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A STUDY INTO TELEWORK: ITS ADVANTAGES, DISADVANTAGES, AND FUTURE BUSINESS PRACTICES

DEVELOPMENT OF A SET OF PRINCIPLES TOWARDS EFFECTIVE REMOTE WORK-
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A study into telework: its advantages, disadvantages, and future business practices.

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"A straight line may be the shortest distance between two points, but it is by no means the most interesting." (Doctor Who)

ABSTRACT

Telework and the promise of its future adoption has been heralded ever since its coining in the 1970's, but the outbreak of the COVID-19 pandemic has brought it into the spotlight and forced its widespread adoption, but its implementation can be described as erroneous as there isn't a clear guiding tool on how to do so. It was then, this dissertation's goal to evaluate the current state of teleworking practices in Portugal and establish a set of principles that could guide managers in the evaluation of their teleworking practices and aid them in the implementation of new ones. Based on a review of both academic and professional literature, an online survey was distributed to Portuguese workers having yielded 135 valid responses from teleworkers. The conducted research limitations were related to survey length constraints and limited reach into private and public companies.

Analysis of the responses demonstrated that there is a clear perceived productivity increase among those who engage in telework. Work reorganization, a recurrent concern for managers, shows no global trend but is shown to have clear links to teamwork.

The proposed set of principles yielded moderately positive result of 4.9 out of a possible 7, indicating that Portuguese teleworkers view their companies as having adapted to this form of working in a sufficiently good manner.

From the results, it can clearly be stated that telework increases productivity, and bolsters work and family balance. Additionally, attention must be paid to the effects telework has on mental health and the mitigation role of software.

To build upon the results of the present dissertation, post-pandemic application of the developed set of principles is warranted as well as hard data gathering from within companies and performance indicators analysed.

Keywords: Telework, Remote work, Business practices, Set of principles

RESUMO

O teletrabalho e as promessas da sua adoção futura têm sido anunciadas desde o seu cunho na década de 70, mas o surto da pandemia COVID-19 fez os holofotes incidir sobre o assunto e veio forçar a sua adoção generalizada, podendo esta ser descrita como errónea, muito devido ao facto da não existência de uma ferramenta guia. Foi, assim, o objetivo da presente dissertação avaliar o estado das práticas de teletrabalho em Portugal e estabelecer um conjunto de princípios que pudessem guiar as empresas na avaliação das suas práticas de teletrabalho, e na implementação de novas medidas. Com base na revisão da literatura académica e profissional, um questionário foi distribuído junto de trabalhadores portugueses, tendo sido obtidas 135 respostas válidas de teletrabalhadores. As limitações da investigação conduzida tiveram que ver com a extensão do questionário e com o acesso a empresas, tanto públicas com privadas.

A análise das respostas demonstrou um claro aumento da produtividade percebida em teletrabalhadores. A reorganização do trabalho, grande preocupação de gestores, não mostra nenhuma tendência, ainda assim existem claras ligações com o trabalho em equipe.

O conjunto de princípios obteve 4.9 de 7 pontos possíveis, indicando que os teletrabalhadores consideram que as suas empresas adotaram o teletrabalho suficientemente bem.

Dos resultados obtidos, pode-se claramente afirmar que o teletrabalho aumenta a produtividade e potencia o equilíbrio entre o trabalho e a família. Deve ainda, ser prestada atenção ao efeito que o teletrabalho tem sobre a saúde mental e os efeitos mitigadores do Software.

Por forma a construir sobre os resultados desta dissertação, uma aplicação pós-pandemia do conjunto de princípios deve ser conduzida bem como recolha de dados dentro das empresas bem como análise de indicadores de performance.

Palavras chave: Teletrabalho, Trabalho remoto, Práticas de negócio, Conjunto de princípios

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GLOSSARY

Benchmarking	The process of comparing business practices and performance metrics to industry bests and business practices from other companies
Onboarding	The action of integrating a new employee into an organization
Telepresence systems	Set of technologies which allow a person to feel as if they were present at a location other than their current location

ACRONYMS

EU	European Union
HRM	Human Resource Management
ICT	Information and Telecommunication Technologies.
ILO	International Labour Organization.
IT	Information Technology
VR	Virtual Reality
WFB	Work-Family Balance

INTRODUCTION

1.1 Motivation

The current work paradigm and practices are now decades old when considering the latest technological advances and the prospect of a more computer savvy workforce and these working practices need to evolve in order to keep up with the wants and needs of the new generation of workers.

The recent health crisis has shown us that such a change is possible, and that the new workforce is willing, welcomes change and wishes that their life and work journey may follow different paths and patterns from the ones we've been observing.

These are the great motivators behind the decision to write this dissertation, taking on the task of understanding what it is to telework from a scientific point of view informed by published papers and consulting articles, offering insights into this "new" form of working as well as contributing into this field's body of literature in the hopes that it may help shift the paradigm towards something better and more sustainable.

As in life, so too can businesses and the scientific community benefit from the lessons learnt during trying times as the one we are enduring. The past two years have taught us many lessons when it comes to alternative business arrangements and forms of work, they have forced businesses who were unwilling or never considered telework to do so or face certain demise.

For the many companies that remote working has been well implemented, we can also find ones where this was not the case, making this a never-before-seen opportunity to gather knowledge and insights into what it is to telework.

1.2 Research Questions

The question to be answered is quite simple in its nature - Why has telework never been widely implemented given its potential?

It is, then, this dissertation's goal to analyse the state of teleworking in Portugal and develop a set of principles to be used as a guide to evaluate already established teleworking practices and aid in the implementation of new ones. In order to achieve this, an overview of the advantages and disadvantages, business practices as well as the concerns and implications of this work arrangement are to be gathered from peer reviewed scientific papers, and articles from renowned consulting groups.

Given this theme's wide breadth, the author chose to seek answers to four specific questions which have arisen during the process of obtaining a picture of what it is to telework around the globe and what are the best business practices.

- 1- Does telework increase productivity?
- 2- Does adopting telework result in better work-life balance?
- 3- Does adopting telework require extensive work reorganization?
- 4- Has telework impacted teamwork?

The posed questions seek to explore concerns found throughout telework literature and which are of concern to managers in general from the perspective of Portuguese market teleworkers. Productivity and work reorganization can be considered major worries, as managers are unsure as to the effects of decentralization, reduced observability and direct control, and their impacts on performance. Teamwork is another area of interest with uneasiness stemming from the nature of telework, with teams located outside the office space, whether if the same levels of coordination and cooperation can be maintained and in particular, output quality.

And finally, what impact does telework have on people's lives, does it indeed result in an increase in wellbeing, particularly, if they are better able to juggle their work and personal lives.

1.3 Methodology

The two methods used to achieve the previously established goals were the conduction of a systematic literature review and the deployment of an online survey.

The literature review serves the purpose of obtaining the necessary knowledge into the topic of telework, gathering best practices, industry insights and guidelines for a successful implementation and operation of remote working. Consisting in secondary data from online databases, namely *Scopus* and *ScienceDirect*. In addition, as consulting firms have a large stake and interest in the matter at hand and conduct relevant research, articles from a select few were also included. Even though they may not be peer-reviewed, they give a relevant contribution to the fields of Business, Management, and Technology.

The second method, collection of primary data through the deployment of an online survey, a widely used and accepted form of research in the fields of management and business, and telework in particular, as it enables the researcher to gather evidence from geographically dispersed subjects, which given the field and scope of the topic is the most appropriate form of data collection.

1.3.1 Literature review

The first inquiry was conducted using terms such as "telework", "telecommuting", "remote work" and "teleworking" with the aid of Boolean operators in the following form ""Remote working" OR "remote work" OR telework OR telecommuting". Secondly, exclusion filters such as "Rural", "Covid", "Confinement" were applied as well as limiting the scope to research and review articles only. A similar search was implemented throughout the consulting firms' websites.

One of the difficulties encountered had to do with the selection of relevant articles among the vast numbers found, as such, a more hands-on approach was needed, which is to say, selecting the most relevant by article name and subsequently by abstract.

There was no timeframe limitation so as to cover the first mentions of telework and appearances of teleworking related articles and obtain an historical context and a snapshot throughout the decades. Some articles outside of the scope of this research were also considered with the aim of obtaining knowledge on complementary information on other topics including mental health.

