IUL School of Social Sciences

Department of Political Economy

THE OVERALL POTENTIAL OF TELECOMMUTING

Deveani Achevincumar Babú

Dissertation submitted as partial requirement for the conferral of

Master in Human Resources Development Policies

Supervisor:

Doutor Nelson Campos Ramalho, Assistant Professor,

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Abstract

Commuting become not only a common feature in the urban landscape but also a potential problem for developed societies that translates into economic, social and environmental losses. This study is set to explore the potential of telecommuting as well as a model that connect sociodemographical, psychological, and operational variables to the intention to accept telecommuting offers via attitudes towards telecommuting.

The empirical study started with interviews to inform a survey that was answered by 126 Lisbon commuters. Results show interviewees views on telecommuting consequences are in line with extant research and that attitudes towards telecommuting (productivity, and cost savings) are predictors or intention to accept telecommuting offers. Likewise, professional tenure and work-to-home stress foster a more favorable attitude related to productivity / QWL while displacement mode (active) and home-to-work stress foster a more favorable attitude related with cost savings.

The study concludes that the potential is not negligible and that the process of implementing telecommuting as a HRM policy is doable on the basis of the attitudes identified.

Key words

Commuting; Potential of telecommuting; Remote work, Attitudes towards telecommuting

JEL Classification System

M54 - Labor Management

J29 - Time Allocation, Work Behavior, and Employment Determination: Other

Resumo

As deslocações tornaram-se não apenas uma caraterística na paisagem urbana mas também um problema potencial para as sociedades desenvolvidas e que se traduz em perdas económicas, social e ambientais. Este estudo pretende explorar o potencial do teletrabalho bem como um modelo explicativo que ligue variáveis sociodemográficas, psicológicas e operacionais à intenção de aceitar uma oferta de teletrabalho por intermédio das atitudes face a esta alternativa.

O estudo empírico encetou com entrevistas para informar o questionário que foi respondido por 126 trabalhadores a viver em Lisboa. Os resultados mostram que os entrevistados têm uma visão do teletrabalho que está em linha com o que se conhece na literatura e que as atitudes face ao teletrabalho (produtividade/qualidade de vida no trabalho e redução de custos) são preditores da intenção de aceitação de ofertas de teletrabalho. Do mesmo modo, a antiguidade profissional e o stress sentido na viagem casa-trabalho promovem uma atitude mais favorável face ao teletrabalho (produtividade) enquanto que o modo de deslocação (ativo) e o stress trabalho-casa promovem uma atitude mais favorável relacionada com redução de custos.

O estudo conclui que o potencial do teletrabalho não é despiciendo e que o processo de implementação do teletrabalho enquanto política de GRH é fazível com base nas atitudes identificadas.

Palavras-Chave

Deslocação; Potencial teletrabalho; Teletrabalho; Atitudes face ao teletrabalho

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Introduction

Urban consolidation led to the expectation of masses of people dislocating regularly to work, shopping, get some entertainment, and fulfill their social duties amongst many other possibilities. Traffic jam became an expectable urban landscape at certain hours due to the convergence of social rhythms mostly to work and return home. Additionally, the urban growth patterns, with emerging suburbia, created a class of individuals that spend considerable time and money to assure their transportation, the commuters.

Although such pattern is discernible across most of – if not all – large metropolitan areas in the world, it is not necessarily positive to accept it as a fact of life as its consequences can be dare, putting sustainability at hazard both from the social, economics, and ecological points of view.

With the shift to services economy and the increased use of IT, some societies have bet on replacing the traditional job post by working from home. This became known as "telecommuting" because workers will remain bounded to the most of the duties they had, but without the assumption that they must be physically present at their job post to actually perform their duties.

The changes that Portugal have experienced in the last decades with growing metropolitan areas, especially in Lisbon, and the rise of automobile ownership, is matched by scarce knowledge on the adoption of telecommuting in this country. In this context, the study focuses on "The overall potential of telecommuting", where through the drivers and consequences of commuting at economic, social, and environmental levels, we evaluate a possible explanative model for adopting telecommuting with a diverse sample of Portuguese workers.

It is particularly interesting to understand to what extent it is inevitable, and whether its impact justifies the formulation of Human Resources management policies. In this way, the study sets itself the general goal of evaluating telecommuting potential by means of self-reported perceptions of in-job time reduction, cost reduction, and effectiveness differential while exploring possible attitudinal and psychological predictors of intention to accept telecommuting offers. To achieve these goals, we questioned "What are the predictors of

attitudes towards telecommuting and intention to accept telecommuting offers?" as estimators of telecommuting potential.

Literature review focused the rise of commuting, its drivers and consequences as well as how telecommuting emerged, its advantages and disadvantages, and its potential and effectiveness impact. The remaining of this work shall explore these issues related with telecommuting to proceed with the report of an empirical study.

The study is of a qualitative and quantitative nature, where interviews were conducted to Portuguese workers from different sectors to gain insight into specific variables operating in this context. On the basis of this information and crossing with it literature review we built an online survey to test the predictive model between sociodemographics, job-related variables (workload, extra work), telecommuting-related variables (displacement modes, time, cost, stress) and attitudes towards telecommuting plus intention to accept telecommuting offers.

By having a better understanding of telecommuting with a Portuguese sample, it is expected to tap its potential so that organizations can better consider this way of organizing work to overcome the challenges that an urban and professional life place. In order to think of a HR policy concerning telecommuting, it is important to understand the patterns of association between certain sociodemographics, work design (workload), transportation options and costs in order to understand which variables should lead to better acceptance of telecommuting, where it is advantageous.

Chapter 1. The rise and fall of traditional job post

The traditional job post can be associated to the concept of commuting, since millions of people use car or another mode of transport to go to their workplace, spending their time on it. Commuting refers to traveling from the home to the workplace (Mattisson et al., 2014) and the person who has to do that on a daily basis has been known as "commuter". This includes those who travel using a car, public transport and also those who bicycle or even walk.

The Industrial Revolution of 1760-1830 became known as the "rise of the factory" (Mokyr, 2001), which led to the displacement of the workers from home to their workplace. But how did the traditional job post fall? What led to the decline of the traditional job post?

First of all, it is relevant to understand the events that conducted to the rise of traditional job post. The last decades of the eighteenth century and the first half of the nineteenth century witnessed the creation of the factory and its towns as well as an industrial wage labor force or proletariat. By 1914, the decline of people working from home led to the majority being working in a job post (Mokyr, 2001). Commuting became thus a necessity.

But why did the factory established itself as the main work venue? In the current literature, there are three explanations for the "Rise of the Factory". First, the technical requirements of an assembly line and the advantage from economies of scale pushed the minimum size of firms upward so that the number of workers required would not fit the maximum household capacity. Second, the transaction costs were higher in decentralized households and the development of technology changed the costs of monitoring and incentives to self-monitor. Third, concentrating workers under one roof and placing them under supervision, reinforces the actual work effort (Mokyr, 2001). According to Marglin (1974), the emergence of factories occurred when workers were placed together to work longer hours than they would have if left at home. The factories were more efficient than cottage industries since they save on transactions costs, so their rise was inexorable (Williamson, 1980). With the rise of the factory there was an increasing stringency of the competitive environment where workers operated, and in this way increased the allocative efficiency and also accelerated the adoption of new best-practice techniques. "The rise of the factory was a wholly technological event" (Mokyr, 2001, p.13).

However, today, a return to the conditions of pre-Industrial Revolution is being predicted by some telecommuting enthusiasts, in which networked households will become once again the main location in which people will work as proximity requirements will decline in business in the near future (Moriset & Malecki, 2009). The "death of distance" may conduct the production to take place from any location, therefore, the need for employees to be physically present at central office may become less and also less required (Mokyr, 2001).

Even in the early factories there was a compromise between the domestic system and the need to produce away from home (Mokyr, 2001). Most of the companies did not change abruptly the domestic system to a factory system, but continued to cultivate some processes for domestic workers while mechanization and technology were not sufficiently developed and apt to be used to make workers work under one roof. The reason to put workers under one roof was to ensure repeated interaction and personal contact, so the information can be fully and reliably transmitted, since the distance is a negative factor in the transmission of information (Mokyr, 2001). Communication needs played a critical role in the home-factory shift.

Reallocating workers to a factory depended on the cost/benefit ratio of moving information relative to that of moving people. These cost/benefit ratio differential slightly shifted as communication technologies took place in society. These were the emergence of the telegraph and the telephone in one of the most innovative periods of history, 1859-1873 (Mowery & Rosenberg, 1989, cit. in Mokyr, 2010). Most recently, the emergence of the internet reversed this ratio differential since it weakened the relation between information exchange and physical transportation. Alongside with the internet the wide use of cellular or mobile networks became a decisive factor (Mokyr, 2001).

At a time, the direct contact was the essential technique of sharing information, but the model further predicts that the knowledge can be shared and trusted among people by others means, such as electronic communication, in which firms may survive but large plants may become less necessary (Mokyr, 2001). Aligned IT systems can even be treated strategically by CEOs to provide competitive advantage to companies (Kearns & Lederer, 2003).

Kraut (1989, cit. in Mokyr, 2001) describes some advantages and drawbacks of telecommuting before the emergence of the Internet. The "factory" is in retreat as a central location where people have to go physically, and also as a time-organizing institution in which the time of beginning and ending of the work is already defined, basically the time of

leisure and work is already stipulated. Working at home led to less commuting, more flexibility in the leisure-work trade-off and also contributed to combine work with family and house responsibilities.

According to the 1990 census, about 3.4 million workers aged 16 and above worked "only or mostly at home" (Russell, 1996). However, a review by Mokhtarian et al. (2005) for data sources between 1995 and 1999 showed between 4.8 and 5.6 million workers in this condition. According with these authors there is considerable variation in the number of estimated telecommuters in the USA depending on the definition of telecommuter. If defined as "worked at home at least one day last week instead of traveling to work", the rate can go up to 26% of the telecommuting population, while defining it as "worked at home at least 6 days last week instead of traveling to work" showed only 4.5%. It is worth noticing that setting the threshold at 5 days a week returns a 25% rate indicating that there is no linear progression on the rate considering the number of days in the definition. The mode is set in one and five days.

In 2012, Citrix Systems examined in many countries the proportion of employees providing or expanding telework options, and the research revealed highest percentage in United States, about 90% of employees provided or expanded telework options. China presents the second highest percentage (85%), 77% in India, 75% in UK and 71% at France and Germany (Hess, 2014). According with the same source, technology made possible the work to be done remotely and in the U.S. telecommuting has consistently been on the rise, where there has been, since 2012, a 20% increase in telecommuting, as there were about 24% of workers doing telecommuting some hours each week. The results based on Gallup's annual Work and Education poll showed an increase in telecommuting, in U.S., between 1995 and 2015, where 37% of workers said they have telecommuted against 9% twenty years before (Princeton, 2015, cit. in Jones, 2015).

According to the Eurostat, telecommuting in the European Union has increased ever since 2006. The proportion of employees working from home was 11.8% in 2006, while in 2015, the overall proportion grew up to 14.5% (Picu & Dinu, 2016).

But telecommuting is still a long way off as an economy-wide phenomenon. Just because technology is changing and developing, it does not mean that the workplace as a physical institution will cease to exist, but will make commuting to work increasingly optional and part-time (Mokyr, 2001). As mentioned by Picu and Dinu (2016), the globalization of

business and the technology's advancements will continue to change the nature of future work flexibility, offering more people the chance to work remotely.

According to a study conducted by *SHRM Foundation* in collaboration with the *Economist Intelligence Unit* (2013, cit. in Picu & Dinu, 2016), the proliferation of communication and information technology is slowly diminishing the proportion of employees working from a central office. The remote work is on the rise (Picu & Dinu, 2016), leading to the fall of traditional job post.

