypotheses. We may then proceed to gather information and either confirm or reject the previously formulated hypotheses.

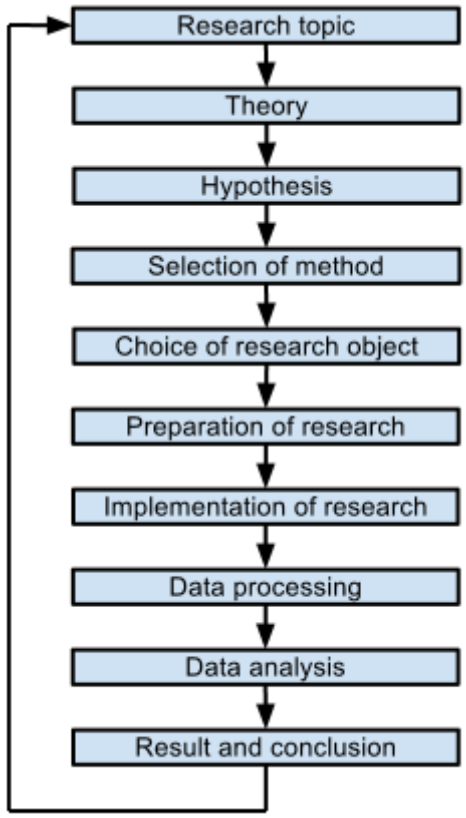

Figure 5 - Overview of the quantitative research process

5.2 The choice of research object

This study will be delimited within several scopes: temporally, geographically as well as contextually. These delimitations will make sure that the scope is narrow enough for the intended research goal, as well as for the overarching goals of a thesis of this magnitude.

The temporal delimitation will be present time, we do not intend to research attitudes of the past nor will we attempt to predict the future. Memory degradation makes self-administered research about the past very hard to perform and verify and we do not have the time or ability to perform a longitudinal study.

Geographically, our limitation will be Sweden. This is mainly a limitation of convenience, as we are more likely to be able to find respondents from Sweden than we are from other countries. Another consideration, however, is that we will not be required to take cultural differences into consideration and we will not need to track which country a particular respondent hails from.

Finally, the context: our goal is to determine how technostress and burnout appears in the intersection between work space and private space, and how it is affected by people's attitudes towards mobile ICT.

5.2.1 Brief summary of our selection of target population

Due to the intended area of research, we initially limited our selection of respondents to IT-professionals in Sweden. This will help make the result more suitable for generalizing, as there will be little need to account for cultural differences.

Our approach will be to send out questionnaires en masse to the companies that permit us to do so. After that, a certain level of self-selection will occur, with the results biased towards those who are willing to take the time to answer a questionnaire. This kind of selection is obviously beyond our control, but it is something to be aware of as our analysis progresses.

We have performed selection by convenience; we found our respondents by asking current and former employers if they were willing to participate.

5.3 Electronic questionnaire

Our choice fell to perform a survey in the form of electronic questionnaires, as they will give us large chunks of quantifiable data and it will permit us to create a generalized view of our research topic. Once the choice had been made, we used to tree structure as outlined by Saunders et al. (2009) to determine what medium should be used to distribute the questionnaire and how it should be administered.

Saunders et al. (2009) warn that oftentimes people employ questionnaires to collect data without properly evaluating all other alternatives. For our purposes, however, the questionnaire will be the most useful choice, as we are looking for well-structured and quantifiable data that can be easily used in statistical analysis and correlation studies.

The next choice is of who shall administer the survey: the surveyed themselves or the interviewer. This became a question of expediency and practicality; we do not have the time or ability to travel around the country to administer questionnaires and we can bypass that by simply sending the survey to potential respondents and allow them to answer in their own time. As we have no particular need to survey any specific individuals, there is nothing in particular that makes this approach unsuitable.

Thus remains the final choice, to hand out questionnaires by sending them via mail, hand-delivery or the Internet. Hand-delivery was excluded for the same reasons as interview-administration: feasibility. The choice, in the end, became a matter of convenience, for us as well as the respondents.

By sending out electronic questionnaires (in the form of a hyperlink), we allow people to respond easily and at their own pace. While a postal questionnaire certainly had been possible, its implementation would have involved greater costs and would have required the respondents to fill in the questionnaire and then return it by mail. This would also have increased the risk that the questionnaire would simply have been ignored.

5.3.1 Designing the questionnaire

Many authors (e.g., Saunders et al., 2009; Bell, 2005; Oppenheim, 2000) warn that creating a good questionnaire is much harder that might be readily apparent. There are some very important considerations to keep in mind in the design-process:

- Will this survey actually give the kind of information that is necessary to answer the initial question?
- Is the scope and length of the survey appropriate for the intended audience?
- Is the survey complete?

One most often is only given one chance to get the survey right, it is thus of grave importance that the answer to all three questions is *yes*. If there is any doubt at all, one should review the questionnaire further and make changes as necessary.

Furthermore, it is helpful to avoid loaded or leading questions as much as possible. Dillman (2007) argues that respondents may self-censure themselves and pick a more socially desirable answer. We hope to avoid this by using anonymous electronic questionnaires; there will be nothing connecting an individual to their answer, or any form of a paper trail.

As previously stated, one must take care to make sure that the survey actually records data that is relevant to answer the initial question. This requires a data-driven bottom-up approach, where we look at the expected data and attempt to formulate questions from answers. Also, since we are likely to only get one opportunity at collecting data, it is paramount that the survey is well-designed from the very start (Saunders et al., 2009).

5.3.1.1 Dividing the questionnaire

Because our theoretical framework comes from several sources, and we have not found a unified theoretical framework for studying burnout and technostress, we have chosen to divide the questionnaire into three parts. We did this in an attempt to make certain that our questions would give the necessary data to test our hypotheses.

Aided by the theory of technostress and the model of technostress depicted in figure 4 (Ragu-Nathan, et al., 2008), we have designed the two parts of the questionnaire covering individual differences, and technostress creators. We chose to refer to "individual differences" as demographics, as it is a much more well-known phrase and leaves little to ambiguity.

We then used the concept of technostress creators to decide on what questions we ought to ask to satisfactorily examine the factors affecting experiences of technostress. This, in combination with the work on burnout by Maslach and Leiter (1997) and Maslach et al. (2011), was used to create the questions for the section known as Technostress & burnout.

The third and final part of the questionnaire is about user habits with regard to mobile ICT. The questions in this part are based on the parts of Ragu-Nathan et al. (2008) that focus on user habits rather than technostress. Further inspiration was also taken from the section on employee work habits in the theory section of this thesis.

Based on this theoretical basis, we created three parts that we used as a basis for designing the questionnaire:

- Demographics
- Technostress & burnout
- User habits

5.4 Validity and reliability

Two central factors in the overall quality of data collection are *validity* and *reliability*. These two factors determine whether or not the data measure what it was intended to measure, and the level of internal consistency, respectively (ibid).

5.4.1 Validity

Validity, in turn, is broken down into several subcategories: content, predictive and construct validity. These subcategories address different ways in which validity needs to be measured.

5.4.1.1 Content validity

Content validity refers to how well the selected data collection apparatus covers the intended area of study. Adequate coverage can be hard to discern and requires careful and extensive study of the available theoretical material. This specific study will require exploring the use of mobile computing, its effect on technostress and general sense of burnout. Finding a survey that is both exhaustive while avoiding running too long is a careful balancing act that involves careful consideration.

5.4.1.2 Predictive validity

Predictive validity (also known as criterion-related validity) is a measure of how well one can use the resulting data set to make accurate predictions. In this case: whether or not we are able to predict a correlation between increased use of mobile technology and a sense of technostress and the user's level of job dissatisfaction.

5.4.1.3 Construct validity

Finally, construct validity determines to extent of which the data actually measures the presence of the intended constructs. It answers the question, "How well can one generalize from the collected data?" and is a key factors in making sure that the answer data collected is actually valid for the entire intended population (ibid).

5.4.2 Reliability

It is not sufficient that the questionnaire is merely reliable; the respondents must be able to interpret the questions the same way that the creators interpret them. Failure to do so will render the final result meaningless, and one will be unable to draw any conclusions from the data. It is important that the questionnaire will provide consistent findings without regard to point in time or current conditions. Our research will be slightly less sensitive to this than others, as we intend to study a snapshot in time. We do not require our questionnaire to be timeless, as the data it intends to collect is about attitudes at the current juncture.

5.4.2.1 Designing reliable questions

Bourque and Clark (1994) argue that there are 3 approaches in designing individual questions: adoption, adaptation or developing. Adopting or adapting questions is useful when there is a need or desire to compare the results of one's own questionnaire with the results from other studies. Adopting a question means that one simply takes it wholesale and adds it, without editing, to the new questionnaire.

Adapting a question means to take an existing question and retooling it to fit the new purpose. Whether one adopts or adapts questions, one should always be aware that not all questions were created equally. Just because a question has been previously used in a questionnaire doesn't mean that it is necessarily a good question. The same care one would take in developing one's own questions must be taken in evaluating existing questions (Saunders et al., 2009).

For this questionnaire, some questions from the Maslach Burnout Inventory (Maslach et al., 1996) have been adapted. They belong to a relatively generalized framework for measuring burnout. However, as the questions are primarily tailored to fit health-care personnel, we have retooled them to fit our target population better. Furthermore, some questions from the Technostress questionnaire (Ragu-Nathan et al., 2002) have been adapted for our needs. These questions will then be categorized in accordance with the three parts specified earlier. The source material is available in appendices V and VI.