1.3.2 Survey

The survey was deployed during February 2022, participation was voluntary, and no incentives were offered. It consisted in thirty-four questions in total: age, gender, level of education, occupation, two multiple choice questions, three open ended questions, and twenty-three questions with a 7-point Likert scale response. From the outset, the target population for this study can be described as anyone who is 18 years or older, aimed at the working force who has teleworked before but not limited to. The chosen platform for survey deployment was Google's *Google Forms*, a globally known application with broad customisation potential and capabilities. Its simplicity and the fact that it allows the researcher full control over question and item design were the main reasons behind this choice. As means of distribution, LinkedIn, Instagram, Facebook, and WhatsApp were used due to convenience and capability to reach workers from all walks of life, different companies, and sectors.

The two main objectives behind the survey's design were answering the research questions posed and the establishing a link between the main advantages, disadvantages and business practices gathered through the literature review. Additionally, a scoring of the proposed set of principles was attempted, although it could not be fully accomplished due to questionnaire length constraints. Typically, as questionnaire length increases the number of responders decreases.

With these objectives and constraints in mind, the final survey had 34 questions in total. Beginning with the necessary characterization of the population through age, gender, occupation, whether they teleworked before and if they wanted to continue teleworking. It included three open-ended questions, whose objective was to provide some latitude to the respondents and offer them the possibility to express their individual observations. By phrasing the questions as "What are the advantages/disadvantages you have seen", one can attempt to correlate them with the main advantages and disadvantages found throughout the literature and listed in the present document. The remaining 25 questions were designed as Likert scale items scored between 1 - "Strongly Disagree" to 7 - "Strongly Agree" [1]. A complete list of questions, written both in Portuguese and English can be found under APPENDIX A - Survey.

1.3.2.1 Survey analysis

Database clean-up, consolidation and subsequent analysis was accomplished using *Microsoft Excel (Microsoft Office 365)* software and the *Statistical Product and Service Solutions (SPSS)*. The first phase consisted in database clean-up and data scoring. Scoring the collected information of questions one to six into categorical numerical data, as well as coding open-ended question responses as binary variables (1 and missing) which resulted in the identification of seventy-six individual variables. This process was conducted as some data collected through *Google Forms* comes in text form and is not suitable for analysis in either *Excel* or *SPSS*.

Although data analysis was made in a case-by-case approach due to the nature of the different questions and the requirements towards meeting the proposed objectives, the two most common and prevalent techniques were with visual analysis being the first approach and quite universal in all data analysis and scientific methods, achieved through frequency tables and Excel's graphing capabilities, which in some cases readily yielded relevant conclusions as a clear trend could be identified. Secondly, a combination of statistical tests, namely, t-tests and normality tests were run. Skewness and Kurtosis analysis were also used in such cases in which t-tests and normality tests failed in an attempt to identify relevant trends.

In order to answer those questions that require a combination of variables, *SPSS's* tools such as bivariate correlation, and contingency tables commonly known as crosstabulations were used. In the case of bivariate correlations, Spearman's ρ Kendall's τ -b coefficients were used as they are able to deal with rank data as are Likert Scales and are insensitive towards the type of distribution, non-linear data as well as outliers [2]. In the case of contingency tables, their relevance is of note as they are a powerful tool in understanding the interrelationships between categorical variables as is the case of ordinal data derived from Likert items [3].

Classification and analysis of the open-ended questions was conducted using multiple response set frequency and crosstabs. A complete report and analysis of the collected data can be found in section 4 - Survey.

It must be noted, that although data collected as a Likert scale is not a continuous scale and may be interpreted by some as categorical data, it is admissible to be treated as an interval scale as long as certain conditions are met. The scale must be anchored (ex: Strongly Disagree, Strongly Agree) as well as comprised of at least five categories, (seven were used in the analysis herein) and a numbered horizontal scale must be also present as it allows the interviewee to visualize said scale. Additionally, and pertaining to the use of t-tests, these are relatively robust

to violations of normality and equality of variance given that the sample is reasonably large ($N > 100$) and two-tailed hypothesis tests are used [1], [4].

1.4 Structure

This dissertation is divided into 6 main chapters with several sub sections.

Chapter 2 consists in the necessary literature review, whose goal was capturing the main aspects of teleworking, introduces telework and presents a short historical contextualization.

Chapter 3 presents the proposed set of principles for the evaluation of teleworking practices.

Chapter 4 presents the results for the proposed research questions and set items.

Chapter 5 comprises the discussion of the previously presented results.

Chapter 6 wraps up the present work and presents the conclusion of the conducted research and offers recommendations for future studies.

LITERATURE REVIEW

2.1 Introduction

Telework has long been regarded as the future ever since the development of information and telecommunications technologies (ICT), but contrary to early predictions it has never seen widespread adoption. The years of 2020 and 2021 saw millions of workers conduct their jobs from their households and thus brought telework into the spotlight and greatly accelerated the implementation of technological solutions that would otherwise take several years as well as raising a vast number of questions among all involved parties.

In light of recent events and concerns, such as: global warming, overcrowded cities, and increasing number and awareness towards mental health issues. Usual business practices and work arrangements need changing, a shift to remote working can be an ally in this fight. Permitting workers and their families a move to less densely populated areas, opposing the break-neck speed of today's work environment with more relaxed surroundings as well as bolstering local economies [5]–[7].

But ultimately, traditional work arrangements may not be able to cope with the demands of today's work environments enabled by the ICTs as well as the people's will. 21st century workers look for different ways of living when compared to their predecessors, empowered by ICTs and the digital world, which has brought them improvements in the way they communicate, travel, and manage their finances. They wish to move away from the typical 9 to 5 job and daily commutes, and this is where remote working can add value to people's lives and by consequence, the companies in which they work, because a fulfilled and motivated employee is an invaluable asset.

2.2 Telework

Remote work or telework, according to the International Labour Organization (ILO) consists of business operations and professional tasks conducted outside of the office space, usually at home with recourse to information and communication technologies such as smartphones, tablets, laptops, and desktop computers [8], [9]. And, according to the European Union "Telework is a form of organising and/or performing work, using information technology, in the context of an employment contract/relationship, where work, which could also be performed at the employers premises, is carried out away from those premises on a regular basis." [10, p. 2]. As the teleworker is physically isolated from his or hers co-workers, ICTs are instrumental in keeping the whole organization interconnected [11], [12]. There are several types of remote working arrangements, such as: home-based teleworkers, those who work in co-working spaces, and nomadic workers such as engineers and sales representatives and over-time workers who conduct professional tasks at home outside working hours. This dissertation will focus on home-based teleworkers as a formal or informal work practice but not limited to full-time home workers [11].

2.2.1 Historical context

Telecommuting as a concept emerged during the oil crisis in the early 1970's where Jack Nilles and his colleagues discussed that the growing availability of sophisticated ICT's may increase the growth and decentralization of information industries, as well as tackle societal issues regarding the commute between home and the work-place and its relation to fuel consumption, road congestion and land use [13]–[15].

In the book "The Third Wave" published in 1980, Alvin Toffler wrote "A white collar labour force working on computer terminals in their "electronic cottages" is one vision of the future." and some estimated that half the working force could be working remotely, but a decade later in 1994, Baruch and Nicholson reported that in the European Union less than 1 percent did so, and according to the United States Census, from 1980 to 1990 it rose from 2.2 to 3% regarding full-time telework [15]–[17]. 50 years have since elapsed since the coining of the term telework and that promise of "electronic cottages" and that a vast number of workers would be occupied as such, has remained unkept despite the several reports throughout the decades reiterating so.

In 2002 the European Union produced the European Framework Agreement on Telework as a means of expanding on the existing government regulations as a response to the spread of this new mode of working and the debate around working time regulations, work conditions and occupational health and safety [18].

A 2020 report from the European Union on its citizens shows that in 2019 only 5.4% of those employed were working from home on a regular basis and up to 9% when also considering those who sometimes do so [13], [19]. With its highest prevalence being in the Information Technology (IT) and knowledge-intensive sectors, reaching up to 40%, and the lowest being among the manufacturing sector with 8%, according to data from 2018 [19]. This data contrasts with reports from 2018 which show that around 37% of those employed in the European Union (EU) can technically telework [7].

2.2.2 Characterization

Teleworking is mostly practiced by those in intellectual professions and knowledge intensive industries who enjoy a considerable amount of job autonomy.

Teleworkers usually live in large cities where commuting takes a considerable amount of time per day, use teamwork and are avid and well versed users in electronic communication [11]. They require and make less use of direct supervision (i.e., coordination and control are based on goals and objectives), are accustomed to flexible hours and their colleagues are usually highly qualified and ambitious people. It has also been shown that cognitive and creative tasks are more suitable to this work arrangement when compared to those of a more routine and dull nature [20].