Alongside, the digitization of the economy brought a set of new services such as the trade of software, video, computer games, digital TV, call centers, digital design (CRC), e-learning and moocs, online shopping, and banking (Moriset & Malecki, 2009). These services replaced traditional ones providing the same service at a lesser cost.

All in all, the rise of the traditional job post or, as it was called, the "rise of the factory", was a reaction to an information/moving workers ratio that has been reversing ever since IT took central role in modern societies. The foreseeable future will be one with less and less traditional job posts.

1.1. Commuting modes

Commuting is not just done by cars or by public transport (bus, metro, train), it can also be done by biking and by walking. And it is important to understand that not all commuting modes have benefits, some of them have costs, since different travel modes have different effects on personal well-being (ONS- Office for National Statistics, 2013).

The different types of commuting are grouped into two major categories: active and passive commuting (Hansson et al., 2011; Lindstrom, 2008; Gatersleben & Uzzell, 2007, cit. in Künn-Nelen, 2016). The active commuting includes commuting by bicycle or walking and the passive commuting encompasses commuting by car or public transport.

Commuting by car is more stressful than any other way, since those who go by private vehicle have more health problems. According to Gatersleben and Uzzell (2007), the passive commuting modes, car and public transport, are more stressful and also more boring. When people choose to commute by bicycle or walking they get benefits to their health. These

modes of commuting contribute to people's physical exercise and also provide lower probability of obesity (Lindstrom, 2008, cit. in Künn-Nelen, 2016). As mentioned by Gatersleben and Uzzell (2007), active commuting modes, as opposed to passive, are more relaxing and exciting.

Wener and Evans (2011, cit. in Künn-Nelen, 2016) compared the stress effects of commuting for car drivers and those who use public transport, and they found that car drivers have more stress than bus commuters. Commuting by car raises physiological markers of stress, such as blood pressure and neuroendocrine hormone levels (Robinson, 1991, cit. in Künn-Nelen, 2016). And as found by Cox et al. (2006) and Singer et al. (1974), public transport commuting, namely crowded trains, raise physiological stress. These stress effects differences can be explained by flexibility and predictability of travel between work and home linked with distinct transport options (Evans, Wener & Phillips, 2002; Lyons & Chatterjee, 2008, cit. in Mattisson et al., 2015).

1.2. Drivers of commuting

There are many factors influencing commuting activity, such as the population density (Levinson & Kumar, 1997), transport accessibility (Zhao et al., 2011), transport affordability (Cropper & Bhattacharya, 2012), housing costs at center urban areas (So, Orazem & Otto, 2001), and the number of working women (Grieco, Pickup & Whipp, 1989). Time spent at commuting is also explained by some factors such as the growth of automobile per household and the traffic congestion (Novaco & Gonzalez, 2009).

Population density is very important for country development and it is a significant variable that influences the commuting activity (Levinson & Kumar, 1997; Gordon et al., 1989, cit. in Dai et al., 2016). The more dense urban areas are, the more likely will be that people will be living farther from their job location. People are the main object of commuting activities, affected by household factors (Dai et al., 2016).

Transport accessibility and affordability are other factors which have different effects on commuting activities (Zhao et al., 2011; Cropper & Bhattacharya, 2012, cit. in Dai et al., 2016). The growth of suburbia was a direct result both of urban fast expansion as housing costs in central areas spiraled, which made the choice of living far from central areas (e.g.

downtown) the only one that provide affordable housing for many (So, Orazem & Otto, 2001).

The large increase in the number of women working contributed to the increase in commuting as well (Grieco, Pickup & Whipp, 1989; Pisarski, 1987, cit. in Novaco & Gonzalez, 2009).

There was a growth in automobile commuting, especially in USA, between 1960 and 1980, which increased the accidents rates and road deaths (Novaco & Gonzalez, 2009). This growth raised the commuting time, since accident rates and road deaths delay people on their commuting.

The commuting time is also a central dimension which is influenced by traffic congestion that became a salient problem in metropolitan areas (Novaco & Gonzalez, 2009).

All in all, the rise of commuting is driven by many factors, some of a sociodemographic nature and other of an economic one. During the XX century, commuting has been the hallmark of metropolitan growth and economic signs of prosperity and dynamics. This however, does not occur without consequences.

1.3. Consequences of commuting

The consequences of commuting have been studied by several authors and most of them showed the negative impacts of the phenomenon at different levels: economic, social, and environmental. To analyze the consequences of commuting, we focus on three dimensions through the GRI Global Reporting Initiative – Triple bottom line "tool".

Before using this model to analyze the consequences of commuting, we shall explain its relevance for that purpose. The GRI, founded in 1997, is an independent international organization that aims to help businesses, governments and other organizations not only to assess the business impact, as well as helping to communicate about it in different areas (human rights, corruption...). GRI offers the guidelines for the triple bottom line, focusing in the three-dimensional model that encompasses economic, social and environmental aspects (Schlank, 2002). The triple bottom line model is a type of structure that incorporates three dimensions of performance that many companies have wagered to create higher business

value. The triple bottom line consists of three Ps: profit, people, and planet. Each of the bottom line has its specific dimension: the first bottom line is the traditional measure of corporate profit- profit and loss account and it is at the economic level; the second, at the social level, is the bottom line of a company's "people account" and the third is the company's "planet" account, which is at the environmental level (Hall, 2011). The comprehensiveness of this framework was the feature that made us adopt it to identify the consequences of commuting in order to assess the potential of telecommuting.

Commuting presents drawbacks at the economic level, since higher commuting leads to higher automobile circulation which will, consequently, lead to higher energy consumption and, in this way, there will be greater economic costs. According to Kluger (1998, cit. in Emre & Elci, 2015) and Costal et al. (1988, cit. in Künn-Nelen, 2016), greater commuting time is related to higher absenteeism. And as found by van Ommeren and Gutiérrez-i Puigarnau (2011, cit. in Künn-Nelen, 2016), commuting distance also raises workers' absenteeism. Commuting stress is a contributor to absences from work, which does not only affect the employee but also the organization (Holland, 2016).

Commuting has disadvantages at the social level, since, according to Cassidy (1992, cit. in Mattisson et al., 2015), commuters with longer travel times or distances have less time to socialize and have issues in their social lives. Additionally, disadvantages extend to family life as long distance commuting to workplace has been associated with increased risk for marriage breakdown (Sandow, 2011, cit. in Li & Pollmann-Schult, 2015) as well as significant decreases in time spent with family and friends (Christian, 2012, cit. in Li & Pollmann-Schult, 2015).

At work sites commuting has also been associated with negative mood when arriving at work and coming home, increased lateness, turnover at work (Koslowsky et al., 1995, cit. in Stutzer & Frey, 2008). Commuting also generates lowered frustration tolerance, cognitive performance impairments (Novaco & Gonzalez, 2009), and decrements in overall life satisfaction (Stutzer & Frey, 2008).

As regards health, commuting is also related to poor mental health outcomes (Hilbrecht et al., 2014), since longer commuting times contributes to fatigue symptoms (Kageyama et al., 1998), to less nocturnal sleep (Walsleben et al., 1999) and also to reduced sleep time (Costal et al., 1988, cit. in Künn-Nelen, 2016). A longer commuting time is also associated to a higher body mass index (BMI), as showed by Lindström (2008) and Frank et al. (2004, cit. in Künn-

Nelen, 2016). White and Rotton (1998) demonstrated that commuting is linked with increased pulse rate and systolic blood pressure. Lengthy commutes have other health issues, such as hypertension, obesity, decreased cardiovascular fitness, stress and low energy (Hansson et al., 2011; Hoehner et al., 2012) or less evident ones such as bad home mood at evening (Novaco, Stokols & Milanesi, 1990).

Koslowsky et al. (1995, cit. in Künn-Nelen, 2016) showed that the association of commuting strain is not only with hypertension but also with musculoskeletal disorders and increased anxiety and hostility.

At the environmental level, commuting also brought negative consequences, because alongside with increase automobile use, there is an increase in air pollution which harms people's well-being (Smyth et al., 2009, cit. in Hilbrecht et al., 2014).

As mentioned, commuting has many negative consequences at the three levels. It is, therefore, important to assess the potential of reducing commuting taking into account economic, social and environmental aspects. Telecommuting is a possible answer.

Overall, the attitudes towards telecommuting may result from considerations about displacement modes, displacement time, transportation costs and psychological costs translated as stress experienced in traveling from home to work and back from work. We hypothesized that **the higher these cost-variables get, the more favorable attitude towards telecommuting will be observed (Hypothesis 1)**. Adopting less expensive modes of displacement (e.g. walking as compared with automobile), having longer commuting times, paying more for transportation or feeling more stress will be positively associated with attitudes towards telecommuting. Additionally, the workload and full working hours (extra work) should be taken into consideration as well as sociodemographics, as control variables.

Chapter 2. Telecommuting emergence and impact

Commuting is a part of the urban landscape worldwide. The urban development, automobile use increase, a bigger job offer, workforce feminization, and population growth are some of the factors explaining its rise in societies. As explained, its consequences have been profusely documented. Despite being time-consuming especially with great distances involved, commuting also generates out-of-pocket costs, causes stress and tension in the work-family relationship (Stutzer & Frey, 2008) and long commutes are harmful to people's health (Hansson et al., 2011, cit. in Künn-Nelen, 2016).

To tackle these negative consequences, organizations challenged some assumptions on work, namely, that work has to be performed in a work station within the physical premises of the organization. Telecommuting, as was named, refers to the work done at home or another remote location through information and communication technologies (Asgari & Jin, 2015), without having to physically commute to the workplace.

The emergence of this phenomenon occurred in U.S.A. in 1970s, but the term is thought to have been coined in 1973 by an engineer, Jack Nilles. This was necessary to alleviate traffic problems, to reduce energy consumption and also to help individuals to manage work and family responsibilities (Allen, Golden & Shockley, 2015). This phenomenon is not only gaining acceptance in the U.S.A. but also at many other countries and for many reasons, such as business and public policy (Mokhtarian & Salomon, 1994) and is growing (Davis & Polonko, 2001, cit. in Gajendran & Harrison, 2007).

Telecommuting does not refer to time spent working at home after spending all day working in the office. It involves working at a remote place away from a central office (Allen, Golden & Shockley, 2015).

It is important to state that telecommuting has been referred to many terms, such as *telework*, *remote work*, *virtual work*, *flexible work*, among others (Allen et al., 2015). But each has its own specification and it is relevant to perceive the differences between the two main, "telecommuting" and "telework", since people think that these concepts have the same meaning.

Normally, telecommuting is equated with teleworking, but not all teleworking, leaving aside teleconferencing (Mokhtarian, 1991). Some authors have defined the concept of

"telecommuting" and others the term "telework", which seems alike but are not. Mokhtarian (1991, p.1) defined telecommuting as "The use of telecommunications technology to partially or completely replace the commute to and from work". And telework is "Work performed by those whose remote work is from the home or a satellite office, those whose telework is primarily in the field, and those whose work is "networked" in such a way that they regularly work in a combination of home, work, and field contexts" (Morganson, Major, Oborn, Verive & Heelan, 2010, p.43, cit. in Mokhtarian, 1991).

Telework is about the use of telecommunications-related technology to do the work and it is not quantified as "remote work", but telecommuting is both telework and remote work as well (Mokhtarian, 1991).

Telecommuting has a major impact nowadays. The biggest impact of telecommuting is visible in the social life of telecommuters, since they begin to spend more time at home, giving greater attention to the family (Mokhtarian & Salomon, 1994). This phenomenon also has a big impact on external environment, through which we can see less commuting.

2.1. Advantages, disadvantages, and potential for telecommuting

This phenomenon - telecommuting- can provide positive and also negative impacts on telecommuters, and it is important to understand both sides.