It is important to know what products the respondents own for this survey to explore correlations with use of mobile ICT. To this end, we added a multiple choice question where respondents were asked to check boxes corresponding with ownership.

As mentioned above, the questions covering technostress and burnout have been created based on the Maslach Burnout Inventory (Maslach et al., 1996), with the technostress questionnaire (Ragu-Nathan et al., 2002) as a lens to better focus on our area of interest. The common denominator for all questions is the experience of stress related to technology and work. We have attempted to tool our questions so that we capture stress that comes from the work itself, and not from colleagues or the work-environment. We have added questions covering these areas so that we may reduce the risk of finding false correlations.

There are several ways of communicating with one's office with mobile ICT, according to the theory of employee work habits. It also raises the claim that work can be location-independent. This, in conjunction with Ragu-Nathan et al.'s (2002) technostress questionnaire, gave is a basis to create or adapt questions about technostress. These questions will then hopefully give us a better understanding of the users' habits, but also how their friends and family view the respondent's situation.

There are some factors that are inherent in the respondents and may affect their responses, known as individual differences, or demographics. They give a multidimensional overview of the composition in the target population, and may be used to compare the target population with other known data sets and also to facilitate a more robust analysis and understanding of the resulting data.

We have also selected four sample demographic variables, to be able to test our four sub-hypotheses: age group, gender, level of education and general computer knowledge. There are many, many more potential demographic variables, but for the sake of time and brevity, we limited ourselves to these 4.

As the base-level of stress, burnout or technological adaptive ability may vary with age, gender, level of education or computer experience. We chose age group over age for two reasons: to increase anonymity of the responses, but also to increase the response rates of each group; if we had allowed respondents to pick their exact age we would, on average, only have 1-2 respondents per age.

It is necessary to track a respondent's gender in order to test one of our sub-hypotheses. For example, women are more likely to experience emotional exhaustion; thus, the gender balance of the respondents will skew the result (Ghorpade et al., 2007).

5.5 Analysis of data

In order to perform analysis of the collected data, we will present the results with individual response frequencies. Frequency tables will provide an overview of the various responses, and will permit us to analyze one variable at the time and see the number of respondents who picked that specific option (Bryman, 2011). The analysis will be performed with our three parts, demographics, technostress & burnout, and user habits in mind. This in order for us to test our hypotheses:

- Hypothesis 1: There is a correlation between high use of mobile ICT and burnout indicators.
- Hypothesis 2: There is a correlation between demographic variables, such as gender, level of education, age, computer confidence and technostress. (Based on the work by Ragu-Nathan et al. (2008), technostress creators and inhibitors).
    - Sub hypothesis 1: Gender affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 2: Level of education affects the correlation between mobile ICT and burnout indicators.

- Sub hypothesis 3: Age affects the correlation between mobile ICT and burnout indicators.
- Sub hypothesis 4: General computer knowledge (confidence) affects the correlation between mobile ICT and burnout indicators.

Correlation describes the relationship between two seemingly independent variables. The correlation coefficient uses a scale of -1 to 1 to describe the strength of the correlation. It is, however, important to remember that correlation does not equal causation and does take the third variable problem into account. A relationship between two variables may be established if the correlation coefficient lies in the range of 0.3 to 0.7 (positive or negative) (Denscombe, 2000).

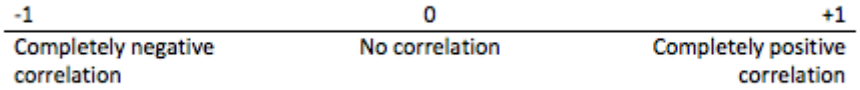

Figure 6 - The correlation scale

As pictured above, the correlation scale goes from -1 (complete negative/inverse correlation) to 1 (complete positive correlation). Given variables A and B, a negative correlations means that as A increases, B will decrease; conversely, a positive correlation will see B rise in sync with A. Finally, a correlation coefficient close to 0 implies little to no relationship between the two variables (Denscombe, 2000).

According to Denscombe (2000), a relationship is recognized if two variables have a correlation value in the range of 0.3 and 0.7 (negative or positive). As such, we take a particularly thorough look at those relationships. The questionnaire was pre-coded prior to being sent out; this means that all non-numeric values were assigned a number. Being able to convert text-answers to numbers will aid in analyzing correlations (Bryman, 2011).

Excluding the demographic data, 2 cumulative results were calculated from the two remaining data sets: One for user habits and one for burnout & technostress. These two sets were made cumulative because they are designed to measure total usage and total burnout indicators, rather than an average. A weak, positive overall correlation value of 0.284 was found, when comparing the normalized cumulative values of user habit intensity and burnout indicators.

To calculate the normalized cumulative, the responses were then transformed (where needed) so that higher response values always indicated more stress/more work. We then calculated their total scores and normalized them by dividing the result with the highest score possible. This gives us decimal values in the range of 0 and 1, inclusive.

Because a p-value from a single study is of limited use, we chose to omit them from our calculations; Siegfried (2010) quotes Economist Stephen Ziliak saying "That test itself is neither necessary nor sufficient for proving a scientific result".

Siegfried (2010) goes on to argue that a p-value only speaks of the chance of getting a specific result by random chance; it does not confirm or reject the null hypotheses. It is also important to remember that “statistically significant” does not necessarily mean that the measured effect is strong enough to be meaningful from a practical standpoint. I.e., we could measure a statistically significant link between use of mobile ICT and burnout indicators, but the actual effect may be so weak that it makes no practical difference.

We have defined resilience to be a measure of how much work a person can perform, without a concordant increase in burnout, so that resilience can be regarded as R = $\frac{w}{b}$, where w represents the normalized cumulative for work, and b represents the normalized cumulative for burnout indicators.

Finally, the data set will be processed through Microsoft Excel and presented in a manner more easily understood. This means calculating and normalizing averages from the two sections (ICT use & burnout), and using them to create and present correlation tables and pivot tables.

Correlation tables, as shown above, allow us to understand how closely linked two variables are, and pivot tables show the value variations when split into sub-groups.

6 Results & Analysis

Research question was framed as: *"What correlation can be found between use of mobile ICT and experiences of burnout in Swedish IT-professionals?"* and the result set came from the questionnaire found in appendix X, and will be presented henceforth.

The final sample size was 85, out of an estimated pool of 400 potential respondents, giving us a respectable response rate of slightly more than 20 %.

6.1 Data collection

Questionnaire data was collected from five different organizations. The respondents were specifically targeted due to their perceived use of ICT as part of their daily work habits.

Table 3 - Sample characteristics of demographics variables

Age bracket (Year)	n	Percent
18 - 25	2	2.4%
26 - 35	13	15.3%
36 - 45	28	32.9%
46 and over	42	49.4%
TOTAL	85	100%

Gender	n	Percent
Woman	32	37.6%
Man	53	62.4%
TOTAL	85	100%

Level of education	n	Percent
Compulsory school	0	0.0%
High school	23	27.1%
University (Bachelor)	42	49.4%
University (Master)	19	22.4%
University (Ph.D.)	1	1.2%
TOTAL	85	100%

6.2 Analysis

The analysis will be performed broken down into the viewpoints necessary to test the hypotheses presented earlier on. This will permit us a more finely grained understanding of how use of ICT affects stress and burnout indicators, without risking that some data may be drowned out within larger data sets. If, for instance, one age group experiences an inordinate amount of technostress, they could overwhelm the data and skew the result.

By separating the data set according to known demographic data, we can compensate for this and present a better and more accurate analysis. It should however be noted that there is no objective standard to measure burnout by, and actual work effort is impossible to measure without highly invasive methods. As such, there is no way to account for over- or under-reporting and the data has to be taken at face value.

6.2.1 Testing hypothesis 1

This part will test hypothesis 1, which is as follows:

- There is a correlation between high use of mobile ICT and burnout indicators.

6.2.1.1 Correlation table of cumulative results

The following is a comprehensive summary of the results from the correlation table, with a presentation of correlations between the use of mobile ICT and experiences of stress and burnout.

Working during leisure time has a strong correlation to constant availability and remaining updated and to adopt new habits to match new technology. It is also correlated with having one's work spill into one's leisure time to such a degree that family and friends comment on the amount of time work takes up, and that it gets in the way of doing other things. Furthermore, the feeling of being required to be constantly available is also strong positive correlated with all of the aforementioned issues, with exception to comments from family and friends.

Various issues in the category technostress/burnout have many strong positive correlations to different types of information sharing outside of office hours. There are different ways of communicating with one's workplace. The questionnaire covered this through a multiple choice question covering the most common ones: e-mail, instant message, telephone calls, calendar sharing, or organization-specific applications.

Many are tempted by the ability to be constantly connected, and by being able to quickly check their mail or respond to instant messages. This temptation may very well play an integral role in shifting or blurring the divide between work time and leisure time. Feeling overworked, which is a part of burnout, has a strong correlation of 0.643 with sharing information outside of normal work hours. It is also notably correlated with feeling like one fails to do things in their spare time, because they are busy with work-related tasks (0.471).