On most companies, their job descriptions are usually among the upper levels of company boards, whereas workers represent a small margin. In the case of knowledge intensive industries, the likelihood of telework adoption is higher when compared to those whose nature requires physical presence [21].

2.2.3 Advantages and Disadvantages

The effects of introducing this form of work are wide reaching and have implications in the most diverse areas, ranging from mental and physical health, company culture and performance, office building and city planning as well as environmental impacts. As such, in the present work, focus will be given to the aspects regarding company and worker performance, and the workers' health and well-being.

Throughout the body of literature there is disagreement in regard to the extent in which telework may improve people's lives, there is however, consensus regarding the areas where both advantages and disadvantages are felt. Cultural aspects and location have been shown to influence adoption of this practice with evidence showing that, for example in Japan, where the worker's journeys are typically longer (upwards of one hour using public transportation) telework adoption is higher [22]. Even within the same corporation, managers with identical responsibilities in two different locations (France and the Netherlands) valued its advantages and drawbacks differently, whereas in the Netherlands the implementation was fitting, in France it was reduced.

For the many advantages that adopting this form of working can bring, there are however downsides that have to be taken into consideration and carefully weighed whenever an organization is making the decision into transitioning. Another aspect to take into consideration, is the fact that both advantages and disadvantages have spill over effects and interactions between them that must be considered as well as either positive or negative unforeseen consequences.

2.2.3.1 Advantages:

Literature concerning this topic informs us that when adopting telework, improved or increased productivity is among the advantages researchers have found to be of note. Bailey and Kurland [23], declare that in almost all empirical articles teleworking advantages are in some cases intertwined. Take the example of productivity increase, which is a clear and often cited advantage of this working practice and whose effect is associated with other variables such as an improved work-life balance (WLB) and freedom from interruptions and distractions [24], [23]. Productivity increase is also related to less absenteeism, one of the reasons being the added ease in organizing one's private life [25].

Time saved in commuting is another example of teleworking advantages and is positively related to work-life balance when considering time as any other finite resource that can be either spent or gained. Simply put, time spent commuting can now be allocated to family time, household duties as well as leisure activities [17], [26]. Furthermore, R. S. Gajendran and D. A. Harrison [26], state that there is a negative relationship between telecommuting and work-family conflict. Teleworking can also play a significant role when it comes to employee attraction and retention, as flexibility towards one's needs has been shown to be positively related to job satisfaction and WLB [23], [26]. On another level, flexibility in scheduling

individual work-related tasks also has other implications, leading to improved productivity, increased job satisfaction, and better work-family balance (WFB).

Furthermore, R. S. Gajendran and D. A. Harrison [26] also affirm that telecommuting is negatively associated with employee turnover intention. Managers, by allowing work to be performed outside of the company's premises, are perceived as awarding employees with trust and thus impacting the teleworkers' psychological contract which in turn reciprocate through loyalty and appreciation towards the organization and its managers [27], [28]. Pinsonneault & Boisvert [29] also state that this form of working contributes to the employees sense of belonging within the company.

Another example of spill over effects is job satisfaction, whose measure is closely linked with productivity and output quality as well as being key to the stability of the organization's human capital resource-base [30].

Worker's concentration and incidentally job performance in certain tasks is impacted by work environment, whereas some thrive from bustling surroundings, others find it distracting and anxiety inducing which causes a drop in efficacy.

On an individual level, according to L. Leung and R. Zhang [31], telecommuters also experience savings with regards to clothing, food, travel time and its cost, although the extent greatly varies between industries, job occupation, and commute length.

For further reference, below is a list of the advantages previously mentioned:

- Improved productivity
- Better work-life balance
- Flexibility
- Freedom from interruptions
- Time saved in commuting
- Organizational loyalty
- Job satisfaction and belonging
- Employee retention and attraction
- Scheduling
- Job satisfaction

2.2.3.2 Disadvantages

As in every aspect of the human experience, there isn't a single choice that doesn't come with drawbacks. When it comes to this working practice, most have to do with psychological aspects. Such is the case of professional and social isolation, which occur when task coordination and co-worker cooperation is dependent on managers in addition to insufficient support being given. This results in workers feeling disconnected from what would otherwise be office interactions [17], [32]–[34]. Interpersonal relationships with peers, and both subordinates and supervisors have been shown to suffer as telework imposes a physical barrier between co-workers and thus diminishes the power of social interaction [12], [33], [35].

Teleworkers are more susceptible to working overtime on a regular basis than they would if they were working out of the traditional office. Stemming from an outdated perspective, where the worker feels that he or she must be seen as busy at all times, this perceived lack of visibility leads teleworkers to putting in extra hours. In addition, it has been shown that the lack of social interactions with co-workers is leading the work force to never before seen levels of burnout and anxiety [35].

Furthermore, remote workers encounter additional challenges when establishing professional relationships with their co-workers, whether they are their managers or their subordinates. Another obstacle in the teleworkers' path is the loss of casual interactions, the so-called "water cooler" conversations, which are of noted importance in creating meaningful connections with colleagues, evaluating team morale (in the case of managers), answering brief questions which can sometimes be responsible for serendipitous solutions, and help create important rapport with higher management [35].

Technology and ICT's already play a central role in today's businesses and its seamless integration and impact in a company's bottom line will only grow as cutting-edge tools are increasingly accessible, less costly, and the work force is increasingly tech-savvy.

Telepresence systems, remotely operated tools, and virtual reality (VR) systems in conjunction with fifth generation mobile networks (commonly known as 5G) and broadband connections facilitate social and professional exchanges between colleagues and managers, in addition to making knowledge more accessible as well as making specialized services more affordable and readily available in remote locations [36].

Technology is a great ally in the current and upcoming challenges, but there are also perils and drawbacks, one is the case of technostress. Born in the modern world, and the result

of having to check multiple sources of information and managing a plethora of tools and software. Those who suffer from technostress feel overwhelmed either by the amount of information, or by not being sufficiently familiarized with the multiple tools, software and platforms that teleworking requires. These individuals, suffer physical and psychological strain resulting in decreased job performance and increased judgement errors [37]. On the managerial side, hesitance in the adoption of telework is related to cost, loss of control over employees and the perceived requirement of major work rearrangements, additionally, companies also overlook the possibility for its introduction as there is no perceived necessity [23].

For further reference, below is a list of the disadvantages previously mentioned:

- Employee burnout
- Overtime
- Professional and social isolation
- Interpersonal relationships with co-workers
- Technostress
- Serendipitous solutions

2.2.4 Concerns and implications

2.2.4.1 Concerns

Companies who have not implemented the practice, believe that doing so will result in a great reorganization of their working methods and procedures as well as resulting in a decrease of productivity, which is in direct contradiction with the experience of those who have. A survey conducted by A. Aguilera et al. [11] demonstrates that only a minority of those who have implemented telework had to reorganize their working methods. The simple fact of executive awareness of teleworking practices has been shown to reduce the implementation barrier as the concept of telework becomes part of the conversation, as it has for the past two years, a greater degree of implementation is expected [38].

Generally, executive management is concerned by the financial outcome and their biggest motivation is derived from programs which clearly show an increase in productivity. In the case of middle management the challenge is of another sort, these individuals will potentially need to change their management style, instead of directly observing their subordinates, they must manage by results and trust them in the meantime [15].

2.2.4.2 Implications:

When society moved from the rural to the factory floors during the industrial revolution and standardization of work became the norm, managers wanted to make sure that every part was delivered correctly. This was achieved through strict supervision and control along with 9-5 working days, as such, this model has become ingrained in our collective minds of what work means and how it should be supervised. As we are now on the outset of the fourth industrial revolution, society has gradually come to realise that the working ways of the past are to become outdated and are not suitable for every individual and for every company. Remote working implies a rethinking of corporate organization quite far from the “traditional company” that still uses that first model, in which employees should be always in the office where they can be kept under observation.

Implications such as the reorganization of work, which entail the revision of supervisory methods and granting greater autonomy to employees, as well as the non-compatibility with work which is one of the main reasons given by employees for not wanting to adopt telework. Requirements such as these, conceal the organisational changes implied in the implementation of teleworking practices [11]. The extant literature is quite clear on this matter, if controlling the employee in a direct manner remains a standard practice, failure is assured [39].

For those whose telework intensity is greater, companies must clearly specify their roles and the company rules so as to reduce work related strain and role ambiguity [37].

The manner in which workers engage in remote working differs according to role and job title, as such, managerial strategies and work scheduling practices must take into account this heterogeneity [40].