Many companies implement telecommuting because it offers an answer to human resources problems, such as recruitment, retention, staffing flexibility; it also has facilities issues (office space or parking) and, sometimes, emergency preparedness (Pratt, 1991, cit. in Mokhtarian, 1991).

Bailey and Kurland (2002, cit. in Meroño-Cerdán, 2016) mentioned some advantages of telecommuting, such as improved productivity, job satisfaction, employee retention and attraction, and organizational loyalty. According to Tredup (2016, cit. in Picu & Dinu, 2016), telecommuting can help employees gain a better work-life balance (especially with children, Cascio, 2000), it also contributes to the increased productivity and improves the engagement at work. Through the reduction in commuting, telecommuting supports the environment and local infrastructures as well (Picu & Dinu, 2016). The existence of telecommuting leads to the reduction of automobile circulation, thus contributing to less pollution, less traffic congestion,

lower energy consumption (Mokhtarian, Bagley & Salomon, 1998; Meroño-Cerdán, 2016) and, thus, also saves money and time spent on commuting while also improving air quality (Asgari, 2015). Telecommuting leads to reduced costs of working, not only via savings in transportation, time and money, but in many cases in formal business attire that is not required if workers telecommute (Gajendran & Harrison, 2007).

This phenomenon contributes to save space and money for companies by eliminating or reducing a physical office, and increases employee morale and loyalty by offering them work in a location of their choice (Picu & Dinu, 2016).

Telecommuting helps in emergencies that can disrupt business and government operations, such as weather events, influenza outbreaks, and in that case, telecommuters play an important role, since they can work from home. Telecommuting is a way for organizations to continue the work in disaster periods (Heng, Hooi, Liang, Othma & San, 2012, cit. in Allen et al., 2015). Telecommuting also helps people who have environmental sensitivities, episodic symptoms, fatigue conditions or other health issues (Allen et al., 2015).

However, telecommuting has its disadvantages as well. As mentioned, telecommuters may spend more time with their family but telecommuting can also foster conflict between work and family, since work can interfere with family and family can interfere with work as well (Allen et al., 2015).

According to Madden and Jones (2008, cit. in Allen et al., 2015), being connected to technologies create more hours of work and lead the telecommuters to check e-mail outside of normal working hours.

An increase on telecommuting also contributes to isolation. According to Harpaz (2002, cit. in Allen et al., 2015), telecommuters become more isolated not only from other people (friends/family), but also from public institutions.

A meta-analysis conducted by Gajendran and Harrison (2007) found several positive consequences associated with telecommuting. In proximal terms, the meta-analysis identified significant effects on the degree of perceived autonomy and less conflict between work and family. In distal terms, the significant effects evidenced positive relationships with work satisfaction, performance and negatives with the intention of voluntary exit and role stress. It should be noted that when the intensity of telecommuting reached 2 ½ days per week, a zero-

sum game (trade-off) was identified between the positive effects in the family and the negatives in the relationship with coworkers.

Telecommuting can be beneficial and also detrimental for telecommuters (Allen et al., 2015), it is important to perceive both and try to led this phenomenon to success, taking into consideration the weaknesses of it and, thus, it is possible to mitigate the negative consequences and focus only on the benefits of telecommuting. This phenomenon can only have success if we consider both aspects - negative and positive.

Besides the advantage-disadvantage debate there is the critical issue of assessing what can and cannot be turned into telecommuting.

The potential of transforming work into virtual work is shown through the benefits of telecommuting and disadvantages of commuting as reviewed. The negative consequences of commuting in all the three dimensions show the potential to do virtual work, which has potential benefits for some kind of jobs, since not all jobs allow telecommuting (for example, jobs that demand physical presence), because this is for workers who work with information or data more than with people or things (Handy & Mokhtarian, 1996). Basically, the "information workers" are the primary candidates for telecommuting, while jobs where physical presence is necessary, such as waiters or hairdressers, are not (Handy & Mokhtarian, 1996). A study conducted by Bélanger (1999) demonstrated that telecommuting is not for everyone, since certain jobs cannot telecommute. Workers which functions are creation, manipulation, and dissemination of information are clearly able to telecommute (Bélanger, 1999).

Overall, the intention to telecommute should reflect considerations of positive impact on effectiveness and cost savings. Therefore we hypothesize that **more favorable attitudes towards telecommuting will be positively associated with intention to telecommute** (**Hypothesis 2**).

2.2. Evaluating telecommuting effectiveness and conditions to be effective

Support from the organization to employees is critical in organizations that offer telecommuting, so that it can be effective (Allen et al., 2015). According to Lautsch et al.

(2009, cit. in Allen et al., 2015), supervisor's support is also relevant for the acceptance and administration of telecommuting work arrangements.

Technology is another aspect that can provide and facilitate effective telecommuting. The success of remote work is possible through communication tools that can best simulate face-to-face interactions (Waber, 2013, cit. in Allen et al., 2015). The technologies make telecommuting more effective. But not all telecommuting requires sophisticated technology (Mokhtarian & Salomon, 1994). Some jobs use advanced technology, such as computer-aided design/manufacturing equipment, to the extent that this use may be considered essential to effective telecommuting (Mokhtarian & Salomon, 1994).

Telecommuting effectiveness is multifactorial and may be related with the way in which individuals execute their work activities (Golden & Veiga, 2005). One aspect that telecommuting provides to workers is the location and temporal flexibility (Allen et al., 2015). Such arrangement may challenge control over time individuals are actually working. The schedule control enables telecommuters to more effectively manage resources, such as time, in order to improve telecommuting outcomes (Golden, 2006, cit. in Allen et al., 2015), so telecommuting can be effective through the control of working time.

The individual differences may influence the ability to effectively work from home, such as planning behavior and self-regulatory skills which enable individuals to function effectively in an environment (home) that provides them a great deal of control (Lapierre & Allen, 2012). It means that individual characteristics that promote self-regulation permit individuals to focus on their work tasks at home (Allen et al., 2015), therefore, individual differences play a role in telecommuting effectiveness.

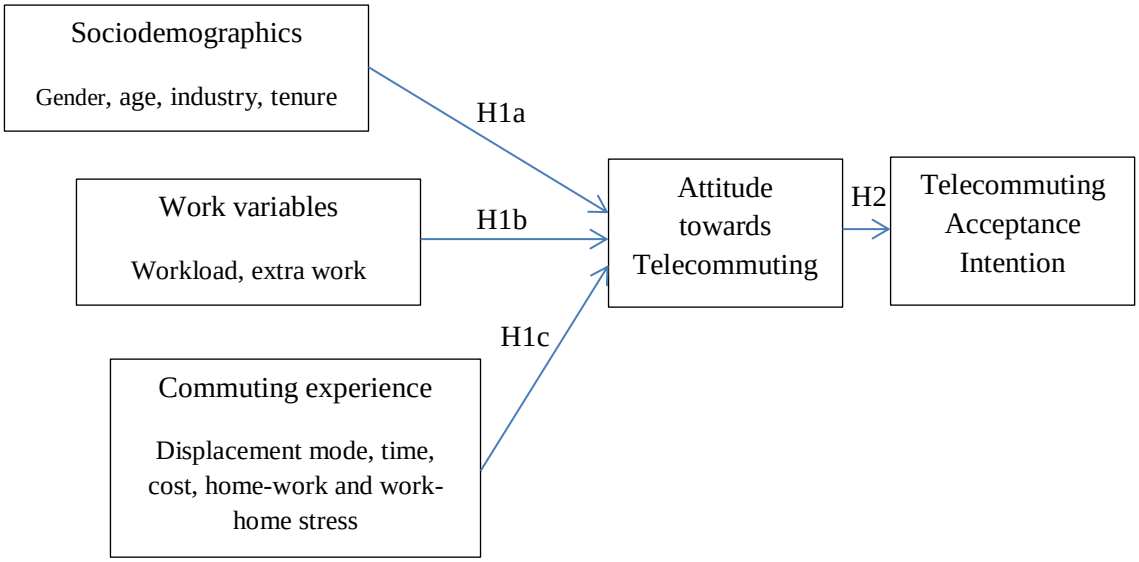
An outcome taken as indication of effectiveness of telecommuting is the reduction of commute trips as travel demand is less required under telecommuting situation (Sampath, Saxena & Mokhtarian, 1991).

All in all, telecommuting emerged as a response to the negative consequences of urban design which fostered hardly sustainable commuting costs, economic, social, and psychological. This response, however, does not only has positive outcomes but also negative ones which must be acknowledged in order to better grasp its effectiveness. The balance between positive and negative effects lies very much in the functional content of job itself (if it is suitable for telecommuting or requires physical presence), and in the way organizations

support and design telecommuting (e.g. technology, rules of use, workload among others) as well as in the individual differences related with skills and attitudes required to autonomously perform a job (e.g. planning behavior, self-regulatory skills).

The overall literature review suggested a plausible research model where a set of predictors (sociodemographics, work related, and commuting experience) may explain attitudes towards telecommuting that, in turn, should explain intention towards telecommuting, as follows (Figure 2.1).

Figure 2.1 – Research model



Chapter 3. Method

3.1. Research design

The goals of this research advise both the use of an inductive and deductive approach. In an inductive approach, data moves from the specific to the general (Chinn & Kramer 1999, cit. in Elo & Kyngäs, 2008), as opposed to deductive approach which moves from the general to the specific and is based on an earlier theory or model (Burns & Grove 2005, cit. in Elo & Kyngäs, 2008). Firstly, due to the context dependency of commuting phenomenon we opted to deploy a qualitative phase which translated an inductive approach. With this phase we intended to extract the meanings and reported personal accounts of commuting experience as well as individual's conceptions and attitudes towards changing that experience. Once ideas and meanings were extracted via content analysis we drafted a set of items that translated the categories. These items were gathered into a survey as a scale with quantitative answering in order to collect data for the hypothetic-deductive phase via quantitative data analysis. Hence we opted to use a mixed method approach.

3.2. Data analysis strategy

As the research design uses a mixed method approach we shall explain data analysis strategy both for the qualitative and quantitative phases. Data from interviewing were recorded and transcripted to word document in order to allow content analysis. We opted to conduct content analysis with a summative approach (Hsieh & Shannon, 2005), which results in many phases. First, we analyzed the responses of all the interviewees and began by considering the advantages and disadvantages of telecommuting referred by them (appendix E). Next, we elaborated a table in which we inserted the advantages and disadvantages grouped, each one, into three categories: economic, social, and environmental. Then we counted the times each type of advantage or disadvantage was referred to. In this way, it was possible to know the advantages/disadvantages most mentioned by the interviewees on telecommuting, and in what category they are.

Categories were extracted without *a priori* matrix with a traditional content analysis (Bardin, 1977) because the amount and complexity of data was not advising the use of software such as MaxQDA or similar (Ahuvia, 2001).

Quantitative data was firstly analyzed to detect missing cases, lack of variance and outliers to screen out cases that could technically compromise the data analysis. As novel measures were proposed, we then moved on to exploratory factorial analysis so to validate constructs emerging as latent variables. Factorial analyzes is considered valid whenever the following requirements are cumulatively met: KMO>.500, Bartlett's X^2 non-significant (p>.05), MSAs above .500, communalities for each item >.500, each emerging scale must have face validity (interpretable) and load on each item at least .600 with no *crossloadings* (after Varimax rotation). The full explained variance by the factorial analysis after rotation should be at least 60% and in the present study we opted to extract factors on the basis of Kaiser criterion (eigenvalue > 1). The reliability of each scale was measured by means of Cronbach alpha and should attain .70 or, as the scale is tentative, at least .60 for acceptance (Hair et al., 2010).