Table 4 - Summary of correlations between use of mobile ICT and stress & burnout indicators

	I feel that mobile computing prevents me from relaxing in my time off	I feel that I am expected to be constantly available	I feel that I am expected to be constantly available	I'm considering quitting my work	The thought of a new workday makes me exhausted, even after a night's sleep	I feel completely drained after a workday	I feel that I work too hard	I experience frustration above what's normal at work	I feel that I wind up working more than I had planned	I feel justly rewarded for my efforts at work
I exchange information with my workplace, outside of normal hours, using different functions.	-0.643			0.500	0.500	0.423	0.634	0.323		-0.845
I feel that I neglect doing things in my time off because I am busy with work-related tasks		0.321	0.492	0.337			0.471		0.527	
Family or friends comment that I seem to work a lot			0.453				0.400		0.542	
I keep myself updated about work situations. even in my leisure time		0.401	0.620							
I have changed my work habits to work better with new technology		0.320	0.381							
I reply to e-mail/text messages no matter where I am		0.349	0.379							

According to the table below, 91.8 % of the users use e-mail to share information with their colleagues, which is the most common way of communication. Phone calls, calendar sharing and instant messaging are also very common methods of information sharing, and ⅓ of all respondents use some sort of organization specific application to share information. There is obviously a fair bit of overlap between these groups, as the total is far more than 100 %.

Table 5 - Percentages of respondents using various communication methods

I exchange information with my workplace, outside of normal hours, using	Percent
E-mail	91.8%
Telephone calls	77.7%
Calendar	62.4%
Instant messaging	49.5%
Organization specific-applications	33.0%
None	4.7%

6.2.2 Testing hypothesis 2, with sub hypotheses

In this part, we will test the hypotheses involving demographics, they are as follows:

- There is a correlation between demographic variables, such as gender, level of education, age, computer confidence and technostress. (Based on the work by Ragu-Nathan et al. (2008), technostress creators and inhibitors).
    - Sub hypothesis 1: Gender affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 2: Level of education affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 3: Age affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 4: General computer knowledge (confidence) affects the correlation between mobile ICT and burnout indicators.

6.2.2.1 SH_1: Gender

The responses were 62 % male (n = 53) and 38 % female (n = 32), and showed some correlations of note. The gender skew towards male respondents was expected, as the IT-field is typically male-dominated.

Men are more likely to work in their spare time, reporting an average of 3.567 to the question “I work in my spare time”, compared to the female average of 2.938. Similarly, the question “I feel that I skip doing things in my spare time because I am busy with work tasks” yielded a male average of 2.452, whereas the women had a response of 2.094.

The respondents were also asked how often they attempt to stay updated on work situations in their spare time, and the male average there was more than 0.5 higher than the female: 3.396 to 2.844.

Thus, in terms of habits, men indicate a higher tendency to work more beyond the scheduled work hours. However, the results from the burnout and technostress related questions paint a different picture.

Women are more likely to feel drained after a day at work and more likely to experience frustration with their work. Women report averages of 2.781 and 2.844, respectively, whereas the same numbers for men are 2.472 and 2.472.

On a more positive note, men and women alike report a high satisfaction with their workplace (4.224) and with their colleagues (4.541). In fact, most respondents gave the responses “Often” or

"Almost always", only a few answered with "Sometimes" and none of the respondents rated their satisfaction lower than that.

Overall though, we only see some minor differences in gender response. In order for us to compare the normalized cumulative values from before, we have created a series of pivot table where we compare various demographic data with the Average Normalized Cumulative (ANC).

Males had average normalized cumulative of 0.580 (work) and 0.430 (burnout), while the same numbers were 0.533 and 0.450 for women. Thus, the resulting resilience for men is 1.349 and 1.184 for women, though it is important to remember that this value is susceptible to several error factors and is only used to confirm whether or not that our data is in line with expected values.

6.2.2.2 SH_2: Level of education

We fully expect the level of education to be skewed towards higher education, in comparison to the population at large. IT is a field where at least a bachelor degree is often the minimum requirement for employment, so it is to be expected that the respondents are more highly educated than the average.

Table 6 - Respondents divided by level of education

Level of education	n	Percent
Compulsory school	0	0.0%
High school	23	27.1%
University (Bachelor)	42	49.4%
University (Master)	19	22.4%
University (Ph.D.)	1	1.2%
TOTAL	85	100%

Due to the small sample size in the doctorate bracket, this bracket has been excluded from further calculations.

What we found was a very strong positive correlation between level of education and work habits (i.e., people with more education report working more) and a very strong negative correlation between education and burnout indicators, as seen in the following table.

Table 7 - ANC and resilience scores by level of education

Level of education	Work habits ANC	Burnout ANC	w/b
High school	0.548447205	0.460869565	1.190027
Bachelor	0.561564626	0.442857143	1.268049
Master	0.573684211	0.409022556	1.402574

As expected the resilience rating, as discussed earlier, increases with the amount of education a person has; this both due to a reduction in burnout indicators and an increase in intensity of work habits.

6.2.2.3 SH_3: Age group

The questionnaire permitted 4 age groups, as it was decided that that would provide an acceptable level of granularity without generating too small groups to be meaningful. The results were thusly:

Table 8 - Respondents by age group

Age group (Year)	n	Percent	National percent
18 - 25	2	2.4%	15.4%
26 - 35	13	15.3%	17.5%
36 - 45	28	32.9%	21.1%
46 and over	42	49.4%	45.9%
TOTAL	85	100%	100%

Compared to the population overall, the 18 - 25 bracket is severely underrepresented, 26 -35 slightly underrepresented, 36 - 45 overrepresented by more than 10 points and the 46+ bracket somewhat overrepresented. National percentage numbers are from 2011 and we have assumed that the 46+ bracket covers ages from 46 to 70 (SCB, 2011). In practical terms, this means that the respondents in the 18 -25 bracket are too few to give any meaningful data.

The reported user habits hold fairly steady across the age groups, as seen in the figure below. The same figure also show that burnout increases by age; the 46+ bracket reports 6 percentage points higher level of burnout than the 26 -35 bracket.

Table 9 - ANC and resilience scores by age group

Bracket	Work habits ANC	Burnout ANC	w/b
26 - 35	0.567032967	0.391208791	1.4494382
36 - 45	0.545408163	0.433673469	1.25764706
46 and over	0.569387755	0.45170068	1.26054217
Total	0.562521008	0.437983193	1.28434382

The only clear trend with regards to age is that burnout indicators increase with age, however, without a corresponding change in work habit intensity. As shown in the theory section, there are other factors that can affect burnout indicators and not all of them are related to use of ICT.

6.2.2.4 SH_4: General computer knowledge

It is difficult to determine how accurate the responses to this factor are, as it is an entirely subjective determination. However, it is still an interesting factor to consider, as a person's attitude towards ICT can easily be informed by how confident they feel in using it.

As our target population is IT-professionals, we fully expected them to report high levels of computer knowledge, and so was the case. The respondents were asked to, on a scale of 1 to 5, rank their perception of their general computer knowledge. None of the respondents gave themselves a 1 or 2, and a vast majority ranked themselves as a 5.

Table 10 - Respondents by general computer knowledge

Ranking	Percentage	n
3	4.7%	4
4	18.8%	16
5	76.5%	65

As seen in the above table, ¾ of the respondents ranked themselves a 5, and the 4 and 5 groups together made up for more than 95 % of the total responses.

Table 11 - ANC by general computer knowledge

Ranking	Work habits ANC	Burnout ANC
3	0.428571429	0.450000000
4	0.575000000	0.448214286
5	0.567692308	0.434725275
Total	0.562521008	0.437983193

We see that the average normalized cumulative of work habits increase sharply and then decrease slightly as one's perception of one's general computer knowledge increases. The vast difference in population sizes of the rankings makes it hard to rule out a regression to the mean as a cause. It does however seem likely that people who work a lot, and use mobile ICT a lot will rank themselves as more proficient than those who do not.

Burnout, on the other hand, seems to decrease with increase computer proficiency. Each increase in self-ranking of proficiency corresponds to a 1 percentage point decrease in the burnout ANC.

6.3 Method discussion

Discussing the method is an opportunity to frankly and honestly discuss strengths and weaknesses in our research methodology and to critique the quality of our work. This part is invaluable for later research; it will give the researchers a broader understanding of our thinking and may help them better utilize our research data.

6.3.1 Accounting for variances in population sizes

Testing the correlation between two values is a common statistical task. If one were to examine how a variable B changes (or does not change) with a variable A, the ideal situation is to have an even spread of values of A. I.e., if A is on a scale of 1 - 5 and 100 respondents were queried, it would be desirable to have 20 respondents for each value of A.

There are many reasons why this might not be feasible, most importantly that one simply cannot in advance predict too well what respondents will answer. Sometimes a superset of the target population may affect variance. In our case, for instance, we expected that the age groups would have an uneven spread, as reflected by the national averages.

However, our results were even more lopsided than anticipated; the age bracket 18 - 25 accounts for 15.4 % of all Swedes, but accounted for only 2.4 % (2 / 85) of our actual respondents.

This kind of variance causes problems in more than one way: It is hard to generalize from such a small sample size, but the fact that the sample size from the 46+ bracket is 21 times larger than the 18 - 25 bracket means that there is a serious risk for data skew. Similarly lopsided data sets also appeared in general computer knowledge (each step is roughly 1:4 to the previous).

Rather than applying any weighting to our results, we have simply removed data sets that were too small (e.g., 18 - 25 bracket, respondents with doctorates, etc.). It is a potential shortcoming on our part, and there is a risk that it may have hidden existing correlations or indicated false correlations.

Complicating the matter further is the fact that we had no knowledge of expected values in most cases, which meant that we had no basis to calculate standard deviations. Knowing the standard deviation is incredibly helpful in performing proper weighting, and lacking that data was another obstacle.

In the end, we have resigned ourselves to hoping that any aberrations that have emerged weren't significant enough to be noticeable.