A. Suh and J. Lee [37] have found that applying a standard teleworking practice across an entire company does not effectively manage technostress as well as employee performance.

Within companies, there are also ambiguities as where the responsibility for its implementation lies, and as a result, telework isn't being explored to its full potential. For this work arrangement to be better exploited, its strongly advised that both parties (employer and employee) agree on the job specificities, which is to say when and where in conjunction with other added benefits.

Apart from the short-term effects that telework can produce on the bottom-line it must also be viewed as a tool to affect change and have long-term effects in an organization. This is due to the fact that telework will, if applied correctly, strongly impact the available human resources [30]. The research on the topic of telework is a complex matter, as different

companies have different and complex ecosystems and conflicting outcomes are likely to arise as a result of said research [36].

Within organizations, telework can potentially produce effects such as the reduction of the necessary office space, operational costs, improvement of knowledge distribution, information sharing and collaboration which allows for a more efficient operation [37], [41], [42].

Facility management, knowledge production and service delivery processes are areas that have been identified as having the potential to be affected by telework, but further research must be conducted in regards to the extent to which change is possible [6].

Unilever introduced an interesting work practice, which can be described as "managing available capacity and talent", one of which has long been a practice of Industrial Management. They introduced a matchmaking tool where employees could list their passions, skills, and available time and others could list their need for a specific skillset or task completion, transforming their employees' slacks between tasks into productive time. This simple strategy drives overall productivity within the organization and builds cross-department collaboration which in turn results in employee and work satisfaction [43].

The single goal of a company cannot simply be turning a profit, it also extends into expressing corporate social responsibility, as such, promoting employee and family-friendly work practices are a huge first step towards this goal [44]. Make your employees part of the process and transmit a clear view of the company's goals and they, in turn will feel that they are an Integral part of the company giving them empowerment and a sense of ownership.

As most of the observed drawbacks are linked with both social and professional interactions as well as mental health, it is certain that the actions to be undertaken must have a direct impact in this area, promoting teamwork, communication, and interactions beyond those that are work related as well as establishing a sense of community within the company. ICTs are paramount in this endeavour, as these tools are what bridges the gap between co-workers when they leave the office space, and their application can facilitate spillover effects and synergies.

To mitigate these disadvantages and capitalize on the upsides, a strong foundation must be present within the organization, in the form of adequate business practices and work conditions, as organizational support has been shown to have a positive influence on the perceived social isolation of personnel, reduce psychological stress as well as increase job satisfaction [35].

2.2.5 Best Practices

As defined by Merriam-Webster and Cambridge Dictionary, best practices are procedures or working methods that have been shown to produce optimal results through research or experience. These can come in many forms, benchmarking, standardization of business processes, and human resources practices [45], [46]. When it comes to telework, the latter is of greater relevance, because it is comprised mostly of managing people. As such, innovative human resources practices as highlighted by Martínez-Sánchez et al. [47] and Illegems and Verbeke [30] have a clear link to firm performance, but ultimately must be viewed not only as having the potential to reduce costs or improve productivity but as a means to achieve long-term gains on the organization's competitiveness and competences. Human resources (i.e., workers), must be looked at as any other on an organization's toolbelt, and telework can be utilized so as to attract and retain those who are better qualified and difficult to replace and/or find.

One may think, as has been the norm, that its benefits are limited to the bottom line, but recent research has shown that this is only the tip of the iceberg, its potential impact on an organization's growth and longevity are ample. Both studies affirm that these practices are of great importance as they amplify telework's contribution, that could otherwise be minimal.

As workers are geographically dispersed, the efforts necessary towards maintaining teamwork and team cohesion are increased, as such, high quality and frequent communication arise as the pillars of telework. Where teams and their managers must strive to communicate frequently as well as keeping interactions concise and the message well relayed [48]. The rise in the usage of platforms such as *Salesforce's Slack* or *Microsoft's Teams* enables co-workers to communicate more quickly and efficiently than in a traditional office setting and at the same time improving visibility across the organization [49].

Effective managers must be able to cultivate trust and collaboration by maintaining contact with their subordinates by means of brief meetings ("touching base") of up to 15 minutes, where the employee's work-related tasks are not the main topic of discussion and rather their general wellbeing. Another important practice is the organization of regular companywide social activities and frequent team building events.

Both these strategies require the involvement of senior management and have two different effects, they build psychological safety by fostering connections with co-workers and managers, thus combating isolation, building team spirit as well as perceived employee value [50].

Measures such as the organization of company meets and others such as the prevention of worker isolation are envisioned in the European Union's Framework Agreement on Telework.

When it comes to maintaining productivity and engagement, according to a 2021 survey by *McKinsey*, leaders of top-performing companies and which results and performance increased, spent additional time into transmitting and clearing company goals and its strategy. Setting clear goals and making sure that the company strategy to be followed is well understood must be a priority for managers and board members, as it assures that lower-level employees are able to visualize the "big picture". As managers delegate tasks, unclear goals mean that decision making at a lower level doesn't take into account the company strategy and may lead to bad decisions [51]. Additionally, companies should reinforce their onboarding practices, establish specific remote work transition sessions to make sure that future teleworkers are aware of best practices as well as being familiar and at ease with communication and collaboration tools.

Companies must implement both collaboration and communication software as well as project tracking tools. Where platforms like Slack, Zoom, and Microsoft Teams are fundamental as they promote interconnectedness and communication within the organization, project management tools enable all involved parties to track real time project status, and extract daily metrics and reports [49]. Adopting biweekly performance reviews and bidirectional feedback sessions are fundamental if businesses are to thrive in a remote working environment as it aids employees reach their set goals and job responsibilities [52].

As reported by Baruch [53], telework can shift a portion of costs incurred from employer to employee regarding hardware (personal computers or office furniture) or running costs (electricity and internet connections). As these can be seen as a problem by those who telework, providing employees with the adequate tools and hardware is determinant of employee attitude towards telework as stated by Mann et al. [54] [32].

According to a survey conducted by The Future Workplace, senior human resource leaders of top performing companies place employee well-being and mental health as a top priority. Further evidence is given when looking at figures related to the corporate wellbeing market, estimated to be 20.4 billion US dollars and forecasted to grow up to 87.4 billion by 2026 according to McKinsey [55]. These companies have also expanded their well-being benefits in order to include online counselling sessions as well as providing their managers with empathic leadership training [55] [48].

Further promotion of work-life balance can be managed by allowing employees to have flexible work schedules as opposed to the traditional "nine to five" as well as encouraging them to take time off during the day, otherwise known as time-blocking which can favour productivity and the employees' mental health [55]. As evidenced in a survey by *The Future Workplace* [55], around 70% of top performing companies have offered workplace flexibility.

The quality of communication, technological and administrative support are fundamental when applying telework. It is, therefore of great importance that the organization has quality training, information, administrative and technological support [38]. As such, upper management must work on improving their processes, information systems and especially their management style. As observability and direct control are counterproductive and questionable, managing through goals and milestones must instead be practiced as opposed to hours worked.

Another essential aspect towards the correct operation and implementation of telework is making sure that all business-related meetings become "high quality", where collaboration and discussion is fostered and welcomed in opposition to simple information conveyance [52].

Future managers must also be provided with coaching in regard to their soft skills, i.e., they must feel at ease when providing and receiving feedback, the latter which must be welcomed and encouraged as continuous feedback is a must as it helps employees meet performance expectations and job responsibilities [33].

The practices previously laid-out cannot be implemented without the human element, it is then fundamental for companies to invest and coach managers to be better, which is to say, train them to be better leaders as opposed to the traditional role of "boss". The purpose of the middle manager shouldn't be about checking up on people, rather, it must be about getting the most from the people who are doing the work themselves [56].

For further reference, below is a list of the best practices previously mentioned:

- Communication
 - High Quality communication - concise and well relayed.
 - Frequent communication.
 - Input from employees.
- Provide emotional and social support - combat social isolation
 - Check in on employees - touching base (brief meeting).
 - Organize social activities.
 - Senior management involvement.