Hypotheses were analyzed via hierarchical Multiple Linear Regression with a significant p set at .05 and testing for all assumptions as well as common issues such as multicollinearity (where VIF must be below 5), distribution of variables should be normal (Kolmogorov-Smirnov statistic non-significant for p =.05) and residuals should be normally distributed.

3.3. Sample

Interviewees were selected as anyone who is actively on a paid job and may experience daily commuting for work reasons. Considering the diverse nature of people's working life, we endeavored to reach individuals that were probably more receptive to the idea of telecommuting while experiencing the advantages and disadvantages of physically commuting. Also, we opted to approach individuals living far from their job with daily displacements.

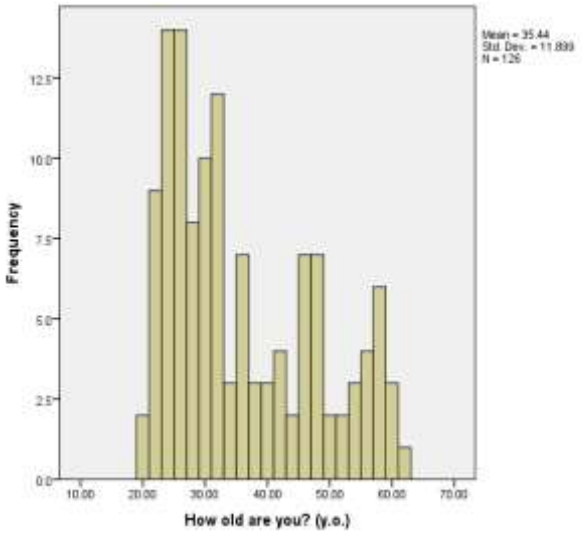
Surveys were spread out online (Qualtrics) with a snow ball strategy which produced a convenience sample.

The sample comprises 126 employed individuals, being mostly composed of female (60.3%) and aging average 35.4 years-old (sd=11.9) with minimum 20 and maximum age 62 years-old (Table 3.1, Figure 3.1).

Table 3.1 - Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Feminine	76	60.3	60.3	60.3
	Masculine	50	39.7	39.7	100.0
	Total	126	100.0	100.0	

Figure 3.1 - Age distribution



The sample comprises different professions, which we believe may add to the external validity of findings. We endeavored to reach professions that vary as regards the capacity to telecommute. Thus, we included "accountants, administrative assistants, bank clerks, secretaries", but also "receptionists, sales assistants, cashiers ", "HR technician, translator, recruiter, auditor, consultants, fiscal experts, call-center assistant, teachers, elementary school up to university, explainer", "Drivers, barista, engineers", "HR managers, Marketing managers, Chief of police," and "IT programmer, IT technician" (Full list in the appendix A).

3.4. Measures

Interview script (appendix B) - The main objective of the interview is to understand the nature of the functions and/or sector. We interviewed seven workers who perform different functions in terms of front office and back office work (appendix D). Among these, four were interviewed face-to-face (of the sectors Food, Financial and accounting services, Management services and Tax consultancy) and three via telephone (of the IT, Transports/Logistics and Insurance sectors). The interview script contains ten questions concerning the type of functions that each interviewee performs and the modes of transport used with their respective costs and time spent on travel, in order to understand the way the job/work can be done remotely. It is a semi-structured interview and the responses of the interviewees contributed to determine the empirical object of the study on the potential of telecommuting. These answers are crucial to fulfill the defined objectives of our research.

Survey (appendix C) - The purpose of the survey is to understand the perceptions related to home-work and work-home displacements, and comprehends four sections.

The first one collects sociodemographic characteristics namely: Gender (1=female, 2=male), Age, occupation, industry (1=Financial and accounting services, 2=Insurance, 3=Banking sector, 4=Health, 5=Transportation, 6=Education, 7=Industry, 8=other), place of living (post code first 4 digits), place of work (post code first 4 digits) , professional tenure (1=less than 1 year, 2=2 to 5 years, 3=6 to 10 years, 4=11 to 20 years, 5=over 20 years), and weekly workload (in hours both regular and extra).

The second section covers home-work displacement modes (1=automobile, 2=public transports (bus, subway, train, boat, other), 3=bicycle, 4=walking, and 5=other), time ("How long do you take, on the average day, in your home to work displacement - add go and return time."), costs ("How much do you estimate your home-to-work transport costs are - monthly value in euro currency."), and stress level ("Consider your commuting period. How stressful is it for you? Scale ranged from 0 ("no stress at all") to 100 ("extremely stressful"). We composed the "displacement mode" variable in such a way that it can be read as an ordinal variable with higher value reflecting less costly modes of displacement (costly as regards maintenance and operation).

The third section covers telecommuting possibilities namely telecommuting workload potential ("From all hours workload you reported weekly, how many would you estimate could be done from your home?"), telecommuting cost-saving potential ("How much would you estimate to save if those hours were home-based? – weekly basis in euro currency"; these include transport, food, attire cost savings).

The last section comprehended the scale on attitudes towards telecommuting (1="Totally agree", 5="totally disagree") with 10 items covering several aspects:

1. *Work from home largely compensates if one takes into consideration transport and food costs (of the alternative, work at the job post).*
2. *My productivity would be higher working from home than the one I have today at my job post.*
3. *Working from home would give me more time for my family and friends.*
4. *Working from home would give more resting time.*
5. *My concentration level would be higher working from home compared with the one I have working from my job post.*
6. *Working from home would improve my quality of living.*
7. *Environmental pollution would diminish if I worked from home, as I would not have to physically displace to my job post.*
8. *I would eat healthier food if instead of displacing physically to my job post I would rather work from home.*
9. *My professional life would be less stressful if I would work from home.*
10. *Working from home would offer more advantages than disadvantages to me.*

This section ends with questions concerning intention to accept telecommuting if offered by current employer (1= "I would not accept whatever the benefit they wanted to offer me", 2="I would only accept if offered a net wage increase – with no meal subsidy waving", 3="I would accept even if they wanted to cut on my salary (but only if this matched my costs savings with transport etc)", and 4="I would accept even facing net salary reduction"). We believe these options cover all possibilities as the case where individuals might or not accept such telecommuting offer retaining the precise salary, is indeed represented by the second option as legally the employer could not keep meal subsidy without physical representation at

job post. In case individuals selected the fourth option (accept with net losses) we asked what would a reasonable percentage of such net loss within the individuals' acceptance range.

Psychometric quality tests are applicable to the Attitude towards Telecommuting scale (tables 3.2 & 3.3). The factorial analysis had valid indicators (KMO=.836, .783<MSA<.888, Bartlett's X2=605.658, 36 df, p<.001) but one item had unacceptable communality (I would eat healthier food if instead of displacing physically to my job post I would rather work from home). Thus we removed this one and repeated the analysis. The revised 9-item scale showed good valid indicators (KMO=.836, .783<MSA<.888, Bartlett's X^2=605.658, 36 df, p<.001) with no communalities issues and explain 67.5% total variance after rotation (varimax). We extracted factors with eigenvalue above 1 that we named "quality of working life" (F1) and "cost savings (time, money and ecology) F2", showing good reliability (α=.889 and α=.794, respectively).

Table 3.2 - KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.836
Bartlett's Test of Sphericity	Approx. Chi-Square	605.658
	df	36
	Sig.	.000

Table 3.3 - Rotated Component Matrix[a]

	Component	
	1	2
My concentration level would be higher working from home compared with the one I have working from my job post	.885	.062
My productivity would be higher working from home than the one I have today at my job post	.866	.201
Working from home would improve my quality of living	.756	.283
Working from home would offer more advantages than disadvantages to me	.727	.436
My professional life would be less stressful if I would work from home	.676	.397
Working from home would give me more resting time	.102	.863
Work from home largely compensates if one takes into consideration transport and food costs (of the alternative, work at the job post)	.161	.737
Working from home would give me more time for my family and friends	.388	.696
Environmental pollution would diminish if I worked from home, as I would not have to physically displace to my job post	.314	.671
Cronbach alpha	.889	.794

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Chapter 4. Results

Findings are firstly shown by way of descriptive statistics and a first approach to the way variables relate, via bivariate statistics (correlation).

Table 4.1 - How do you displace from home to workplace?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Private vehicle	61	48.4	48.4	48.4
	Public transports	50	39.7	39.7	88.1
	Bicycle	1	.8	.8	88.9
	Walking	9	7.1	7.1	96.0
	Other	5	4.0	4.0	100.0
	Total	126	100.0	100.0	

Table 4.1 shows the different modes of transport used by 126 respondents for commuting. The largest set of respondents, or to be more precise, 48.4%, commute by private vehicle, followed by public transports that represents 39.7% of the total. Only a few percent commute by bicycle or walking. This shows most of respondents use passive commuting modes to go to their workplace.

Table 4.2 - How long do you take, on the average day, in your home to work displacement - add go and return time (in minutes)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<20	14	11.1	11.1	11.1
	21-40	45	35.8	35.8	46.9
	41-60	21	16.7	16.7	63.6
	61-80	7	5.6	5.6	69.2
	81-100	13	10.3	10.3	79.5
	101-120	11	8.7	8.7	88.2
	121-140	1	.8	.8	89.0
	141-160	1	.8	.8	89.8
	161-180	11	8.7	8.7	100.0
	Total	126	100.0	100.0	

It is important to know how long people spend on commuting, and table 4.2 shows, on an average day, the time spent in home to work and work to home displacement. Only 11%

spend up to 20 minutes. 35.8% spend 21 to 40, and 16.7% 41 to 60 minutes. Just a few percent take long hours on commuting: only 0.8% take 121 to 140 minutes and other 0.8% take 141 to 160 minutes. But there is still a considerable percentage of respondents (8.7%), which report taking more than 160 minutes.

The majority of people (2/3 of the sample) make their trips, from home-work and work-home, within an hour. Thus, there is still a considerable amount of people who travel from one to two hours.

Table 4.3 - What is your weekly workload (in hours)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<10	3	2.4	2.4	2.4
	11-20	10	8.0	8.0	10.4
	21-30	15	11.9	11.9	22.3
	31-40	80	63.5	63.5	85.8
	41-50	15	12.0	12.0	97.8
	51-60	3	2.4	2.4	100.0
	Total	126	100.0	100.0	

Table 4.3 refers to the question “What is your weekly workload (in hours)?”, and most respondents said that they work between 31 and 40 hours a week at their job post (63.5%). There is a small percentage that works between 41 to 50 hours and between 21 to 30 hours, 12% and 11.9% respectively. Only a marginal percentage reported working between 51 to 60 hours (2.4%).

More than half of the respondents work between 31 and 40 hours a week, that is, full-time. There is a small percentage, although considerable, which still works overtime, thus exceeding the 40 hours per week. For less than 31 hours, the percentage of people gradually decrease along with the amount of hours.

Table 4.4 - If you take extra work with you to finish at home, how many more hours do you think you work per week? (If you do not take extra work to home, please indicate "0")

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	62	49.2	49.6	49.6
	1-5	18	14.4	14.4	64.0
	6-10	25	19.8	19.8	83.8
	11-15	5	4.0	4.0	87.8
	16-20	8	6.4	6.4	94.2
	21-30	2	1.6	1.6	95.8
	36	1	.8	.8	96.6
	45	1	.8	.8	97.4
	50	1	.8	.8	98.2
	60	2	1.6	1.6	100.0
	Total	125	99.2	100.0	
Missing	System	1	.8		
Total		126	100.0		

Many times, people end up taking extra work to finish at home, which means that they do more hours of work besides the ones they do at their job post. Table 4.4 shows the extra hours people perform their tasks, besides those spent doing at their workplace. About 19.8% do 6 to 10 hours extra, 14.4% do 1 to 5 hours extra, and 6.4% end up doing 16 to 20 hours extra at home. However, there is 49.2% that do not take extra work to do at home. Only a minor percentage of people do, per week, more than 40 hours extra work (3.2%).