6.3.2 Hypothesis testing

With the aid of the theoretical background, we created a number of hypotheses to be tested in the analysis. As the hypotheses are based on prior research within our theoretical framework, our goal was to examine whether or not correlations existed between our two primary theories: technostress (Ragu-Nathan, Monideepa, & Ragu-Nathan, 2008) and burnout (Maslach, Jackson, & Leiter, 1996).

In order for us to perform the testing, we set up conditions in the method chapter, which identifies weak and strong correlations, but also no correlation. The purpose was to detect which, if any, correlations exist.

The testing was performed with the assumption that the hypotheses would be proven correct, and results to the contrary were noted without further comment. An absence of correlation values above 0.3 or below -0.3 would mean that it is unlikely that a correlation exists, but shortcomings in our statistical analysis introduce a fair bit of uncertainty to our results.

The lack of rigorous statistical hypothesis testing is problematic, as it is an obstacle for falsifiability. This means that there are some limitations to what kind of conclusions one can draw from our analysis. However, we deemed that the results we were able to obtain, where clear correlations appear to exists, were of enough interest that it was an acceptable compromise.

Traditionally, in order to test hypotheses such as the ones we have posited, one would employ statistical hypothesis testing. Such an undertaking may come from having used one of two types of hypotheses: research hypothesis or statistical hypothesis. For our thesis, the latter would have been the correct choice.

Grandin (2012) outlines an 8 step process that must be followed to obtain correct results, though he notes that these days some of these steps are computerized.

1. Selection – Statistical testing requires a random selection from the population
2. Data – The scale and distribution of the data dictates what kind of testing one should perform.
3. Hypotheses – The hypotheses indicate what we are testing. The null hypothesis must be formulated in such a way that it can be rejected. Note that H_0 can be rejected or not rejected, never confirmed.
4. Significance level – Indicates the risk of rejecting a true null hypothesis, due to random chance in the selection indicating a correlation that does not exist in the larger population. See table 12 below, and subsequent text for an in-depth explanation.
5. Test function – Calculated from the sample and used to decide whether or not to reject the null hypothesis. There are several different kinds of tests depending on how the data is structured.
6. Decision rule – The final rule that basically states: The null hypothesis is rejected if the value of the test function is greater than X. The value of X depends on the chosen test, the significance level and sample size.
7. Performing calculations
8. Statistical decision – The final decision to reject or to not reject the null hypothesis.

We performed random sampling as best as possible, by sending out e-mails to our contacts at the various companies, with a request that they in turn forward it to their colleagues. This decision had two underlying factors: We assumed that people are more likely to read e-mails from their colleagues than from an external party, and that there are internal e-mail lists that will help improve coverage.

The data regarding user habits and burnout indicators are on an ordinal scale and discrete, meaning that there is a clear separation between values but it isn't possible to tell how much they are separated. Most questions have options like "Often" or "Seldom". It is clear that "often" occurs more often than "seldom", but there is no way of knowing how much more often.

We do not know whether or not our data are normally distributed, but an ocular inspection of histograms of both data sets appears to indicate that the data are normally distributed.

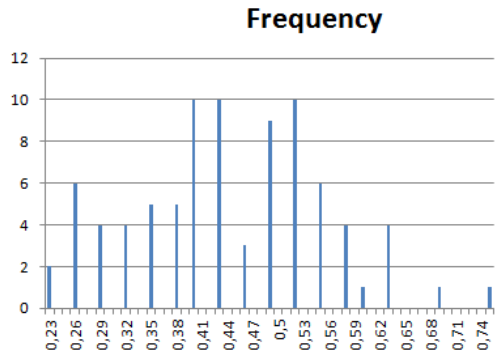

Figure 7 - Histogram for distribution of burnout ANC

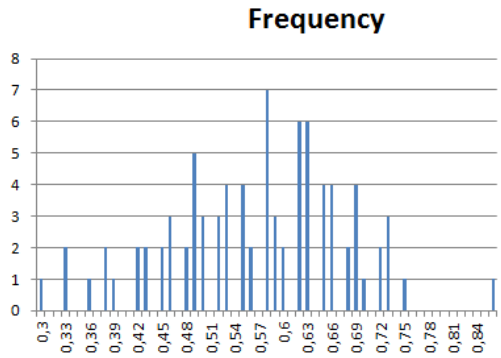

Figure 8 - Histogram for distribution of work habit ANC

While they do not have clear distinctive bell curve, there is a definitive drop off in values in both ends of the histograms.

The first step in establishing a hypothesis is setting up the null hypothesis, or H_0, which must be formulated in such a manner that it describes what the situation would look like if no correlation exists (Grandin, 2012). In our case, reasonable versions H_0 would have been something in the vein of:

- There is no difference in burnout indicators between heavy and light users of mobile ICT
- There is no correlation between burnout indicators and demographical variables.

From there on, we could then have proceeded and formulated our current hypotheses, also known as the alternative hypotheses. Our hypotheses are two-tailed, which means that we have predicted a correlation without making any assumptions on whether or not the correlation is positive or negative (ibid.).

The use of a null hypothesis requires an assumption of what no correlation would look like. The problem we ran into was the lack of data regarding intensity of burnout indicators prior to the smart phone revolution. Our data was too narrowly defined to use national data (which in turn is far too coarse to be of much use) for comparison. This complicated attempting to figure out what values we could expect if the null hypotheses would hold true.

Table 12 - Illustration of α and β in statistical hypothesis testing

		Actual relationship (unknown)	
		H_0 true	H_0 false
Results from statistical testing	H_0 rejected	Type I error, α	Correct decision, 1-β
	H_0 not rejected	Correct decision, 1-α	Type II error, β

Above, we see the 4 different possible outcomes from statistical testing. Two of them are correct in the sense that the decision corresponds with the actual relationship. In table 12, α denotes the risk of rejecting a true null hypothesis (type I error) and β the risk of failing to reject a false null hypothesis (type II error) (Grandin, 2012).

We are cautioned that even with a low value of α, repeated testing rapidly increases the risk of running into type I errors. This is compensated for by performing a Bonferroni correction, which means that the value of α is divided by the number of repeat tests performed. Grandin (2012) uses the example of 3 t-tests with α = 0.05 and how a resulting P-value of below 0.0167 (α / 3) would be required for the results to be considered significant.

Settling for a value of α is a matter of attempting to judge how likely it is that a data set that rejects the null hypothesis can be generated randomly and taking that into account. This value varies by study, but a common value for α appears to be 0.05.

The next step is to select a test function, which function is the most appropriate is determined by the data set. Because we are comparing two dependent groups, Gradin (2012) suggests using a paired t-test. Pairs in this context are two data points that are known to come from the same source (i.e., the same person) and will be used for comparison. In our case, we have the values from work habits to compare with the same person's values from burnout.

The t-test calculates the difference between the actual average differences and the expected average if the null hypothesis is correct, and divides it by the standard deviation through the square root of the sample size (ibid). We used a one-tailed test, as we are only concerned with the effects of mobile ICT on burnout and not the other way around.

$$t = \frac{\overline{x} - \mu}{(s/\sqrt{n})}$$

$\overline{x} = measured\ average\ difference$
$\mu = expected\ average\ difference$
$s = standard\ deviation$
$n = sample\ size$

Figure 9 - Paired t-test

The t-value must then be compared to the critical value, which is in the case of 84 (n – 1) degrees of freedom and $\alpha = 0.05$ is 1.6658 for a one-tailed test. If the value of $|t|$ is less than the critical value, then the null hypothesis cannot be rejected.

The final two steps would then have been to establish a reasonable μ and performing the calculations for comparison. This would have hopefully given us an understanding of the statistical reliability of our data. We were faced with two sources of uncertainty: We did not know what reasonable values of α or μ would be and as they are critical to the calculations, we did not feel comfortable going forth with them.

Finally, Grandin (2012) makes a note on outliers (i.e., values that strongly deviates from the majority of the data set); it is always a good idea to create a visual representation of the data set as it will quickly reveal any anomalous data. These anomalies may not necessarily be problematic, but they must be considered never the less. 3 initial considerations on outliers are given (ibid.):

1. Typing error, either while gathering or computerizing results
2. Problems with the measuring equipment
3. Data point comes from a source outside of the intended population

If any of those 3 is true, the data point should be rejected, otherwise further considerations must be made:

1. The deviation is part of the normal variation and must be considered in the analysis
2. The deviation is due to mistakes in the underlying observation or analysis and should be rejected.

Grandin (2012) argues that it is hard to determine which one of the two that actually is correct, but that studying the normal distribution curve can aid in determining which one is the most likely candidate.

7 Discussion

The discussion is an important part of a thesis; it permits us to reflect more freely on the results from the analysis and consider the implications.

Before we delve into the discussion, there are a few things that are important to note:

1. A questionnaire cannot establish cause and effect (i.e., causality), it can only show correlations. Even though A and B happen together, there is no information on whether A causes B, B causes A, or undetected variable C causing A and B.
2. Self-reported questionnaires always suffer from bias, be it due to under- or over-reporting, and it is hard to compensate for it.
3. Burnout, in particular, is a complex and multifaceted concept. It would do us and everyone else a disservice to pretend like its causes can be measured and understood easily.

We feel that it would be prudent to restate our hypotheses, which were as follows:

- Hypothesis 1: There is a correlation between high use of mobile ICT and burnout indicators.
- Hypothesis 2: There is a correlation between demographic variables, such as gender, level of education, age, computer confidence and technostress. (Based on the work by Ragu-Nathan et al. (2008), technostress creators and inhibitors).
    - Sub hypothesis 1: Gender affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 2: Level of education affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 3: Age affects the correlation between mobile ICT and burnout indicators.
    - Sub hypothesis 4: General computer knowledge (confidence) affects the correlation between mobile ICT and burnout indicators.