- Maintain productivity and engagement
 - Share remote work best practices.
 - Frequent meetings.
 - Micro-meetings (meetings that last up to 15 min).
 - Set clear goals and clarify strategy
 - Higher degrees of delegation.
 - Empower employees.
 - Frequent evaluations instead of annual
 - High quality and more frequent team building events.
- Provide adequate technology
 - Providing platforms and tools
 - Subsidize/provide hardware
- Promote work-life balance
 - Allow for flexibility - Not necessarily from 9-5 if it doesn't suit them that well
 - Encourage taking time off or time-blocking during the day if needed
- Ensure well-being
 - Promote general well-being - Mental and physical
 - Discourage overtime
- Encourage/foster/support connections and group discussions (micro-transactions)
- Provide/train managers in soft skills i.e., providing and receiving feedback and their impact on subordinates
- Quality onboarding and training using collaboration tools.
- Higher quality meetings: Collaboration instead of information conveyance.
- Managing through goals instead of hours worked

SET OF PRINCIPLES

Through the literature review, four key functional areas were identified as having the necessity to be addressed: Business, Communication, Psychological, and Physical.

Business	Communication
Physical	Psychological

Figure 3.1 Set functional areas

The Business area is related to actions and strategies to be applied by top and middle management. Comprised of broad management strategies and specific measures, its aim is one of assuring the company is in line with 21st century management practices, where managers are leaders and humane, and employees are valued and an integral part of the system.

The Communications area is related to company communication strategies to be practiced by all involved parties. Communication is one of the most decisive areas within a company, especially in the context of telework, where a good culture ensures employee visibility, impacts productivity by promoting intra and interdepartmental connection, and also plays a significant role in thwarting telework's disadvantages.

The Psychological area is comprised of strategies to bolster telework's advantages by ensuring the employee's wellbeing. Through strategies designed to strengthen the bonds between manager and subordinate, foster the company interconnectedness, and at the same

time support the workers' productivity and mental health as well as manage and limit telework's associated drawbacks.

The Physical section's main purpose is to highlight the importance of work conditions and its impacts on employee satisfaction, productivity, and health. Where the inadequacy or lack thereof, of ICT solutions such as telepresence systems may compound on the disadvantages of telework and hinder advancements made through the "Psychological area". Furthermore, the lack of adequate office equipment and furniture may lead to physical health issues, for example, musculoskeletal problems [9].

Support towards the necessity for coordinated action is given by socio-technical systems perspective, which dictates that the performance of any organizational system can only be understood and affected if both social and technical aspects are addressed as being interdependent aspects of a system. Thus, in order for telework to be successful the organization must address the technical, personal, and organizational elements [57]. If there is an imbalance in quality or concern between these areas, the performance of the teleworker and by extension, the company, may suffer [57]. For instance, a company who ranks high in all but one of these areas is likely to have successfully implemented remote working, however, if it has failed to provide employees with good work conditions, their performance is likely to suffer, or for example, if it disregards their employee's mental health, they are likely to produce lower quality work product and/or experience high turnover rates.

Due to the urgency brought upon the world by the COVID-19 pandemic, the adoption of telework has been done overnight and the methods through it has been achieved can be described as diverse and erroneous throughout the different sectors. Thus, standard practices and guidelines have not yet been developed and previous studies of telework had only been concerned with niche sectors, and trials within specific companies.

Contributing towards the topic of telework, this set of principles addresses the necessity for conformity and standardization as it is comprised of measures to manage telework, rules to combat and minimize the downsides of this form of working as well as best practices. Further evidence towards this necessity can be seen in the ILO's 2021 report named "Teleworking arrangements during the COVID-19 crisis and beyond" where it is highlighted "As the Covid19 pandemic increased the usage of telework, the need for a set of principles to balance and manage the needs of workers and employers has become more evident" [9].

The proposed set of principles is then, to be used as a tool in evaluating the implemented teleworking practices and if need be, aid in establishing new ones.

As any intervention or action to be taken within a company must be focused and purposeful if it has to have lasting effect, this set of principles provides organizations with a set of principles and guidelines that enable decision makers to make well informed and structured plans.

Although its intended use is the evaluation of the effectiveness and quality of telework measures and policies when applied to a specific company, in the context of the present work and through a survey this set of principles was applied with broader audience in mind so as to evaluate the current state of teleworking practices in the Portuguese market. The deployed survey served two major goals, the first of gathering evidence into the Portuguese teleworkers and their companies and thus scoring the proposed set of principles, and the second, of answering the previously mentioned research questions. It should be noted that there were, however, limitations in its scope and application due to constraints related to questionnaire length. A 7-point scoring system similar to a Likert scale was applied so as to be congruent with the one used to score the questionnaire's items. With the final score calculated as the average of all individual question scores. With 1 corresponding to Poorly Implemented and 7 corresponding to Appropriately Implemented.

$$\text{Equation 1} \quad \text{Final Score} = \frac{1}{n} \sum_{i=1}^n a_i$$

Where:

n – Number of questions

i – Index number

a_i – Individual question score

Set Items

Business

- “All-hands on deck” sessions to present companywide goals and strategies
 - Enables employees to see where the company is heading, “we are all in this together”
- Well-defined and clear goals
 - Allows employees to track their progress

- Managers are able to overview the status of projects/tasks without micromanagement
- Progress Evaluation
 - By goals/objectives instead of supervision
 - Frequent instead of annual
 - Mutual and anonymous - Promotes personal and professional growth for all involved parties.
- Biweekly status update meetings
- Higher quality meetings: Collaboration instead of information conveyance
- Encourage/foster/support connections, group discussions "micro-transactions"

Communication

- High Quality
 - Concise and well relayed
 - Clear and non-ambiguous key information
- Frequent - Manager to manager, employee to employee
- Management welcomes and expects input and feedback from employees
- Team brainstorming sessions to build dynamic

Psychological

- Quality onboarding – Introduction to tools, policies, guidelines
- Allow flexibility
 - Take time off / Time-blocking during work hours if need be
 - Flexible schedule, if possible
- Promote wellbeing and/or social gatherings both online and offline
- Check-in on employees – Managers seek mental wellbeing feedback
- Discouraging overtime – There is life beyond one's job

Physical (work conditions)

- Provide or subsidize technology and/or office furniture
- Provide adequate collaboration and communication tools (software/hardware)
 - Examples: Slack, Zoom, Microsoft Teams

<p style="text-align: center;">Business</p> <ul style="list-style-type: none"> • “All-hands on deck” sessions • Well-defined and clear goals • Progress evaluation • Biweekly status update meetings • Higher quality meetings • Foster group discussions 	<p style="text-align: center;">Communication</p> <ul style="list-style-type: none"> • High quality • Frequent • Feedback from employees • Team brainstorming sessions
<p style="text-align: center;">Physical (work conditions)</p> <ul style="list-style-type: none"> • Provide/subsidize technology/office furniture • Provide collaboration and communication tools 	<p style="text-align: center;">Psychological</p> <ul style="list-style-type: none"> • Quality onboarding • Flexibility • Promotion of wellbeing • Mental welfare check-ins • Discourage overtime

Figure 3.2 Detailed Set

SURVEY ON THE EXPERIENCE OF TELEWORKERS

In the present chapter the researcher presents the data analysis of the most relevant results, providing a snapshot of Portuguese workers, specifically those who are engaged in, or have experience working in a remote work arrangement. Throughout this chapter, there can be found a description of the obtained sample, analyses pertaining to the items which evaluate the research questions as well as to open-ended questions. The complete list of survey questions both in Portuguese and English can be found under Appendix A - Survey.

4.1 Sample Description

Responders were reached through *LinkedIn*, *Instagram*, *Facebook*, and *WhatsApp* and the conducted survey yielded 179 responses including 44 non-teleworkers whose responses were not considered so as not to skew the analysis herein.

A test of the internal consistency of the questionnaire, known as the Cronbach's alpha, yielded a value of 0.709 which can be marked as acceptable according to George, D., and Mallery, P. [58].

The valid sample consisted of 135 Portuguese teleworkers, with ages ranging from 21 to 75 years old composed of 64% women and 36% men.

Most participants, 86% have completed higher education, with the majority having master's degrees (46%) followed by those with bachelor's degrees (37%), with Figure 4.1 providing a complete description.