Here, we can conclude that most people do not work outside their workplace. Still, a small but relevant percentage of people do about 1 to 10 hours of work at home. If this value matches the same people who make long journeys from home-work and work-home, a high number of hours is spent only on work-related actions.

Table 4.5 - How much do you estimate to be your home-work transport costs (monthly amounts, in euros):

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	9	7.1	7.3	7.3
	<30	16	12.7	12.9	20.2
	31-60	49	38.9	39.8	60.0
	61-90	28	22.3	22.7	82.7
	91-120	7	5.6	5.7	88.4
	121-150	15	4.0	4.0	92.4
	151-180	2	1.6	1.6	94.0
	181-210	3	2.4	2.4	96.4
	>210	4	3.2	3.2	100.0
	Total	123	97.6	100.0	
Missing	System	3	2.4		
Total		126	100.0		

Table 4.5 shows monthly transport costs on commuting, in euros. 38.9% of respondents spend between 31 to 60 euros in transports and 22.3% spend between 61 to 90 euros each month. Despite being a small percentage, there is 2.4% that report spending between 181 to 210 euros, and 3.2% expend above 210 euros. For this particular question, it is important to note that only 123 of the candidates responded to this question.

Table 4.6 - Consider your commuting period from home to work. How stressful is it for you? Scale ranging from 0 ("no stress at all") to 100 ("extremely stressful").

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	4.8	4.8	4.8
	<20	22	17.5	17.5	22.3
	21-40	31	24.7	24.7	47.0
	41-60	24	18.3	18.3	65.3
	61-80	29	22.3	22.3	87.6
	81-100	14	11.2	11.2	100.0
	Total	126	100.0	100.0	

Table 4.7 - Consider your commuting period from work to home. How stressful is it for you? Scale ranging from 0 ("no stress at all") to 100 ("extremely stressful").

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	6.3	6.3	6.3
	<20	27	21.5	21.5	27.8
	21-40	28	22.3	22.3	50.1
	41-60	22	17.5	17.5	67.6
	61-80	30	23.9	23.9	91.5
	81-100	11	8.8	8.8	100.0
	Total	126	100.0	100.0	

The level of stress commuting directions can differ. Tables 4.6 & 4.7 shows the stress level considered by respondents, which for some the commuting period from home to work is more stressful than from work to home, and for others the inverse.

Considering the period of commuting from home to work (table 4.6), 24.7% reported a stress level of 21-40 points (in the 100 max scale), and 22.3% between 61 and 80. There is also 11.2% that find the commuting period very stressful. Only 4.8% considered there is "no stress at all". Considering the period of commuting from work to home (table 4.7), 23.8% considered between 61 to 80 the stress level, and there is also a small percentage that considered the commuting period very stressful (8.8%).

Table 4.8 - From all hours workload you reported weekly, how many would you estimate could be done from your home?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	14	11.1	11.2	11.2
	<10	43	34.3	34.4	45.6
	11-20	45	35.7	36.0	81.6
	21-30	20	15.8	16.0	97.6
	31-40	2	1.6	1.6	99.2
	41-50	1	.8	.8	100.0
	Total	125	99.2	100.0	
Missing	System	1	.8		
Total		126	100.0		

Considering the hours of work that can be done remotely, for example at home (table 4.8), 35.7% of respondents said they can do their work 11 to 20 hours remotely, away from a central office, and 34.3% think that they would be able to do <10 hours of their work in the distance. Just a few percent said they could to do 41 to 50 hours away from their job post, 0.8% respectively. In this context, only 125 respondents were counted, since there is one missing.

To better understand how extra-work relates with workload we calculated a simple proportion by dividing reported extra-work hours by the reported workload. Graph 4.1 depicts the full range of answers and its incidence in the sample, clearly showing that almost the majority reports no extra-work with the largest share of those who do falling in the +20% to +25% worked hours beside regular scheduled. The upper limit can be 200% (such cases report low workload, possible reflecting atypical contract arrangements).

Graph 4.1 – Extra work proportion

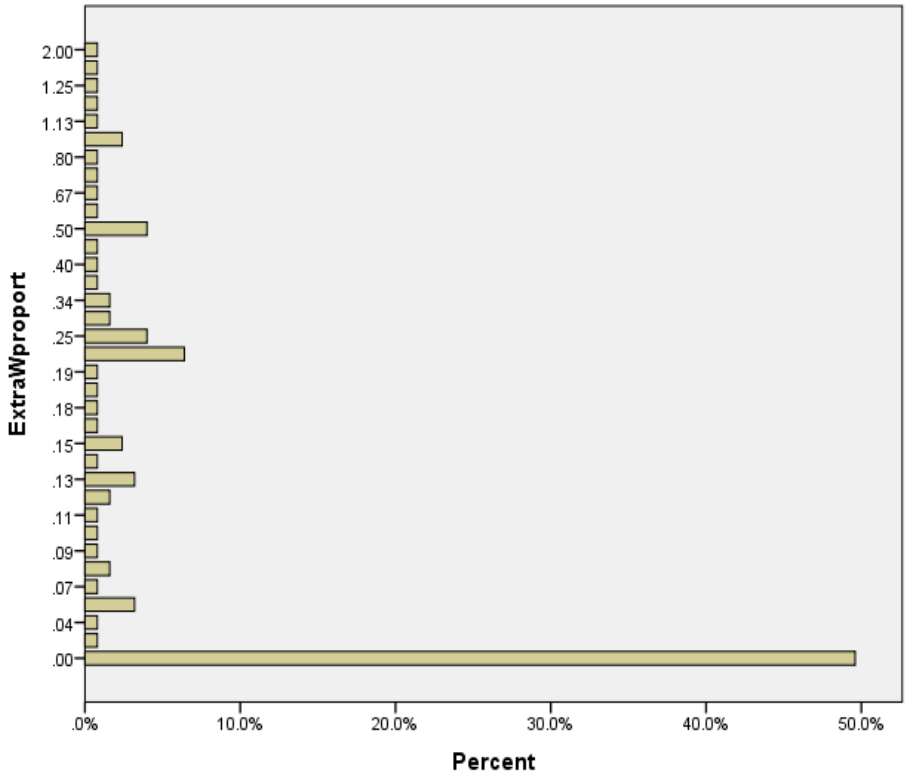


Table 4.9 - How much would you estimate to save if those hours were home-based? – Weekly basis in euro currency. These include transport, food, attire cost savings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	22	17.5	18.0	18.0
	<20	26	20.7	21.2	39.2
	21-40	30	23.8	24.5	63.7
	41-60	16	12.7	13.1	76.8
	61-80	7	5.6	5.7	82.5
	81-100	10	7.9	8.2	90.7
	101-120	3	2.4	2.4	93.1
	>120	8	6.4	6.6	100.0
	Total	122	96.8	100.0	
Missing	System	4	3.2		
Total		126	100.0		

Table 4.9 refers to euros saved, weekly, in hours of work that can be done at home. These include savings in transport, food, attire. There is 23.8% of respondents that estimate to save between 21 to 40 euros if those work hours would be home-based. 20.7% estimate to save up to 20 euros, and 12.7% between 41 to 60 euros. A small percentage, 6.4%, reports an estimated saving of more than 120 euros.

One of the aspects that shows the potential to telecommute is the savings that people can make if the hours they work in the office, could be done from home.

Table 4.10 - If tomorrow your employer propose to you working at a distance, to what extent would you accept it?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 – Unconditional negative	20	15.9	15.9	15.9
	2 – Conditional pos. net salary gain	56	44.4	44.4	60.3
	3 – Conditional pos. same net salary	35	27.8	27.8	88.1
	4 – Unconditional positive	15	11.9	11.9	100.0
	Total	126	100.0	100.0	

As mentioned, not all jobs allow telecommuting. Remote work is for workers who perform their functions based on technologies, that is, those who work more with information than face-to-face with clients. However, those who have the option to do so, have their conditions. Table 4.10 shows the intention to accept telecommuting if offered by current employer and the options are:

1= “I would not accept whatever the benefit they wanted to offer me.”

2=”I would only accept if offered a net wage increase – with no meal subsidy waving.”

3=”I would accept even if they wanted to cut on my salary (but only if this matched my costs savings with transport).”

4=”I would accept even facing net salary reduction.”

The largest share of answers (44.4%) fell in option two, which means that they accept telecommuting if the employer offered a net wage increase. Basically, they want benefits from both sides: they do not have to commute and at the same time they get an increase in their salary. 27.8% would accept to telecommute even if the employer cut on their salary, but only if this matches their costs saving with transport. This can mean that these workers are aware of the advantages of this type of work, and this is why they do not mind to face the cut on their salary and work from home. But still, they want to keep their purchase power. There is a small percentage, 11.9%, of workers that would accept to telecommute even facing net salary reduction. This means that they tradeoff purchase power for quality of living. Workers that chose the option four (unconditional yes) are clearly those who do not mind to face any reduction and the most changeable segment in the population. At opposite position, is a considerable percentage (15.9%) that would not accept to telecommute whatever the benefit the employer is willing to offer them.

Table 4.11 - If you said that you would be willing to give up part of your salary, what percentage would you say would be acceptable to you? (In %)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		111	88.1	88.1	88.1
	10	7	5.6	5.6	93.7
	15	2	1.6	1.6	95.2
	20	1	.8	.8	96.0
	5	5	4.0	4.0	100.0
	Total	126	100.0	100.0	

When individuals selected the fourth option (accept with net losses), we asked what would be a reasonable percentage for them of such net loss (table 4.11). 88.1% are those who did not choose the option four, and of the 126 respondents, only 15 selected this option. Seven respondents opted for giving up 10% of their salary, and five respondents would accept 5% of net loss. There is a small number of respondents that would accept 15 or 20% of net loss.

All in all, respondents do not want to lose any salary with the exceptions accepting to go to as much as a 20% net loss. It means that these exceptional respondents accept to do telecommuting with net losses, but do not accept to give up too much of their salary.

4.1. Bivariate statistics

The following table (4.12) displays the average (or frequency for nominal variables) and their respective bivariate statistics.

It is rather surprising the average reported cost of 67.8 euro (despite the large standard deviation, which suggests two groups of respondents, one with low transportation costs and another one with high) although the displacement time if approximately 67.4 minutes (also with large standard deviation). The level of stress (in a 100 point scale) is moderate (48% and 43%) for going to and returning from work, respectively.

Among variables under study it is the correlation between age and professional tenure that stands out (r=.906) which might lead to multicollinearity if used together in the same equation. We shall keep this in mind in future analyses. Besides this the level of stress experienced by respondents from traveling home to work and vice versa tend to be correlated.