With this in mind, we may approach the discussion in properly framed manner.

7.1 High use of mobile ICT and burnout

Our first hypothesis posits that there should be a strong correlation between use of mobile ICT and burnout. The overview results indicated a weak positive correlation, with consideration that a correlation has to be above/below +/- 0.3 to be considered strong.

Most of the correlations were found between different burnout indicators and information exchange with one's workplace. Among other things, some respondents indicate that they feel like they are working too hard, which may be a sign that the divide between work and spare time is being blurred due to the ease of which one can stay in touch with one's workplace.

We had also expected to find correlations between working in one's spare time, feelings of being required to be constantly connected and communicating with one's workplace in the spare time, but we did not find any correlation.

7.2 Gender

As per one of our hypotheses, we initially predicted that women would report higher cumulative scores in terms of burnout indicators.

While women are reporting slightly higher burnout indicators, they do not do so to the extent found in the SSA's (2012) data, as presented below (figure 6). The difference in reported feelings of burnout is far less than the 1:2.76 in the general population (ibid.).

It is also important to remember that people's threshold values are different, and that while some people would find it hard to deal with low burnout indicators, whereas others could deal with significantly higher numbers.

While taking all of above into consideration, the fact that our numbers are in line with expected values helps increase confidence in data set as a whole.

7.3 Level of education

The results in terms of level of education were as expected: A vast majority holds either a bachelor's or master's degree, with a single outlier with a doctorate. The 27.1 % whose highest level of schooling is high school can probably be explained by looking at the relatively high average age; it is a relatively recent phenomenon that prospective employees must have a university degree to even be considered. As such, a substantial part of our respondents presumably began their career in a different corporate landscape.

We see an almost straight linear increase in work habit intensity when correlated to level of education; one hypothesis would be that higher levels of education require more discipline and focus and that that also spills over into work life, but without data to take into account roles or responsibilities, it is hard to generalize from the data.

Another interesting aspect, one that may come in handy in attempting to reduce the experiences of burnout indicators, is that there is a distinct negative correlation between level of education and burnout. We know that one prominent burnout predictor is lack of control and one can speculate that more schooling provides a person with better tools for understanding and mastering their domain which in turn provides a greater sense of agency. Agency in turn is known to combat burnout.

Unfortunately, our data cannot reveal whether or not the same correlation exists when looking at on-the-job training or other job-related training. However, it does seem likely that it would have a similar effect and that work-training will help a person work smarter (thus reducing work overload) and have a better understanding of their work (thus increasing agency and control).

7.4 Age

When taking age into consideration, some interesting results appear. Again, referring to the data from Statistiska Centralbyrån (2011), we expected the two younger age groups to be represented in greater numbers and the older age groups slightly lesser.

It is not an entire surprise though, that the 18 -25 group is underrepresented, as our data indicate that a vast majority of respondents have completed at least either 3 or 5 years of university level education. Thus, a large portion of the 18 - 25 group ought to be busy with finishing either high school or university and is not available for work.

More curious, however, is how age affects work intensity, or rather, how it does not. The average work habit ANC is 0.562 and varies less than 0.02 points with age. The image of the young, hungry, go-getter who is burning the candle at both ends seems to be incorrect, at least insofar that they do not report working significantly harder than their older colleagues.

The burnout number, however, indicates a clear progression; the older people get, the higher their average burnout score. It does seem to make sense, though, that people who have worked longer and presumably have more responsibilities, are more likely to simply feel exhausted and tired of working.

7.5 General computer knowledge

We had expected that general computer knowledge would be negatively correlated with experiences of technostress and burnout, at least in the IT-field. I.e., people who rate themselves as less comfortable with computers and work in the IT-field ought to feel less agency and would thus be more susceptible to loss of control.

Respondents were asked to rank themselves on general computer knowledge on a scale from 1 to 5, and the results were not surprising; nobody picked 1 or 2 on the scale and over 95 % ranked themselves as a 4 or a 5. Of those 95 %, 76.5 % ranked themselves a 5. Due to the intense clustering of results, we do not feel comfortable drawing any conclusions from this.

The results we do have indicate that work habit intensity may not be affected by general computer knowledge, but burnout indicators are negatively correlated. This is in line with the prediction that knowledge breeds confidence and confidence breeds agency, which in turn affects feelings of control.

7.6 Summary

The results were a mixed bag, some were as expected, and others revealed unexpected connections (or lack thereof). Our initial expectation was that we would detect a significant link between work habits and burnout indicators; such correlation exists but is relatively weak. In hindsight, it is clear that results are likely to be fuzzed due to two factors:

- People who are experiencing a high level of burnout are likely to instinctively attempt to cut down on hours worked
- People who experience little to no burnout *at the present* are more likely to have the energy to work with greater intensity.

It seems reasonable that the majority of the respondents would own a smart phone, as the IT-industry is one that is likely to keep abreast of new technological developments. The fairly widespread ownership of tablets is also as expected, since many of the respondents work and travel and lighter form factor of the tablet makes it ideal for keeping in contact while on the road; it is larger than a smart phone, and thus more pleasant to work with, but smaller and more portable than a laptop.

It is remarkable how many of the respondents use calendars, e-mail, phone calls, IMs or organization specific apps to keep in touch with the office, even outside of work hours. Though, with roughly 90 % owning smart phones, it is not a very surprising result. It would not be a stretch to assume that smart phones is one of the reason why the communication stats are as high as they are.

As people age, they seem to work at roughly the same intensity as before but are more susceptible to burnout. What this depends on is unclear, but if we consider long-term work fatigue and an increase in responsibility (most corporate leaders tend to fall in the last age bracket) we may begin to glimpse at the truth.

However, level of education gave more evenly divided results, and they gave useful insights. There is a definite correlation between how much education a person has and how little they experience burnout indicators.

General computer knowledge does appear to have some effect in reducing burnout indicators, though our results were skewed towards higher scores. This skew becomes problematic, as we have no lower-end values to indicate or counter-indicate the initial analysis.

We speculate that this is due to an increased sense of agency, and it helps support the idea that also general computer knowledge is a factor in reducing experiences of burnout. Presumably, both factors

increase agency and thus reduce feelings of lack of control and even work overload. Increased knowledge means that a person ought to be able to work more efficiently and hopefully reduce stress.

8 Conclusions

We frame the final conclusions by looking at the analysis and the discussion through the lens of the hypothesis. The comparison between the hypothesis and measured reality let us find a starting point and let our data lead us from there on.

8.1 Hypothesis #1

Hypothesis #1 was "There is a correlation between high use of mobile ICT and burnout indicators." How well does it stack up to measured reality? We see a relatively weak positive correlation between intensity of ICT use and burnout, but not strong enough to be the one, single answer.

Furthermore, our results indicate that use of mobile ICT is not overly to blame for a rise in burnout. In fact, reviewing the data from the Swedish Social Insurance Agency (2012), we see that despite a minor uptick in 2010, incidence rates of Neurotic, stress-related and somatoform syndromes have gone down significantly over the last years.

As the below graph shows, aside from a slight uptick over 2010, the incidence rates have dropped sharply. While it would be tempting to simply note that the uptick roughly coincides with the smart phone revolution and permit it to be an easy scapegoat, it would not be entirely fair. The correlation we have shown is too weak to be the sole cause and it is more likely to be the sum of several effects working together.

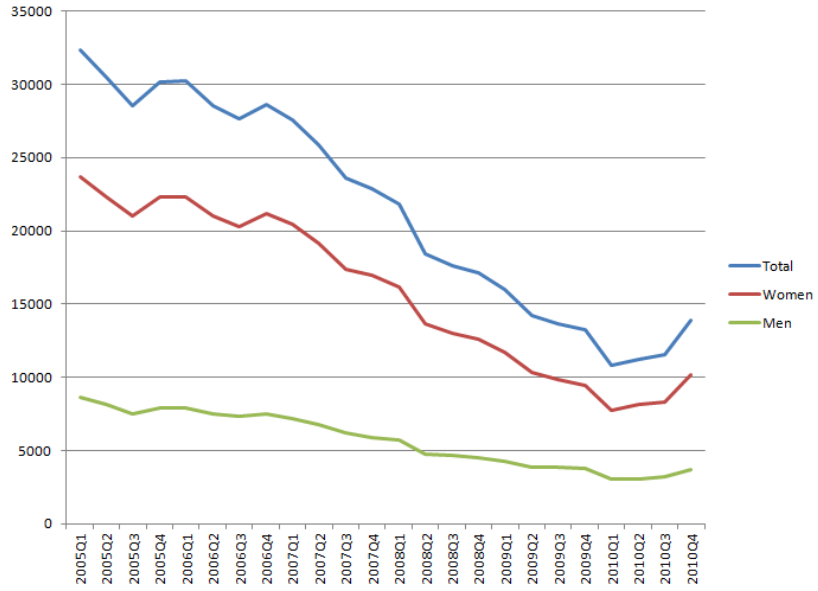

Figure 10 - Change in Neurotic, stress-related and somatoform syndromes over time

Further evidence is the result from the ownership question; while ownership does correlate to an increase in burnout indicators, it is outpaced by the work habits. It is impossible to say whether or not the increase in burnout indicators is due to people simply working more, and that ownership is incidental.

We may also note that while the IT-business is male dominated (62 % in this survey), the rates for men have more or less leveled out, whereas women represent the bulk of the increase. Thus, if smart phones had a significant impact on burnout, we would expect an equal or greater increase in men, but there is no such increase.