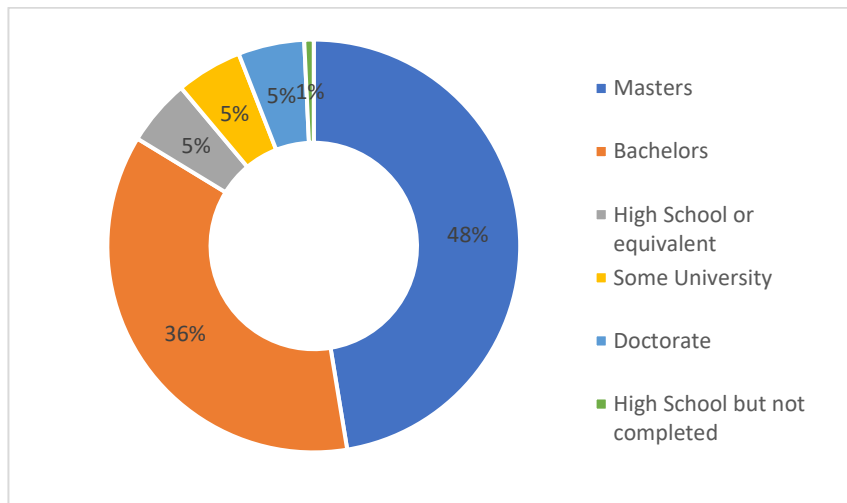


Figure 4.1 Education level of teleworkers

When it comes to the responders' professions, the top five consisted of Management, IT Workers, Healthcare sector professionals, Administrative and support services, and engineering. In order to improve the accuracy of the results presented, those who did not have teleworking experience were not considered towards the analyses conducted in the next chapters. As such, the top five professions among teleworkers are: Managers, IT Workers, Healthcare professionals, Engineers, and Administrative and support services professionals. On Table 4.1 an extensive list of percentages pertaining to the teleworker's occupation can be found.

Table 4.1 Teleworker's occupation

	Frequency	Percent
Management	18	13.3
IT Worker	17	12.6
Health Sector	17	12.6
Engineering	14	10.4
Administrative and support services	11	8.1
Education	10	7.4
Student	10	7.4
Sales Representative	6	4.4
Lawyer	6	4.4

Table 4.1 Continuation Teleworkers occupation

	Frequency	Percent
Design marketing pub audiovisual	6	4.4
Researcher	5	3.7
Banks Finance and Insurance	5	3.7
Consulting	3	2.2
Specialized technician	3	2.2
Other	2	1.5
Manufacturing	1	0.7
Hospitality	1	0.7

Teleworking experience among responders was distributed as follows: full-time telework - 31.8 %, 3-4 days per week - 12.8 %, 1-2 days per week - 14%, some hours per week - 6.1%, a few hours per month - 10.6%, and those who have never teleworked account for 24.6% of the sample. Visual representation can be found in Figure 4.2 .

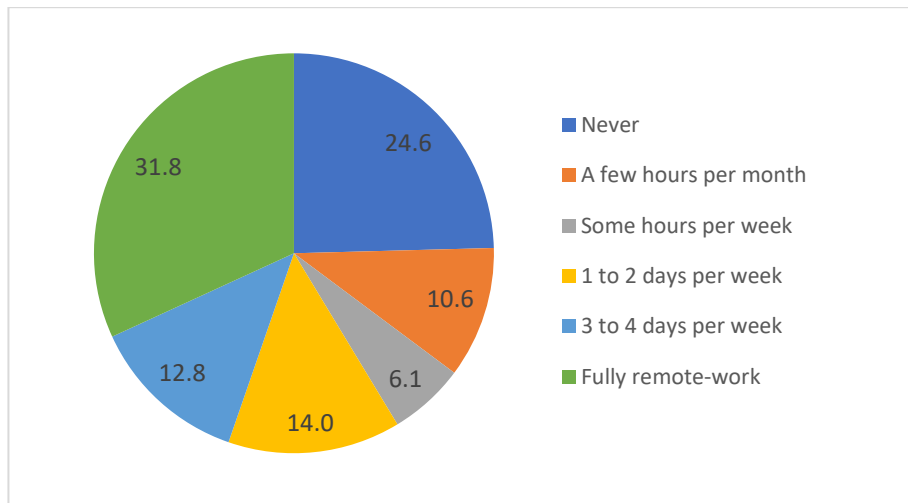


Figure 4.2 Teleworking Experience

Out of those who have past teleworking experience, a majority of 80% want to continue doing so, with 31% wishing to practice it twice per week, 17% three days per week, 16.3 reporting that they only wish to work out of the company's premises once per week, and, lastly, another 16.3% report that it become a full-time practice. Visual representation can be found in Figure 4.3.

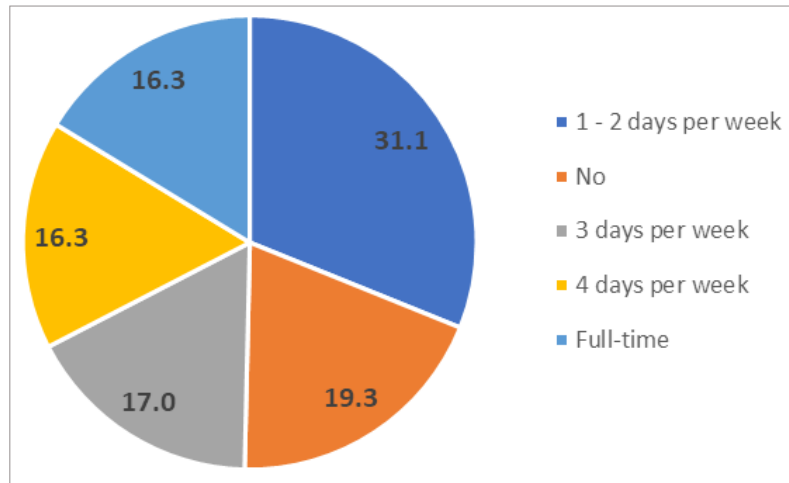


Figure 4.3 Future teleworking practice

Correlating the variables "I want to continue teleworking." vs "I have teleworked before." by means of a box-and-whisker plot (Figure 4.4), we can observe that:

- Those who only have teleworked a few hours per month do not wish to continue or only one to two days per week.
- Those who have teleworked a few hours per week want to spend more time teleworking - between 1 to 3 days per week.
- Those who have teleworked 1 to 2 days per week wish to maintain their present arrangement.
- In between those who have teleworked 3 to 4 days per week, there seems to be the broad answers ranging from 1 day to 4 days. This group's mean however indicates 3 days per week.
- The last group, those who have been full-time remote workers wish to cut on their remote working hours and return to the office a few days per week.

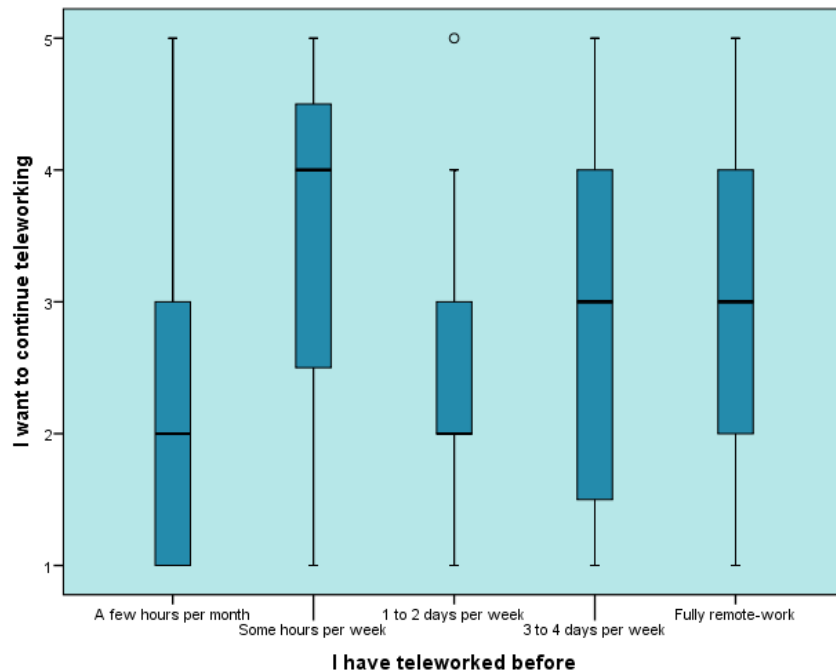


Figure 4.4 Box and whisker plot: "I want to continue teleworking" vs "I have teleworked before".

- The variable "I want to continue teleworking." is labelled:
- 1 - No
- 2 - 1 to 2 days per week
- 3 - 3 days per week
- 4 - 4 days per week
- 5 - Full-time

4.2 Research Questions

4.2.1 Does telework increase productivity?

Visual analysis of Figure 4.5 shows us the distribution of responses to the first research question regarding survey question number 23, with a majority of respondents agreeing with the statement "I felt an increase in productivity when teleworking". Further analysis helps reinforce this conclusion, with a Skewness value of -0.61 and a Kurtosis of -0.47, showing that data distribution is both asymmetric and concentrated to the right of the mean.