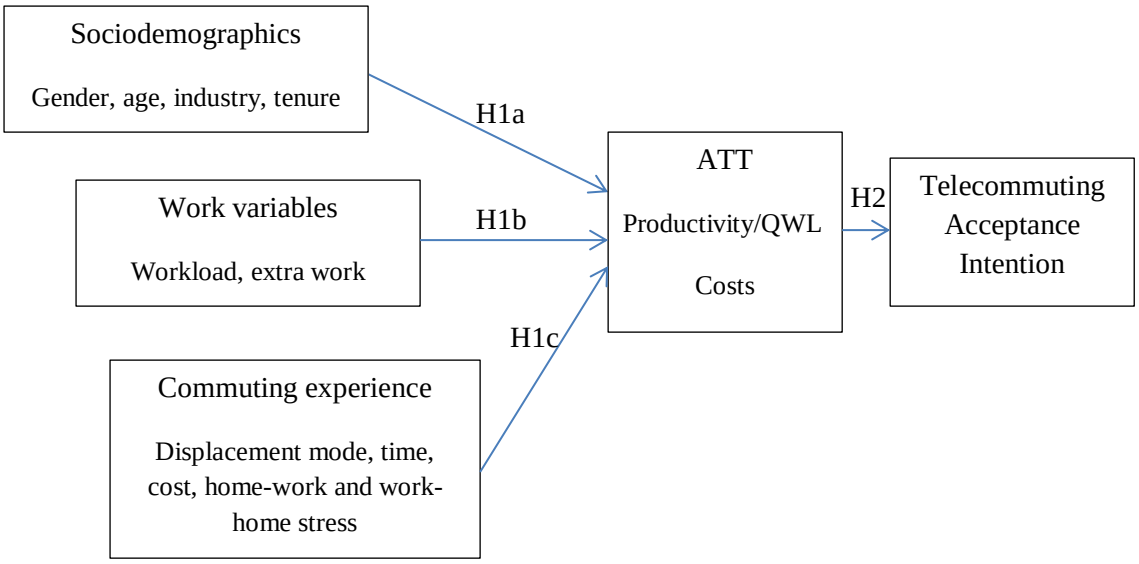
Table 4.12 – Correlation matrix

	Med / Freq	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender	60% (F)	-	1												
2. Age	35.4	11.9	.246**	1											
3. Industry	-	-	.172	-.068	1										
4. Professional Tenure	2.99	1.28	.200*	.906**	-.089	1									
5. Workload	37.0	8.8	.015	.088	-.189*	.121	1								
6. Extra-work	6.34h	11.2h	.125	.114	.085	.138	-.040	1							
7. Displ.Mode	-	-	-.284**	-.279**	.014	-.244**	-.078	-.146	1						
8. Displ.Time	67.4min	48.7min	-.160	-.044	-.035	-.105	-.115	-.034	.040	1					
9. Transp.Costs	67.8€	57.7€	.134	.223*	.036	.151	-.135	.425**	-.329**	.070	1				
10. Home-Work Stress	47.9	27.6	.009	.024	-.111	-.016	.006	.004	-.156	.350**	.118	1			
11. Work-Home Stress	43.6	28.1	.075	.272**	-.038	.198*	-.083	.058	-.201*	.475**	.300**	.598**	1		
12. ATT_Costs (Likert 1-5)	3.59	.90	-.097	.103	-.191*	.199*	.202*	.012	-.152	.077	-.051	.331**	.254**	1	
13. ATT_Productivity (1-5)	4.04	.82	-.040	.108	-.109	.152	-.005	.103	-.295**	.059	.234**	.275**	.349**	.582**	1
14. Telecommuting Accept. Intention (1-4)	2.35	.89	-.089	.067	-.050	.111	.145	.024	-.175	.225*	-.165	.166	.271**	.510**	.470**

4.2. Model / Hypotheses testing

The emergence of two factors within attitudes towards telecommuting implies the original model is refined into more detail (Figure 4.1).

Figure 4.1 – Redesigned research model



The **first hypothesis** concerned the predictors of the attitudes towards telecommuting, namely sociodemographics, those pertaining the workload and extra work, and the displacement modes, time and costs (monetary and psychological, expressed as stress). As the attitudinal variable comprehends two factors (F1 – Productivity/QWL, and F2-Costs) we conducted two hierarchical linear regressions with three steps: the first comprehending the individual sociodemographics (gender, age, industry, professional tenure), the second step comprehending job-related variables (weekly workload, and extra-work), and the last one comprehending displacement mode, displacement time, transportation costs, experienced stress from home-work and vice versa.

For the Productivity/QWL related attitude towards telecommuting, findings show a significant model (Table 4.13) explaining 21.6% (adjusted variance) with professional tenure showing a significant beta of .501 ($p<.05$) rendering all steps significant [$F_{step1}(4, 113)=3.575$, $p<.01$; $F_{step2}(6, 111)=2.919$, $p<.05$; $F_{step3}(11, 106)=3.927$, $p<.01$]. None of the variables inserted at step 2 had significant association but at step three Professional Tenure did have a significant beta of .294 ($p<.01$). Because of the VIF indicator attached to this variable, we repeated the regression analysis without its major correlate (age), the overall significant

patterns remained untouched but the explained variance fell to 20.6% (adjusted) thus probably reflecting true explained variance.

For the Costs related attitude towards telecommuting, findings show a significant model (Table 4.14) explaining 18.9% (adjusted variance) with neither sociodemographic variables [$F_{step1}(4, 113)=1.055$, $p=.382$] nor work-related variables [$F_{step2}(6, 111)=0.844$, $p=.539$] showing significant associations. However, two significant associations were found for the third block of variables [$F_{step3}(11, 106)=3.480$, $p<.01$] with displacement mode (Beta=-.226, $p<.05$) and work-home stress (Beta=.290, $p<.05$) playing a role.

Findings **partially corroborate hypothesis 1**, where predictors vary in explaining attitudes towards telecommuting, from professional tenure to stress. It is noteworthy to highlight that experienced stress is a common theme amongst predictors for both cases.

Table 4.13 – Summary for hierarchical regression for predicting Attitude Towards Telecommuting (Productivity / QWL)

Model	Variables	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF	R^2	ΔR^2	F ΔR^2
Step 1									.112	.112	3.575 (p<.01)
	(Constant)	3.913	.349		11.219	.000					
	Gender	-.182	.177	-.097	-1.031	.305	.884	1.132			
	Age (years-old)	-.024	.017	-.309	-1.460	.147	.175	5.699			
	Industry	-.057	.032	-.161	-1.780	.078	.955	1.047			
	Professional tenure	.364	.152	.501	2.397	.018	.180	5.567			
Step 2									.136	.024	1.539 (p=.219)
	(Constant)	3.245	.517		6.277	.000					
	Gender	-.195	.177	-.104	-1.107	.271	.875	1.142			
	Age (years-old)	-.020	.017	-.260	-1.223	.224	.172	5.799			
	Industry	-.048	.032	-.136	-1.487	.140	.925	1.081			
	Professional tenure	.320	.154	.440	2.083	.040	.174	5.733			
	Workload	.017	.010	.159	1.746	.084	.940	1.064			
	Extrawork	.002	.007	.019	.209	.835	.968	1.033			
Step 3									.290	.153	4.573 (p<.01)
	(Constant)	3.121	.616		5.067	.000					
	Gender	-.284	.170	-.152	-1.674	.097	.817	1.225			
	Age (years-old)	-.024	.016	-.310	-1.532	.128	.164	6.091			
	Industry	-.037	.030	-.104	-1.218	.226	.912	1.097			
	Professional tenure	.337	.145	.463	2.330	.022	.170	5.897			
	Workload	.016	.009	.153	1.752	.083	.879	1.137			
	Extrawork	.003	.007	.037	.408	.684	.795	1.257			
	Displac. mode	-.109	.080	-.127	-1.364	.176	.777	1.287			
	Displac. time	-.001	.002	-.038	-.391	.697	.714	1.400			
	Transport. costs	-.002	.002	-.100	-.986	.326	.656	1.524			
	Home-Work stress	.010	.004	.294	2.785	.006	.601	1.664			
	Work-Home stress	.004	.004	.120	.992	.324	.458	2.182			

a. Dependent Variable: ATT_Productivity

Table 4.14 – Summary for hierarchical regression for predicting Attitude Towards Telecommuting (Cost savings)

Model	Variables	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF	R^2	ΔR^2	F ΔR^2
Step 1									.036	.036	1.055 (p=.382)
	(Constant)	4.045	.327		12.383	.000					
	Gender	-.095	.165	-.056	-.574	.567	.884	1.132			
	Age (years-old)	-.005	.016	-.064	-.291	.772	.175	5.699			
	Industry	-.025	.030	-.078	-.830	.408	.955	1.047			
	Professional tenure	.143	.142	.218	1.001	.319	.180	5.567			
Step 2									.044	.008	0.443 (p=.643)
	(Constant)	4.083	.489		8.351	.000					
	Gender	-.109	.167	-.064	-.650	.517	.875	1.142			
	Age (years-old)	-.005	.016	-.064	-.287	.775	.172	5.799			
	Industry	-.027	.030	-.086	-.893	.374	.925	1.081			
	Professional tenure	.137	.145	.209	.942	.348	.174	5.733			
	Workload	-.001	.009	-.009	-.089	.929	.940	1.064			
	Extrawork	.006	.007	.088	.935	.352	.968	1.033			
Step 3									.265	.222	6.398 (p<.01)
	(Constant)	4.239	.563		7.529	.000					
	Gender	-.280	.155	-.166	-1.802	.074	.817	1.225			
	Age (years-old)	-.017	.015	-.242	-1.176	.242	.164	6.091			
	Industry	-.016	.028	-.050	-.576	.566	.912	1.097			
	Professional tenure	.175	.132	.267	1.323	.189	.170	5.897			
	Workload	.003	.008	.035	.395	.693	.879	1.137			
	Extrawork	-.001	.007	-.013	-.138	.890	.795	1.257			
	Displac. mode	-.175	.073	-.226	-2.392	.019	.777	1.287			
	Displac. time	-.002	.002	-.124	-1.256	.212	.714	1.400			
	Transport. costs	.002	.002	.159	1.549	.124	.656	1.524			
	Home-Work stress	.004	.003	.118	1.098	.275	.601	1.664			
	Work-Home stress	.009	.004	.290	2.356	.020	.458	2.182			

a. Dependent Variable: ATT_Costs

Hypothesis 2 established a possible positive relation between attitudes towards telecommuting (ATT) and Telecommuting Acceptance Intention. Controlling for sociodemographics, the linear regression showed significant coefficients of association between these variables as follows (Tables 4.15 & 4.16).

The model explains 26.6% (adjusted variance) with none of the sociodemographic variables playing any meaningful and significant role [$F(4, 118)=.846$, $p>.05$] while at the second step, both attitudinal variables relate with significant variance [$F(6, 116)=8.373$, $p<.01$]. The second step, thus, added significant explained variance to the model [$\Delta R^2=.274$, $F(2, 116)=22.802$, $p<.01$]. There is some indication of multicollinearity (VIF>5) but it concerns only variables that were not significantly related with the criterion variable and thus can be disregarded.