8.2 Hypothesis #2

Hypothesis #2 stated that there is a correlation between demographic variables, such as gender, level of education, age, computer confidence and technostress.

- Sub hypothesis 1: Gender affects the correlation between mobile ICT and burnout indicators.
- Sub hypothesis 2: Level of education affects the correlation between mobile ICT and burnout indicators.
- Sub hypothesis 3: Age affects the correlation between mobile ICT and burnout indicators.
- Sub hypothesis 4: General computer knowledge (confidence) affects the correlation between mobile ICT and burnout indicators.

8.2.1 SH_1: Gender

The data presented under subheading "Hypothesis #2" also validates the gender aspect of hypothesis #3: "There is a correlation between gender and burnout, with women experiencing more burnout." However, it should be noted that the correlation is weaker than the national statistics.

It is likely that this is due to the combined effect of two factors: Firstly, the national statistics are not very fine grained and does not state specifically how many are burned out. Secondly, they cover all occupations, and thus do not take into account that there may be variations between different professions.

Generally speaking, men work more and can handle the increased workload better. However, they are also more likely to sacrifice their spare time to do work and have a harder time shutting out work.

Conversely, women are better at keeping work at work, in the sense that they are less likely to keep working after hours. However, they are more likely to feel frustrated with their work and feel drained after work more often than men do.

Regardless, both groups are mostly satisfied with their work environment and with their colleagues, which is something that is helpful in reducing intensity of burnout indicators.

8.2.2 SH_2: Level of education

Level of education appears to be helpful in reducing experiences of burnout, but is also correlated with an increase in work habits. It is hard to tell if people who seek higher education simply are more resilient, or if higher education gives better tools for increasing agency.

In any case, we feel strongly that the effects of education on burnout and resilience ought to be further studied. It is of particular interest to see whether this effect also extends to on-the-job-training or other vocational skills. It could result in reductions of burnout and increases in productivity, at a low cost, both in terms of time and effort.

We do feel comfortable in making the conclusion that an increase of one's skill set is always a good thing and should be encouraged. It is clear that an increase in knowledge correlates to a decrease in experiences of burnout and technostress. As Sir Francis Bacon said, "knowledge is power"; it is also true that knowledge means control, and control stands opposed to burnout and technostress.

8.2.3 SH_3: Age

There is a weak positive correlation between age and burnout, i.e., older people appear to experience more burnout. However, there is a fairly big caveat in play: the eldest age group: 46+ is very significantly over represented and the youngest group is woefully underrepresented. We do not feel comfortable drawing any conclusions from this data segment.

Compounding our difficulties is the fact that while work habit intensity does vary between age groups, there is no obvious progression. Work habits appear to be a much more individual factor rather than a direct function of age.

Thus, we do not feel comfortable drawing any conclusions from our data with regard to age, other than to say that perhaps one should attempt to find ways to reduce the slow burn, i.e., burnout that only appears over a long period of time.

8.2.4 SH_4: General computer knowledge

The result here raises again the question of agency. Agency, as previously discussed, is the ability of a person to assert control over their situation. We feel that the clear correlation between higher education and reduction in technostress and burnout is due to increased agency, and we feel confident in our conclusion that well-educated workers are paramount in reducing and preventing burnout.

Not all professions allow for the time and money required for employees to take time off and add to their skill set, but it is well worth taking an extra look at what kind of additional training one can offer one's employees.

Again, as with level of education, it is likely that computer knowledge (or computer confidence) increases the perception of agency which in turn helps reduce feelings of lack of control. It is our conclusion that a company can never go wrong with providing extra training or encouraging their employees to expand their skill sets.

8.3 Summary

While there may be a desire for a silver bullet to deal with and explain causes for burnout and technostress, reality is not that simple. We have, as previously mentioned, identified a weak positive correlation between intensity of work habits and burnout indicators. This is in line with reasonable expectations and entirely in line with the original hypothesis; there is a correlation as we predicted, but it is not the entire truth.

People suffer from burnout for a host of reasons, but they all stem from the triad listed before: lack of control, insufficient reward and work overload. It is not a stretch to see how constant connectivity may influence the first and the third factor, and how it may indirectly affect the second factor.

By constantly being connected to work, the line that separates work from spare time becomes blurred, and one can easily feel like the whole situation is spiraling out of control; one has no control over when one is "at work" and when one is "at home".

Constant connectivity may affect work overload in the same manner, there is no escape from work and where the work day would typically end, another just takes its place.

Finally, these two factors may contribute to the last part of the triad: insufficient reward. It is easy for an employee to feel that work-related issues creep into their personal time, but the reward thereof never seems to change commensurate to the work demands. This kind of demand-creep, coupled with diminishing returns from monetary rewards may be an adverse factor in burnout acquisition.

Education, on-the-job training and other activities that increase employee skills and that increase agency appear to inhibit burnout while they encourage work intensity and efficiency. Helping indi-

viduals feel more comfortable and confident in work procedures and equipment is likely to make that individual less likely to experience burnout indicators.

Finally, if doing an intervention to prevent or reduce burnout or technostress in an individual, there are some questions that one should ask;

- Can more training solve the issue?
- Can we find better extrinsic rewards?
- Can we reduce workload?
- Can we increase control?

The latter three are taken wholesale from the theory on burnout; the first is informed by the theory of technostress and then amplified through the correlations we have detected.

9 Further research

We have seen a definite negative correlation to level of education, and we suggest testing whether this relationship holds true when work-related and on-the-job training are considered as well. Finding ways to increase employee agency is an effective way of reducing burnout indicators and is cheaper and less intrusive than increasing rewards or reducing workload.

This point is supported, albeit mildly, by the findings related to general computer knowledge. Therein, more confident and knowledgeable users rate themselves as experiencing fewer and milder burnout indicators. It is unknown how strong this effect is, but it would be a worthwhile endeavor to figure out what, if any, effect there is and how strong it is.

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11 Appendices

11.1 Appendix I - Cover letter

The following cover letter was sent with the invitation to participate. As most or all of our respondents were Swedish, we decided that the most prudent to communicate in Swedish.

> Hej!
>
> Vi är två studenter som håller på att skriva en C-uppsats inom systemvetenskap vid Luleå Tekniska Universitet. Vår uppsats handlar om hur användning av mobil informationsteknologi påverkar upplevd stress och utbrändhet.
>
> För att kunna samla in data om hur det ser ut i verkligheten har vi tagit fram en enkät som vi hoppas att ni är villiga att besvara. Enkäten är helt anonym och vi frågar inte efter, eller lagrar, någon som helst information som kan vara personligt identifierande.
>
> Enkäten består av 29 frågar uppdelade på 3 segment: demografi, stress/utbrändhet samt användarvanor. Vi bedömer att det kommer att ta ungefär 5 minuter att besvara enkäten och vi hoppas verkligen att ni vill besvara den.
>
> Med vänliga hälsningar,
>
> John Degerman & Jessica Broström

Translation:

> Hi!
>
> We are two students who are currently writing a C-level thesis on systems sciences at Luleå University of Technology. Our thesis is about how use of mobile ICT affects experiences of stress and burnout.
>
> We have designed a questionnaire in order to find out about how this occurs in the real world, and we hope that you are willing to fill it out. The questionnaire is completely anonymous and we do not ask for, nor store, any kind of information that could identify any one person.
>
> The questionnaire consists of 29 questions divided into 3 segments: demography, stress/burnout and user habits. We estimate that it will take roughly 5 minutes to complete the questionnaire, and we really hope that you want to fill it out.
>
> With kind regards,
>
> John Degerman & Jessica Broström

11.2 Appendix II - Questionnaire

The following questionnaire was created using Google Docs Forms, which in turn created a spreadsheet with all questions as columns and all responses are rows.

As most or all of our respondents were Swedish, we decided that the most prudent to create the questionnaire in Swedish. One question was excluded as several respondents told us that the negation felt confusing and that the question was ambiguous.

ENKÄTFRÅGOR OM TEKNOSTRESS OCH ANVÄNDANDE AV MOBIL DATA

Denna enkät har 29 frågor och beräknas ta ca 5 minuter att fylla i. Den är uppdelad i tre segment: demografi, teknostress & utbrändhet, och användarvanor.

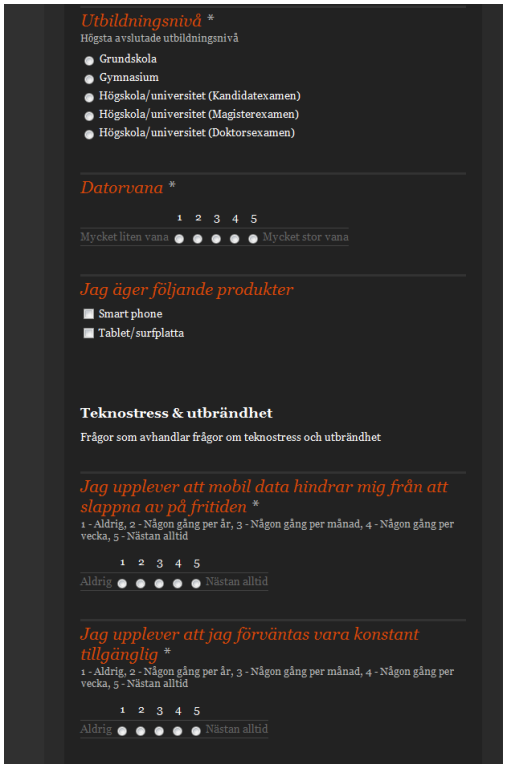
Alla svar är helt anonyma och vi samlar inte ihop någon som helst information som gör det möjligt att identifiera ett visst svar.
* Required

Demografiska frågor

Frågor om ålder, kön, utbildningsnivå, etc.