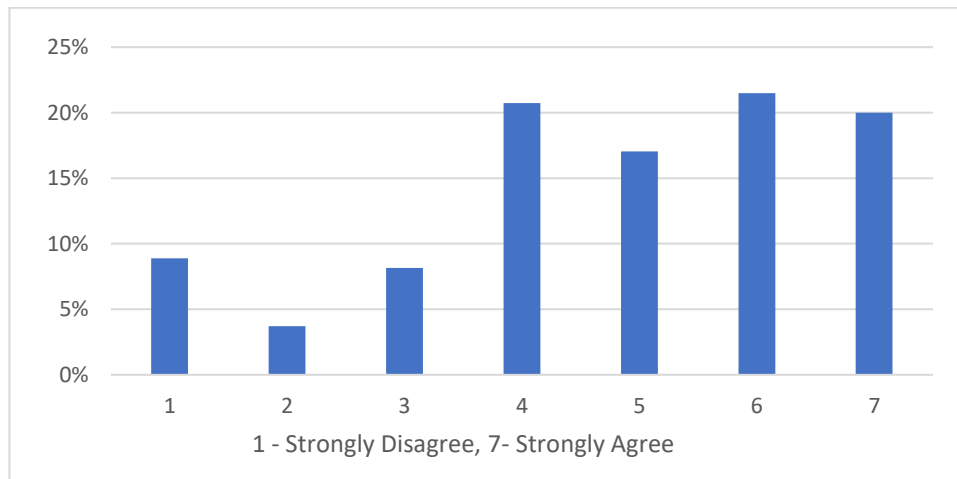


Figure 4.5 Answer distribution for: "I felt an increase in productivity when teleworking"

Table 4.2 Skewness and Kurtosis values for Productivity Increase and Non-essential activities

	Mean	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Productivity	4.78	-0.61	0.21	-0.47	0.41
Non-essential	4.89	-0.63		-0.77	
N=135					

Performing a one sample t-test for the null hypotheses H_{01} : "There is no productivity increase" with $\mu=4$, where the alternative hypothesis is H_{11} : "There is a productivity increase", yielding a p-value of .0 and thus giving confirmation to the results presented above.

A hypothesis can be postulated that the perceived increase in productivity when teleworking can be influenced by other variables. H_{02} : "I don't spend less time doing non-essential activities" to which the alternative hypothesis is H_{12} "I spend less time doing non-essential activities", yielded the results shown in Table 4.3, and as evidenced by p-values of .0 we can reject the null hypothesis with a significance level of 99%.

Table 4.3 t-test score for: "I felt an increase in productivity when teleworking" and "I spend less time doing non-essential activities"

	t	p-value
H_{01} Productivity Increase	4.99	0.0
H_{02} Non-essential activities	5.36	0.0
df= 134		

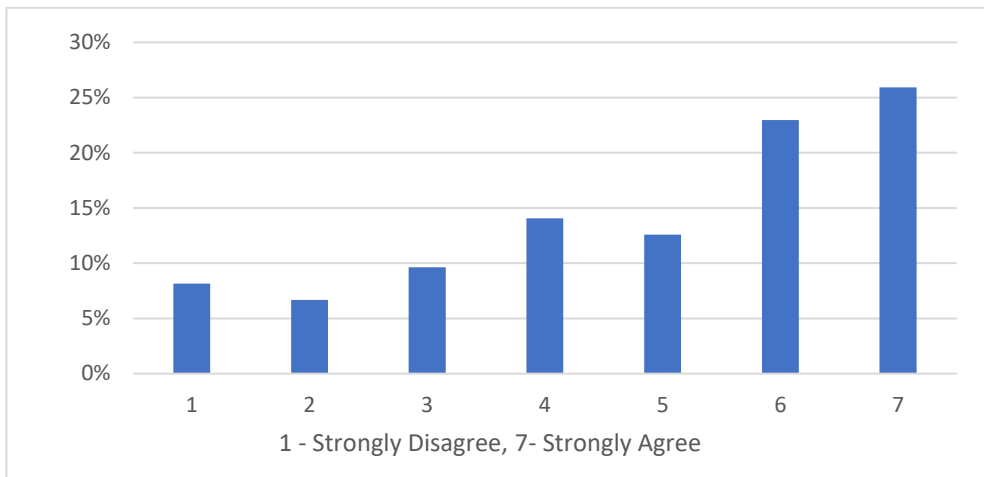


Figure 4.6 Answer distribution for: "I spend less time doing non-essential activities"

Evidence into the hypothesis that productivity is influenced by responders spending less time doing non-essential activities is given by correlating survey question 16 - "I spend less time doing non-essential activities." and 23 - "I felt an increase in productivity when teleworking."

With Kendall's Tau and Spearman's ρ having yielded values of 0.244 and 0.3706 respectively, effectively showing that there is a positive correlation between the two with a significance level of 99%.

Hypothesis testing and measures of symmetry prove that there is an increase in productivity, and the same analysis performed regarding non-essential activities proves that there is a decrease. This data coupled with the existing correlation between the two indicates that the increase in productivity, at least some part of can be explained by the decrease in non-work-related tasks (i.e., coffee breaks, chatting etc.).

Table 4.4 Correlation matrix: "Productivity improvement" vs "Less non-essential tasks"

	p-value	Correlation coefficient
Kendall's τ -b	0.00	0.244
Spearman's ρ	0.00	0.306
N=134		

4.2.2 Does adopting telework result in better work-life balance?

A visual analysis to the data pertaining to the questions: 24 - "I was able to maintain a better WLB.", 29 - "Not having to commute had a positive impact on my WLB.", and 30 - "Not having to commute impacted the balance between my work and family life." showing a clear trend

and positive answer to the questions posed. With those inquired having given answers from levels 5 through 7: 6%, 81%, and 69% respectively to question 24. A detailed answer distribution for question 24 is shown in Figure 4.7, questions 29 and 30 can be found under Appendix Figure 3 and Appendix Figure 4 respectively.

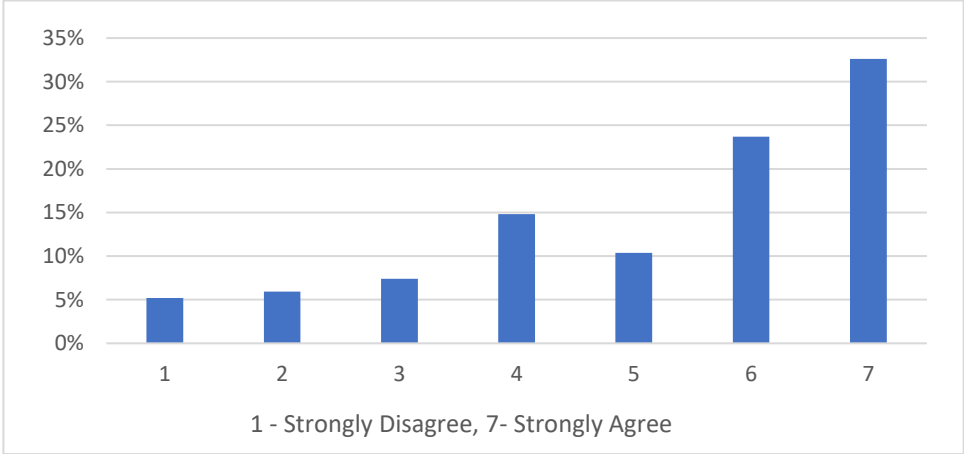


Figure 4.7 Answer distribution for question 24: "I was able to maintain a better WLB."

Performing a one sample t-test for both the main research question as well as for the two additional questions. With the null and alternative hypotheses:

- H0₃: "Teleworking does not improve work-life balance" $\mu=4$
- H1₃ "Teleworking improves work-life balance" $\mu\neq4$
- H0₄: "Not having to commute does not have a positive influence on WLB" $\mu=4$
- H1₄: " Not having to commute has a positive influence on WLB" $\mu\neq4$
- H0₅: "Not having to commute does not impact work-family balance (WFB)" $\mu=4$
- H1₅: "Not having to commute impacts work-family balance (WFB)" $\mu\neq4$

As show in Table 4.5, the p-value of all three questions is smaller than 0.01 and as such the null hypotheses can be rejected with a significance level of 99%.