Table 4.15 – ANOVA for model

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.683	4	.671	.846	.499[a]
	Residual	93.578	118	.793		
	Total	96.260	122			
2	Regression	29.090	6	4.848	8.373	.000[b]
	Residual	67.170	116	.579		
	Total	96.260	122			

a. Predictors: (Constant), Professional Tenure, Industry, Gender, Age

b. Predictors: (Constant), Professional Tenure, Industry, Gender, Age, ATT_Productivity/QWL, ATT_Costs

c. Dependent Variable: Telecommuting Acceptance Intention

Table 4.16 – Summary for hierarchical regression for predicting Telecommuting Acceptance Intention

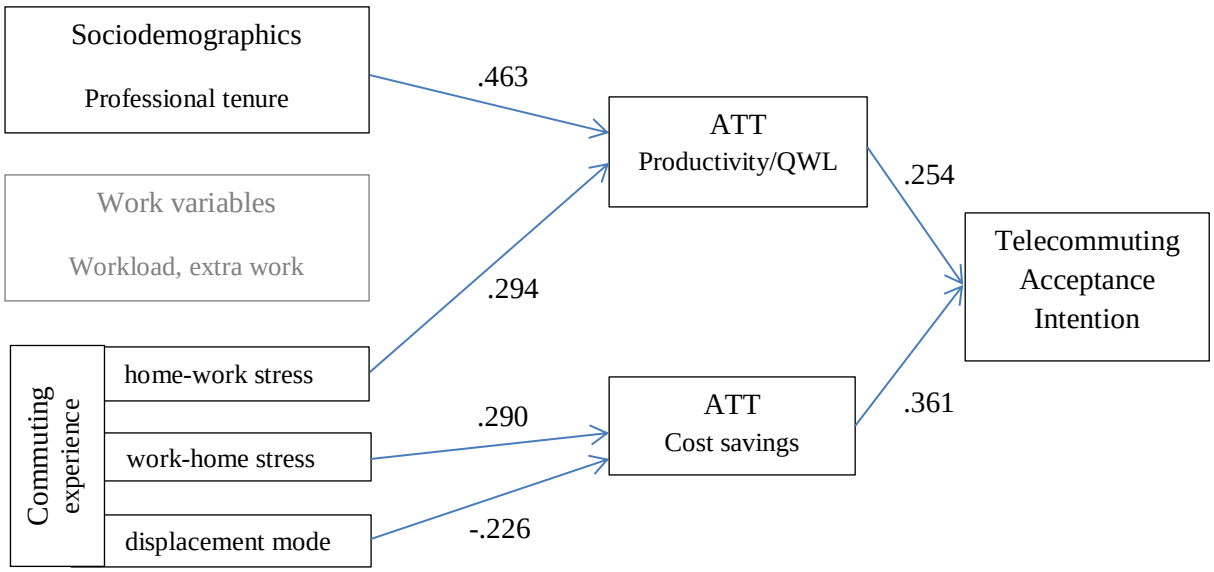
Model	Variables	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF	R^2	ΔR^2	F ΔR^2
Step 1									.028	.028	.846 (p=.449)
	(Constant)	14.477	.346		41.857	.000					
	Gender	-.193	.172	-.107	-1.119	.265	.902	1.108			
	Age (years-old)	-.004	.016	-.056	-.257	.798	.172	5.804			
	Industry?	-.013	.032	-.038	-.412	.681	.953	1.050			
	Professional tenure	.125	.151	.180	.830	.408	.175	5.703			
Step 2									.302	.274	22.802 (p<.01)
	(Constant)	11.980	.478		25.084	.000					
	Gender	-.117	.148	-.065	-.795	.428	.896	1.116			
	Age (years-old)	.005	.014	.073	.387	.699	.169	5.934			
	Industry	.014	.027	.042	.524	.601	.929	1.077			
	Professional tenure	-.034	.132	-.049	-.258	.797	.167	5.974			
	ATT_Costs	.352	.096	.361	3.656	.000	.619	1.617			
	ATT_Productivity/QWL	.275	.103	.254	2.672	.009	.663	1.508			

a. Dependent Variable: If tomorrow your employer propose to you working at a distance, to what extent would you accept it?

The findings corroborate the second hypothesis suggesting that respondents have both considerations of quality of working life / productivity and cost when deciding their degree of telecommuting acceptance. It is noticeable that no sociodemographic variable had significant association with the telecommuting acceptance intention thus ruling out gender, age, industry and tenure differences in our sample.

The joint findings are depicted in Figure 4.2 representing only those variables that had at least one significant association in the model.

Figure 4.2 – Empirical associations



Chapter 5. Discussion and conclusions

The study explores the potential of telecommuting, where through the results obtained from the surveys we could test for attitudes towards telecommuting and intention to accept telecommuting offers. The motivating research question concerned two minor goals: a) to address telecommuting potential by means of self-reported perceptions of in-job time reduction, cost reduction, and effectiveness differential, and b) to test an explanative model linking sociodemographical, psychological, operational drivers to attitudes and behavioral intention.

This was empirically tested by means of a twofold approach: qualitative first followed by quantitative, through a questionnaire. The qualitative consisted of interviewing seven commuters inquiring for personal accounts of commuting experience and implicit theories about commuting and telecommuting. This informed a questionnaire, intended to collect structured data about sociodemographics, psychological, operational, attitudes towards telecommuting, and behavioral intention (probability of accepting telecommuting offer with varying counterpart.

Interviews suggested that there is yet deeper reflection on telecommuting required for interviewees to grasp in its entirety the nature and consequences of telecommuting. However, there is a converging with literature and widely shared opinion that it brings advantages at the economic and environmental levels, and disadvantages at the social level. In the same way as interviewees' responses, authors such as Mokhtarian, Bagley and Salomon (1998), Pendyala, Goulias and Kitamura (1992) mentioned the reduction of costs (transport or others) as the advantage of telecommuting. Less stress was referred by Handy and Mokhtarian (1996), more time for family and friends by Mokhtarian and Salomon (1994), and less pollution by Mokhtarian, Bagley and Salomon (1998). Telecommuters experience social isolation (Feldman & Gainey, 1997) and also professional isolation (Harpaz, 2002). Conflict between family and work was also referred by many authors such as Greenhaus and Beutell (1985), and Allen et al. (2015). Interruptions (Allen et al., 2003) and distractions (Kraut, 1989) are others drawbacks of telecommuting. Many previous studies on telecommuting showed advantages of this new form of work more at the economic level, and disadvantages more at social level. It means that there are similarities in interviewees' responses compared to what is known in previous independent studies.

At the descriptive level, the questionnaire showed the majority of the sample opts for private vehicle or public transports (so passive modes of displacement), takes between 20 and 60 minutes daily in commuting (go and return), and reports having modestly low monthly transportation costs. It also reports regular full-time workload (within the 35-40 hours weekly) but about half the sample reports having no extra time, while those who do add approximately 1 to 10 hours extra weekly.

The majority reported a margin of 1 to 20 hours a week from their workload that could be done remotely. The estimated cost savings from these hours puts the majority ranging between 1 to 40 euro a week. It should be noted that not all types of work can be done remotely, since some tasks require face-to-face contact, just as demonstrated by Bélanger (1999). But nowadays the development of information and communication technologies lead to new forms of work such as telecommuting, which presents benefits for workers, for society and also for environment.

The level of stress reported both in the home-to-work and work-to-home traveling is quite similar and is set slightly below the midpoint scale.

A high percentage of respondents would accept telecommuting offer under the condition that it implies a net salary gain, and there is a small but considerable percentage that do not accept to do telecommuting whatever the benefit the employer wants to offer them.

Overall the profile of the sample is similar to accounts in mass media about the use of automobile versus public transportation in metropolitan Lisbon. The sample does not comprise a large proportion of workers that match the high commuters profile observable in some large metropolis in the world. This is expectable but it will also lower the potential savings and impact of telecommuting compared with a study focusing only on heavy suburbia telecommuters.

The predictors of sociodemographic nature, such as professional tenure, those of a psychological nature, namely home-to-work and work-to-home stress, and those operational namely the displacement mode, were found to influence attitudes towards telecommuting, thus partially corroborating the first hypothesis.

Commuting is known to be related to stress especially when individuals use passive transportation modes (Gatersleben & Uzzell, 2007) and our sample did report high level of passive commuting. Although stress levels can be considerable they may also be

inconspicuous such as mood change at home (e.g. Novaco et al., 1990) which we would not be able to account on the basis of a single general question about stress, such as the one we asked. Being subjectively answered, it is quite possible that respondents may bias true stress levels, as compared with objective measures. We contend this did not occur in our sample as the magnitude of stress reported matched the magnitude of potentially related stress drivers such as average displacement time.

It was rather surprising that work-to-home and home-to-work stress predicted different attitudinal dimensions. We could not locate a single source that would offer explanation on the basis of previous empirical studies. However we believe that the home-to-work subjective travel experience differs from work-to-home in the sense that it might be more pressing to reach at a specific hour in the first (for punctuality sake) when compared with the later. It is also common that people might not avoid rush hour in the morning but employers give them leeway to leave at a later hour at their will, as long as they are not breaking labor relations agreements.

The home-to-work stress association with productivity/QWL might be explained by the eventual perception that wasted time and fatigue built in displacement at morning rush hour can lower their ability to focus, to produce, and as well their subjective quality of working life. The work-to-home stress association with cost savings can find explanation in the perception of commuters that they could be already at home, saving all the time and money as when going back to home they might find more attention to reflect on their personal life. Once again, these are but speculative possibilities as we found no previous study on this issue or reporting similar findings.

Findings concerning the second hypothesis did corroborate it. As expected, the intention to accept telecommuting offers is influenced by attitudes towards telecommuting, namely attitude focused on productivity/QWL and cost savings. It means that the more favorable the attitudes towards telecommuting are, the higher the telecommuting acceptance intention is.

As in any study, methodological and conceptual options imply limitations we should consider. The present study departed from a modest sample size that was collected on a convenience way, which opens room to doubt its external validity and robustness of findings. However, the participation was entirely free, with guarantees of anonymity and confidentiality and without any reward, which could have biased answers towards some

implicit theory respondents could try to meet as Podsakoff et al. (2003) highlighted in the common source variance issue.

We opted to separate the home-to-work from work-to-home traveling due to the possibility that individuals adopt strategies to avoid rush hour or have differentiated working schedules. We believe this is novel compared with literature reviewed but future studies may want to incorporate further detail on the precise time slots people use to travel, and perceived traffic congestion for those who use own vehicle.

We believe many more variables can be collected to better grasp the idiosyncrasies of each individual. For example, spending 20 minutes from home-to-work by bicycle and living 5km away is not the same of 20 minutes by car and living 10km away due to traffic congestion. Likewise, having or not responsibilities outside work, e.g. picking up children at school, may entirely change the psychological pressure to leave work at a specific hour. The same goes to jobs where one is given time exemption versus one has to check in biometric points. Quantitative measures are needed for statistical inference but they do have this downside of reducing diverse experience to a same figure. We did opt to conduct also an initial qualitative study but it is far from enable clarification about idiosyncratic situations that might be needed to account for true commuting experience. So, future studies may address this challenge.

Overall, findings show the potential for telecommuting if far from being negligible, especially as urban areas sum up displaced workers. In the area where respondents live, and accepting a large measurement error due to the sample size and nature, cost savings, productivity and quality of working life are definitely positive outcomes from opting to telecommute. The estimated individual benefits may be largely surpassed by the organizational and societal benefits as they operate in synergy affecting systemic health costs, productivity rates, fixed operational business costs (that could be translated in higher profit margins and lower consumer prices), better environmental sustainability, and better quality of life. At a certain level, the qualitative inquiry did show convergence upon these outcomes. However, social or relational impact might be an issue to further address in research although it did not emerged in the questionnaire but are only expressed as having more free time for family and friends. So, perhaps it gains visibility when individuals are actually experiencing social isolation and could be a target for a specialized research exploring its possible multidimensional nature as regards satisfying relational needs.

We believe this study fulfills the established objectives, as well as contribute, albeit modestly, to answer the motivating research question. Although the potential could not be exactly ascertained, it is motivating to find a working explanative model leading to behavioral intention to accept telecommuting offers, which could inform in future HR development or management policies.

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APPENDIX

Appendix A: List of respondents' professions

1=Accountant, 2=Administrative, 3=Administrative assistant, 4=Administrator, 5=Assistant researcher, 6=Auditor, 7=Bank clerk, 8=Banking Technician, 9=Barista, 10=Businessman, 11=Call center assistant, 12=Cashier, 13=Chief of Police and Technical Assistant, 14=Chief of Police and Treasurer, 15=Commercial assistant, 16=Commercial manager, 17=Computer programmer, 18=Computer technician, 19=Consultant, 20=Contact Manager, 21=Director, 22=Driver, 23=Elementary school Professor, 24=Engineer, 25=Explainer, 26=Fiscalist, 27=High school Professor, 28=Human Resources Manager, 29= HR Technician, 30=Information Assistant, 31=Intern, 32=Job Helper, 33=Marketing & Communication, 34=Marketing Manager, 35=Marketing trainee, 36=Nature's conservative, 37=Pharmaceutical, 38=Promoter, 39=Receptionist, 40=Recruiter, 41=Sales assistance, 42=Seamstress, 43=Secretary, 44=Senior Technician, 45=Sociologist, 46=Store Coordinator, 47=Tax Consultant, 48=Technical assistant, 49=Training Technician, 50=Translator, 51=University Professor.