Åldersgrupp *
- 18 - 25
- 26 - 35
- 36-45
- 46+

Kön *
- Man
- Kvinna
- Annat



Utbildningsnivå *
Högsta avslutade utbildningsnivå
- Grundskola
- Gymnasium
- Högskola/universitet (Kandidatexamen)
- Högskola/universitet (Magisterexamen)
- Högskola/universitet (Doktorsexamen)

Datorvana *
1 2 3 4 5
Mycket liten vana ● ● ● ● ● Mycket stor vana

Jag äger följande produkter
- ☐ Smart phone
- ☐ Tablet/surfplatta

Teknostress & utbrändhet

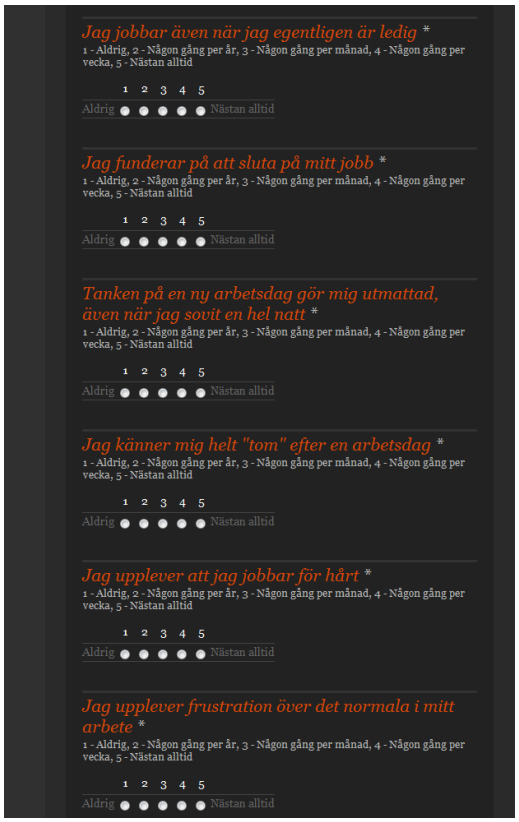
Frågor som avhandlar frågor om teknostress och utbrändhet

Jag upplever att mobil data hindrar mig från att slappna av på fritiden *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid

1 2 3 4 5
Aldrig ● ● ● ● ● Nästan alltid

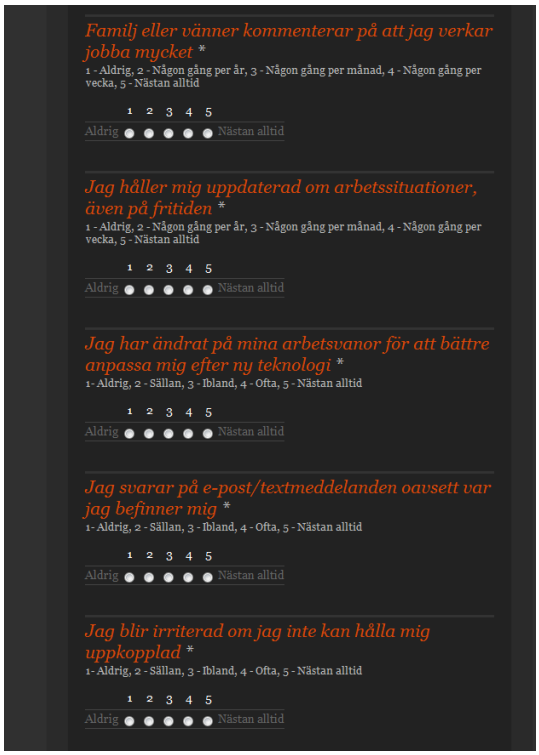
Jag upplever att jag förväntas vara konstant tillgänglig *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid

1 2 3 4 5
Aldrig ● ● ● ● ● Nästan alltid


Jag jobbar även när jag egentligen är ledig *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag funderar på att sluta på mitt jobb *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Tanken på en ny arbetsdag gör mig utmattad, även när jag sovit en hel natt *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag känner mig helt "tom" efter en arbetsdag *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag upplever att jag jobbar för hårt *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag upplever frustration över det normala i mitt arbete *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid


Jag upplever att jag jobbar mer än vad jag tänkt mig *
1 - Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag upplever att jag måste prestera mer och bättre med teknologin *
1 - Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag delar inte gärna med mig av tekniska
This question was excluded due to ambiguity
Jag känner mig full av energi *
1 - Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag trivs på min arbetsplats *
1 - Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag trivs med mina kollegor *
1 - Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid


Jag känner att jag är rättvist belönad för min arbetsinsats *
1 - Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Användarvanor
Frågor om på vilket sätt, hur ofta och hur mycket du använder dig av mobil data
Jag utbyter information med min arbetsplats utanför ordinarie arbetstid, med hjälp av
E-post
Kalender
Snabbmeddelanden
Telefonsamtal
Företagsspecifika applikationer
Jag har gjort en medveten ansträngning för att minska mitt bruk av mobil data *
Ja
Nej
Jag upplever att jag undlåter att göra saker på min fritid för att jag är upptagen med arbetsrelaterade uppgifter *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid


Familj eller vänner kommenterar på att jag verkar jobba mycket *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag håller mig uppdaterad om arbetssituationer, även på fritiden *
1 - Aldrig, 2 - Någon gång per år, 3 - Någon gång per månad, 4 - Någon gång per vecka, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag har ändrat på mina arbetsvanor för att bättre anpassa mig efter ny teknologi *
1- Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag svarar på e-post/textmeddelanden oavsett var jag befinner mig *
1- Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid
Jag blir irriterad om jag inte kan hålla mig uppkopplad *
1- Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid


Om jag inte har någonting annat att göra så använder jag min smart phone/tablet som distraktion *
1- Aldrig, 2 - Sällan, 3 - Ibland, 4 - Ofta, 5 - Nästan alltid
1 2 3 4 5
Aldrig Nästan alltid

12 Appendix III - Correlation table

		Age	Gender	Level of education	Computer-experience	Smartphone/ tablet owner	I work more than expected	I feel that I have to perform better with the technology	Mobile data prevents me from relaxing at leisure	I feel that I expected to be constantly available	I also work when I'm actually off	I'm thinking about quitting my job	The idea of a new day makes me tired. even when I slept a whole night	I feel completely "drained" after a working	I feel that I work too hard	I feel frustration with the standard of my work	I share information with my work outside normal working hours. using different functions
Age	Correlation	1.000															
	N	85															
Gender	Correlation	0.288	1.000														
	N	85	85														
Level of education	Correlation	-0.305	0.025	1.000													
	N	85	85	85													
Computerexperience	Correlation	-0.079	-0.266	-0.046	1.000												
	N	85	85	85	85												
Smartphone/tablet owner	Correlation	0.127	0.156	0.012	-0.172	1.000											
	N	85	85	85	85	85											
I work more than expected	Correlation	0.08	-0.038	-0.019	0.408	-0.147	1.000										
	N	85	85	85	85	85	85										
I feel that I have to perform better with the technology	Correlation	0.131	0.06	-0.136	-0.083	0.159	0.09	1.000									
	N	85	85	85	85	85	85	85									
Mobile data prevents me from relaxing at leisure	Correlation	0.071	0.072	0.077	-0.118	0.032	0.056	0.283	1.000								
	N	85	85	85	85	85	85	85	85								
I feel that I expected to be constantly available	Correlation	0.014	-0.09	0.11	0.008	-0.144	0.157	0.4	0.334	1.000							
	N	85	85	85	85	85	85	85	85	85							
I also work when I'm actually off	Correlation	0.095	-0.295	0.057	0.207	-0.054	0.32	0.114	0.249	0.458	1.000						
	N	85	85	85	85	85	85	85	85	85	85						
I'm thinking about quitting my job	Correlation	0.182	0.006	-0.048	-0.096	0.098	0.324	0.32	0.394	0.275	0.153	1.000					
	N	85	85	85	85	85	85	85	85	85	85	85					
The idea of a new day makes me tired, even when I slept a whole night	Correlation	-0.129	-0.087	-0.121	-0.023	-0.024	0.18	0.229	0.133	0.211	0.056	0.413	1.000				
	N	85	85	85	85	85	85	85	85	85	85	85	85				
I feel completely "drained" after a workingday	Correlation	0.145	0.181	-0.093	-0.101	0.038	0.183	0.076	0.126	0.058	0.035	0.268	0.401	1.000			
	N	85	85	85	85	85	85	85	85	85	85	85	85	85			
I feel that I work too hard	Correlation	0.067	0.061	-0.087	0.12	-0.191	0.615	0.111	0.128	0.215	0.23	0.373	0.354	0.36	1.000		
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85		
I feel frustration with the standard of my work	Correlation	0.253	0.177	-0.232	-0.134	0.166	0.208	0.227	0.251	-0.015	-0.035	0.509	0.414	0.534	0.342	1.000	
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	
I share information with my work outside normal working hours. using different functions	Correlation	0,000	0,000	-0.845	0,000	#DIV/0!	0.577	0,000	-0.634	#DIV/0!	0.198	0.5	0.5	0.423	0.634	0.323	1.000
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85