Appendix B: Interview Script

The use of technological systems to work remotely avoiding the daily displacement to the workplace has been the subject of debate and study. The main objective of the interview is to get a better understanding of this phenomenon. The interview will be carried out to workers who perform different functions in terms of front office and back office work and that cover equally distinctive economic sectors in terms of service versus industry. Your answers will contribute to determine the empirical object of the study on the potential of telecommuting in the dissertation we are developing regarding "The overall potential of telecommuting".

1- Please describe in brief terms the functions you perform.

2- How far do you think you could develop a part of these functions outside your workplace (for example, at home, or elsewhere)? Can you estimate a percentage of your total weekly working time that could be occupied in these modes (of telecommuting)?

3- In terms of physical travel to your usual place of work, what means do you use and how long does it take to arrive? (How much time do you think you spend on a day in transportation)?

4- And how much do you spend on these transports per month? And in food, in the work context? (If you take from home is "zero")

5- What advantages would it have for you if your organization proposed to you this percentage of working time spent at home or in another place of your choice, other than the current job? (Economic, social/relational, family, health, leisure, ecological).

6- And what are the disadvantages you anticipate in this modality of work?

7- What impact it would have on your productivity? Why?

8- If your organization gave you this option, would you accept it?

9- What if the option implies the loss of the meal subsidy or a part of the salary in amount less than the one that spends? How much would you accept less (as a percentage of your net salary) to have this option of being at least one day per week working from home or from another remote location?

10- What if instead of one day there were two?

Appendix C: Survey

Human Resources Development Policies

2016/2017

Gender (M/F): ____ Age: ____

Occupation: _____ Industry: _____

Place of living: _____ Post code: _____

Place of work: _____ Post code: _____

Home-work and work-home displacements modes:

Automobile___ Public transports (bus/subway/train/boat) ___

Bicycle ___ Walking___ Other: _____

How long do you take, on the average day, in your home to work displacement? (add go and return time) _____

What is your weekly workload (in hours)? _____

If you take extra work with you to finish at home, how many more hours do you think you work per week? (If you do not take extra work to home, please indicate "0") ____

How much do you estimate your home-to-work transport costs are? (monthly value in euro currency) ____

Consider your commuting period from **home to work**. How stressful is it for you? Scale ranging from 0 ("no stress at all") to 100 ("extremely stressful).

Stress level _____

Consider your commuting period from **work to home**. How stressful is it for you? Scale ranging from 0 ("no stress at all") to 100 ("extremely stressful).

Stress level _____

From all hours workload you reported weekly, how many would you estimate could be done from your home? _____ hours.

How much would you estimate to save if those hours were home-based? Weekly basis in euro currency (these include transport, food, attire cost savings). _____ euros.

To what extent do you agree with the following statements? (1="Totally agree", 5="Totally disagree")

1. "Work from home largely compensates if one takes into consideration transport and food costs (of the alternative, work at the job post)." ____
2. "My productivity would be higher working from home than the one I have today at my job post." ____
3. "Working from home would give me more time for my family and friends." ____
4. "Working from home would give more resting time." ____
5. "My concentration level would be higher working from home compared with the one I have working from my job post." ____
6. "Working from home would improve my quality of living." ____
7. "Environmental pollution would diminish if I worked from home, as I would not have to physically displace to my job post." ____
8. "I would eat healthier food if instead of displacing physically to my job post I would rather work from home." ____
9. "My professional life would be less stressful if I would work from home." ____
10. "Working from home would offer more advantages than disadvantages to me." ____

If tomorrow your employer propose to you working at a distance, to what extent would you accept it?

1. I would not accept whatever the benefit they wanted to offer me ___

2. I would only accept if offered a net wage increase (with no meal subsidy waving) ___

3. I would accept even if they wanted to cut on my salary (but only if this matched my costs savings with transport etc) ___

4. I would accept even facing net salary reduction ___

If you said that you would be willing to give up part of your salary (option four), what percentage would you say would be acceptable to you? ___ %

How long have you been performing professional activity? ____ years.

Thank you for your availability and collaboration!
Deveani Babú

Appendix D: Interviewees' description

Description of 7 Interviewees					
Interviewees	**Sectors of activity**	**Age**	**Marital status**	**Professional occupation**	**Job functions**
A (Female) From ***Sacavém***	IT	29	Single	COBOL's programmer	To schedule (online programs); Makes all the code that underlies the programs
B (Female) From ***Alverca do Ribatejo***	Transports/ Logistics	26	Single	Administrative	Registers complaints; Makes inquiries to the insurer, makes records of insurance certificate; Internal and external invoicing
C (Male) From ***Santo António dos Cavaleiros***	Food sector	25	Single	Commercial manager	Customer management, especially sales and purchases
D (Female) From ***Santo António dos Cavaleiros***	Financial and accounting services	21	Single	Administrative	Pays invoices; Responds to emails; Import and export of saft
E (Female) From ***Santo António dos Cavaleiros***	Managemen t services	23	Single	Consultant	Elaborates the investment projects, namely, business plans, feasibility studies, market studies
F (Male) From ***Chelas***	Tax consultancy	31	Single	Tax consultant	Makes tax advice, that involves clarifying clients' doubts through email or telephone
G (Female) From ***Ramada***	Insurance	23	Single	Manager of business partners	Management of business partnerships

Appendix E: Content analysis- Advantages and disadvantages of telecommuting mentioned by interviewees

Telecommuting			I1	I2	I3	I4	I5	I6	I7	Total
Advantages	Economic (22:5)	Reduction of costs (transport and others)	3	1	1		2	1	1	**9**
		Reduction of travel time	2		1		2	1	1	**7**
		Increased productivity	1			1	1	1		**4**
		Speed performing work*	1							**1**
		Savings in printed documents*						1		**1**
	Social/Health (21:7)	More rest time	1				2			**3**
		Less stress	1				1	1		**3**
		More time for family and /or friends				1	1			**2**
		Advantage in winter time (working at home)					1			**1**
		Better attention / focus*	2			1		1	1	**5**
		Better quality of living*	3							**3**
		Comfort (at home)*	1				2			**3**
		Healthier food (at home)*						1		**1**
	Environmental (7:3)	Less pollution		1	1	1	1			**4**
		Less gas consumption						1		**1**
		Less traffic					1	1		**2**
Disadvantages	Economic (4:2)	Lower productivity (working from home)			1			1	1	**3**
		Loss of competitive advantage*							1	**1**
	Social/Health (21:9)	Lack of division of personal/ family life and professional life	3							**3**
		Dsitancing from coworkers	1							**1**
		Isolation (social and professional)	2			1	2			**5**
		Lack of trust	1							**1**
		Lack of direct contact with coworkers	2		1		1		1	**5**
		Overtime working		1			1			**2**
		Postponing work		1						**1**
		Affects social and family relationships (home-work conflict)		1						**1**
		Distractions/ Interruptions		1	1			1		**3**
	Environmental									**0**

*Categories *a posteriori*

Appendix F: Advantages and disadvantages of telecommuting (in literature)

Telecommuting		
Dimensions	**Advantages**	**Disadvantages**
Economic	- Improved productivity, employee retention and attraction (Bailey & Kurland, 2002). - Reduced absenteeism (Dionne & Dostie, 2007; Stavrou, 2005). - Reduce commuting costs (Mokhtarian, Bagley & Salomon, 1998). - Telecommuting reduces employee costs and travel times (Morgan, 2004). - Lower energy/gasoline consumption (Pendyala, Goulias & Kitamura, 1992) which saves money spent on commuting. - Benefits for employee: increase in productivity, expansion of job flexibility (Asgari, 2015). - Benefits for employer: parking space and office space benefits (Shafizadeh et al., 2000). - *Telecommuters may be able to proactively reconfigure their duties and responsibilities to support greater schedule flexibility* (Feldman & Gainey, 1997; Harrison, Johns & Martocchio, 2000; Kossek, Lautsch & Eaton, 2005...) (p.9)	- Telecommuters have limited opportunities to network and to develop mentoring relationships (Cooper & Kurland, 2002; Allen et al., 2009). - Who work completely remotely has the lowest performance (Rocco, 1998).
Social and Health	- Telecommuting also helps people who have environmental sensitivities, episodic symptoms, fatigue conditions or other health issues (Allen, Golden & Shockley, 2015). - Telecommuting has advantages for telecommuters who are temporarily disabled (following surgery, or a broken leg), since they can work from home in these circumstances (Mokhtarian & Salomon, 1994). - Working from home helps employed parents balance work and family demands (Cascio, 2000). - Telecommuting might allow a parent to stay at home with a sick child and still work (Handy & Mokhtarian, 1996). - Telecommuters spend more time with one's family (Mokhtarian & Salomon, 1994). - More time for oneself (Mokhtarian &	- Work-Family conflict (Greenhaus & Beutell, 1985). - Childcare and home responsibilities can be a major distraction for telecommuters (when they want to work at home) (Kraut, 1989). - Telecommuters experience interruptions by family and friends (Allen et al., 2003). - Being connected to technologies create more hours of work and lead the telecommuters to check e-mail outside of normal working hours (Madden & Jones, 2008). - Telecommuters experience more time pressure in the long run, while making longer work hours (Peters & Van der Lippe, 2007). - Social isolation (Feldman & Gainey,

	Salomon, 1994). Desire for more free time may be a strong motivator for telecommuting (Handy & Mokhtarian, 1996). - Reduce stress-related illness because it reduces commuting (Handy & Mokhtarian, 1996). - Working away from coworkers provides telecommuters greater control over managing their access to others (Fonner & Roloff, 2010, 2012; Golden & Fromen, 2011; Golden & Veiga, 2008; Venkatesh & Vitalari, 1992). - Telecommuting helps in emergencies, since telecommuters can continue the work at home in disaster periods (Heng, Hooi, Liang, Othma and San, 2012). - Job satisfaction, organisational loyalty (Bailey & Kurland, 2002). - Telecommuters are likely to experience increased feelings of freedom and discretion (DuBrin, 1991 - Benefits for employer: morale and commitment improvement (Asgari, 2015). - Benefits for employee: increase in job satisfaction (Asgari, 2015). Telecommuters with higher autonomy report greater job satisfaction (Allen et al., 2015).	1997). Telecommuters become more isolated not only from other people (friends/family), but also from public institutions (Harpaz, 2002). - Social isolation, career stagnation and family conflict (Baruch & Nicholson, 1997). - Time spent sitting (long hours in front of a computer) generates an excess weight gain, cardiovascular disease, diabetes and premature mortality (Thorp, Owen, Neuhaus & Dunstan, 2011). - Increase in negative emotions and physical health complaints (Mann & Holdsworth, 2003). - Telecommuting hamper the development and maintenance of coworker relationship quality (Allen et al., 2015). - Lack of trust between coworkers (Cascio, 2000). - Telecommuters find their loyalty and commitment being questioned by managers (Desrosiers, 2001; McCloskey & Igbaria, 2003). - Spatial distance from coworkers can also be translated into psychological distance (McCloskey & Igbaria, 2003).
Environmental	- Telecommuting helps the environment by driving less (Mokhtarian, Bagley & Salomon, 1998). - Reduction of greenhouse emissions (Allen et al., 2015). - Reducing automobile emissions (Kitou & Horvath, 2003). - Improved air quality (Asgari, 2015). - Telecommuting helps to reduce traffic congestion (Allen et al., 2015). - Less traffic congestion and reduction in air pollution and energy consumption (State of Florida, 2000, chapter 90-291 of the Laws of Florida).	