		Age	Gender	Level of education	Computer-experience	Smartphone/ tablet owner	I work more than expected	I feel that I have to perform better with the technology	Mobile data prevents me from relaxing at leisure	I feel that I expected to be constantly available	I also work when I'm actually off	I'm thinking about quitting my job	The idea of a new day makes me tired. even when I slept a whole night	I feel completely "drained" after a working	I feel that I work too hard	I feel frustration with the standard of my work	I share information with my work outside normal working hours. using smartphone/tablet
I feel that I fail to do things in my spare time because I'm busy with work-related tasks	Correlation	0.03	-0.175	0.026	0.187	-0.217	0.572	0.299	0.286	0.321	0.492	0.337	0.132	0.229	0.471	0.272	0.5
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
I changed my work habits to better adapt to new technology	Correlation	-0.034	-0.216	-0.159	0.091	0,000	0.215	0.239	0.085	0.32	0.381	0.213	0.088	0.11	0.215	0.235	0.198
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
I keep myself updated about work situations. even in their leisure time	Correlation	-0.05	-0.248	0.258	0.13	-0.193	0.029	-0.05	0.148	0.401	0.62	0.018	-0.155	-0.097	-0.054	-0.105	-0.593
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
I feel full of energy	Correlation	0.004	0.144	0.134	-0.081	-0.092	-0.157	-0.198	-0.115	-0.07	0.118	-0.473	-0.53	-0.422	-0.244	-0.409	-0.211
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
I enjoy my workplace	Correlation	-0.159	-0.005	0.111	-0.127	-0.016	-0.363	-0.318	-0.058	-0.149	0.054	-0.668	-0.434	-0.183	-0.324	-0.376	-0.645
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
I enjoy working with my colleagues	Correlation	-0.056	-0.122	-0.022	-0.131	-0.1	-0.175	-0.084	0.032	0.07	0.204	-0.324	-0.296	-0.108	-0.251	-0.247	0,000
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
I am fairly rewarded for my effort	Correlation	-0.015	-0.093	0.242	0.219	-0.212	-0.214	-0.279	-0.258	-0.161	0.08	-0.472	-0.386	-0.273	-0.137	-0.347	-0.845
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
I made a conscious effort to reduce my use of mobile data	Correlation	-0.051	-0.206	-0.055	0.039	-0.219	-0.087	-0.085	-0.226	-0.037	0.006	-0.121	-0.093	-0.067	-0.038	-0.067	-0.791
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
I respond to e-mail/textmessages regardless where I am	Correlation	0.031	-0.149	0.12	-0.053	-0.058	-0.054	0.055	0.142	0.349	0.379	0.119	-0.013	-0.023	-0.148	-0.038	-0.31
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
I get irritated if I can not hold me constantly connected	Correlation	-0.175	0.098	0.228	0.095	0.067	0.003	0.037	0.039	0.172	0.149	0.122	0.216	0.094	0.068	0.006	#DIV/0!
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
If I have nothing else to do so. I use my smartphone / tablet as a distraction	Correlation	-0.43	-0.01	0.43	0.119	0.104	-0.207	-0.092	0.079	0.017	-0.02	-0.13	0.02	-0.048	-0.248	-0.155	-0.466
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Family or friends commented that I seem to work too much	Correlation	0.007	-0.029	-0.032	0.271	-0.206	0.542	0.165	0.117	0.24	0.453	0.104	-0.065	0.124	0.4	0.002	0.395
	N	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85

12.1 Appendix IV - The quantitative research approach

Our process began in early October 2011, when we started brainstorming each on our own. Through intermittent communication, we eventually decided to look through old thesis projects and see if any of them could serve as inspiration. The resulting ideas from this collaborative process were:

- 10 year retrospective on the Y2K panic. What did actually happen?
- Is it possible to predict extinction patterns in technologies? (VHS vs. Betamax, WAP, etc.)
- Many companies say that they would like to use wiki-like systems, but they often have a hard time getting their employees to use them. Why?
- Study thin clients with web applications and cloud storage. There have been earlier attempts at getting people to adopt thin clients, why did it fail? Are the circumstances any different today?
- Is it possible to make net savings by switching to open source solutions? What are the upsides? Downsides? What should one be aware of?
- How has mobile computing changed over the years?

From these suggestions, we eventually settled on studying mobile computing. We began searching for journal and peer-reviewed articles, and swiftly discovered that most of them had a focus on work-life balance. Because of this, we chose the effect mobile computing has on IT-professionals' work-life balance as our area of study.

In reviewing the available literature, we realized that it mostly relied on a concept defined back in the 1980ies: technostress. This concept is described in greater detail in the section on theory. We felt that the pre-existing knowledge did not mesh well with our original topic, and decided to shift it to our current topic: "How an increasingly connected world affects IT-professionals' experiences of technostress".

The next step was to form a hypothesis that would help narrow and maintain our focus; that high level of use of mobile computing is correlated with an increase in burnout and stress indicators. We collected a theoretical foundation for mobile computing, technostress, Maslach' burnout and stress indicators, and formed our own theoretical basis thence.

The choice in population was easy, we needed people who are "in the thick of things" and who understand what it means to experience technostress. Fortunately for us, Sweden has a large and thriving IT-sector and an abundance of companies to contact for surveys. We reached out to our contacts in the IT-profession to find a good source of respondents.

The next step in our research process was to create a chapter on methods, which in turn would help us design our questionnaire and help us find ways to analyze our results. Aided by the theoretical framework and the method chapter, we designed a questionnaire and implemented in through Google Docs Forms. We then sent the URL to the questionnaire and a text describing our research to our contacts, who in turn forwarded it to other employees at their respective firms.

When the time came to analyze our results, we imported the data set into Excel and created correlation tables, to better get an overview of what correlations were found. We swiftly discovered that our original purpose, finding a link between use of mobile and burnout was too generalized to easily analyze. We did however find strong correlations in other areas, areas that we also felt were relevant and interest to present.

In light of this data, we took measures to improve on our potential for findings; we went back to the theoretical framework, added additional theory and created three main hypotheses with underlying sub hypotheses, where applicable. This gave our analyses a better structure and it was easier to present the results.

We scanned through the thesis to make sure that no redundancies remained or had been inserted. We continuously reminded ourselves of our stated purpose, to ensure that the thesis stayed on the right track and that the path we had taken was clear, from start to finish. We have been constantly granted new and fresh perspectives on our thesis, much thanks to the several research seminars that were held. The input we were given resulted in new ideas on how to proceed with making our rapport easier to read, easier to understand, and most of all, more scientific.

12.2 Appendix V - Factors in technostress

Table taken from Ragu-Nathan et al. (2008), where factors in technostress are identified. They were reformulated for use in designing the questionnaire part relating to technostress.

Factors	Items	Describe	Loading	α
Techno-overload	X101	I am forced by this technology to work much faster	.765	.63
	X102	I am forced by this technology to do more work than I can handle	.652	
	X103	I am forced by this technology to work with very tight time schedules	.711	
Techno-invasion	X104	I am forced to change my work habits to adapt to new technologies	.461	.80
	X105	I have a higher workload because of increased technology complexity	.536	
	X106	I have to spend a lot of time everyday reading an overwhelming amount of e-mail messages	.600	
	X107	I have to work harder because of delays from hardware, software and network problems	.646	
	X108	I spend less time with my family due to this technology	.700	
	X109	I have to be in touch with my work even during my vacation due to the technology	.724	
	X110	I have to sacrifice my vacation and weekend time to keep current on new technologies	.574	
	X111	I feel my personal life has been invaded by this technology	.600	
Techno-complexity	X112	I do not know enough about this technology to handle my job satisfactorily	.675	.77
	X113	I need a long time to understand and use new technologies	.614	
	X114	I do not find enough time to study and upgrade my technology skills	.623	
	X115	I find new recruits to this organization know more about computer technology than I do.	.603	
	X116	I often find it too complex for me to understand and use new technologies	.663	
	X117	I feel constant threat to my job security due to new technologies	.549	
	X119	I am threatened by co-workers with newer technology skills	.482	
Techno-insecurity	X120	I do not share my knowledge with my co-workers for fear of being replaced	.851	.79
	X121	I feel there is less sharing of knowledge among co-workers for fearing of being replaced	.813	
Techno-uncertainty	X122	There are always new developments in the technologies we use in our organization	.796	.81
	X123	There are constant changes in computer software in our organization	.837	
	X124	There are constant changes in computer hardware in our organization	.804	
	X125	There are frequent upgrades in computer networks in our organization	.720	

12.3 Appendix VI - Abbreviated Maslach Burnout Inventory

The following table is the abbreviated Maslach Burnout Inventory (Maslach et al., 1996); it was used to aid in formulating questions pertaining to burnout indicators. As they were originally designed to deal with healthcare professionals, they had to be redesigned to fit our target population.

Scoring the abbreviated Maslach Burnout Inventory

The abbreviated Maslach Burnout Inventory consists of the following questions:

How often do the following statements describe the way you feel about working as a doctor?

	Every day	*A few times a week*	*Once a week*	*A few times a month*	*Once a month or less*	*A few times a year*	*Never*
I deal very effectively with the problems of my patients							
I feel I treat some patients as if they were impersonal objects							
I feel emotionally drained from my work							
I feel fatigued when I get up in the morning and have to face another day on the job							
I've become more callous towards people since I took this job							
I feel I'm positively influencing other people's lives through my work							
Working with people all day is really a strain for me							
I don't really care what happens to some patients							
I feel exhilarated after working closely with my patients							
I think of giving up medicine for another career							
I reflect on the satisfaction I get from being a doctor							
I regret my decision to have become a doctor							