Table 4.5 t-test scores for: "Teleworking does not improve WLB", "Not having to commute does not have a positive influence on WLB" and "Not having to commute does not impact WFB"

	t	p-value
H0 ₃ Teleworking does not improve WLB	7.68	0.00
H0 ₄ Not having to commute does not have a positive influence on WLB	13.9	0.00
H0 ₅ Not having to commute does not impact WFB	9.13	0.00
df=134		

4.2.3 Does telework require extensive work reorganization?

From the outset, visual analysis of the data pertaining to question 17, did not show any clear trend. The variable is not normally distributed as shown by both Kolmogorov-Smirnov and Shapiro-Wilk tests found in Table 4.6, as the p-values of 0.00 where $p < 0.05$, are outside our confidence interval of 95%.

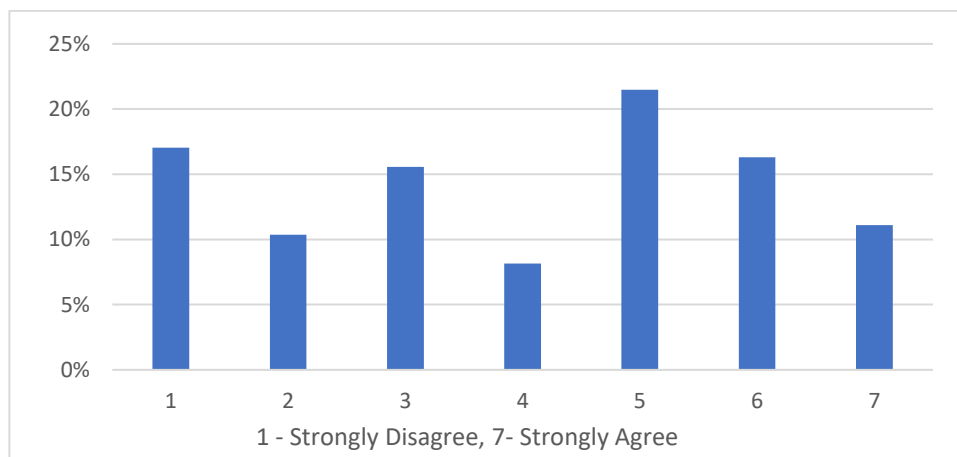


Figure 4.8 Answer distribution for: "I had to change the way I work due to telework"

Table 4.6 Normality tests for: "I had to change the way I work due to telework"

Kolmogorov-Smirnova		Shapiro-Wilk	
Statistic	p-value	Statistic	p-value
0.18	0.00	0.909	0.00
df=135			

Performing a t-test given the null hypothesis $H0_6$: "I didn't have to change the way I work due to telework" with $\mu=4$ and the alternative hypothesis $H1_6$: "I had to change the way I work due to telework" with $\mu \neq 4$, as the resulting p-value is greater than 0.05, we cannot reject the null hypothesis with a significance level of 95%.

Table 4.7 t-test for "I had to change the way I work due to telework"

	t	df	p-value
$H0_6$ Work Rearrangement	0.0	134	1.0

Another step that was undertaken in order to understand the underlying reasons behind the distribution that can be observed in Figure 4.8, was correlating these with the occupations of the respondents. Performing this correlation, both p-values for Kendall's τ -b and Spearman's ρ presented in Table 4.8, showed no significant correlation. As occupational data collected was divided into 17 separate groups, this step yielded inconclusive results due to individual group sample size.

Table 4.8 Correlation between Occupations and Work Rearrangement.

	Correlation Coefficient	p-value
Kendall's τ -b	.061	0.341
Spearman's ρ	.081	0.350
N = 135		

As such, occupations were grouped regarding the ability for a given job to be performed in a telework arrangement with recourse to question number 7 - "My job can mostly be made in a telework arrangement" and thus creating a new variable. Occupations were grouped into 5 categories, from 1 - "Job has a high degree of teleworkability" to 5 - "Job has a low degree of teleworkability" and group details can be found in Table 4.9.

Table 4.9 Occupation Groups

Group 1	Group 2
IT Worker	Engineering
Administrative and support services	Management
Researcher	Group 3
Hospitality	Manufacturing
Student	Lawyer
Banks Finance and Insurance	Group 4
Consulting	Health Sector
Design, marketing, publicity, and audio-visual	Group 5
Specialized technician	Education
Other	Sales Representative

To test the hypothesis whether the necessity for the reorganization of work is related to an individual's occupation, Kendall's τ -b and Spearman's ρ were calculated, showing that there is a significant correlation between the two variables at a significance level of 0.01 as per Table 4.10.

Table 4.10 Correlation between Grouped Occupations and Work Rearrangement.

	Correlation Coefficient	p-value
Kendall's τ -b	.189	0.00
Spearman's ρ	.231	0.00
N = 135		

Further analysis was performed through graphical form in order to understand the underlying relationship between the two variables can be found on Figure 4.9 with no discernible trend having been found apart from group 5 where 48% of those inquired strongly agreed with the statement " I had to change the way I work due to telework", indicating that there is a great need for rearrangement, and data from group 3 indicating that there seems to be some necessity for work rearrangement (WR). Additionally, group 3 had no responses to WR2 and WR3. In Figure 4.9, a scale ranging from WR1 to WR7 can be found, with WR1 indicating that there is low or no need for work rearrangement, and WR7 meaning that there is a high need for work rearrangement. Source data for the construction of Figure 4.9 can be found under Appendix Table 1 on Appendix B.

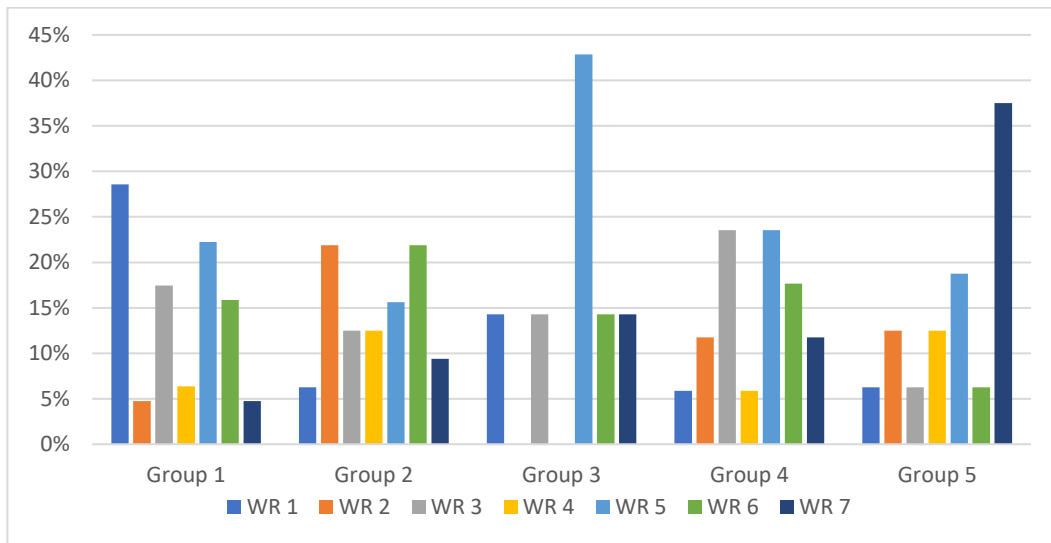


Figure 4.9 Bar-graph correlation between "Grouped occupations" and "Work rearrangement".

Table 4.11 Crosstabulations between "Grouped occupations" and "Work rearrangement".

	WR 1	WR 2	WR 3	WR 4	WR 5	WR 6	WR 7	Total
Group 1	29%	5%	17%	6%	22%	16%	5%	100%
Group 2	6%	22%	13%	13%	16%	22%	9%	100%
Group 3	14%	0%	14%	0%	43%	14%	14%	100%
Group 4	6%	12%	24%	6%	24%	18%	12%	100%
Group 5	6%	13%	6%	13%	19%	6%	38%	100%
	61%	51%	74%	37%	123%	76%	78%	

Table 4.12 lists all other correlations with the variable work rearrangement with a 99% level of significance where "Job mostly" has the highest correlation coefficient and as such was chosen for further analysis.

Table 4.12 Correlations to Work Rearrangement

Question Number	Variable	Kendall's tau b		Spearman's rho	
		Correlation Coefficient	p-value	Correlation Coefficient	p-value
7	Job mostly	-0.37	0.00	-0.45	0.00
6	Continue teleworking	-0.29	0.00	-0.37	0.00
31	Teamwork suffer	0.29	0.00	0.36	0.00

Table 4.12 Continuation - Correlations to Work Rearrangement

Question Number	Variable	Kendall's tau b		Spearman's rho	
		Correlation Coefficient	p-value	Correlation Coefficient	p-value
12	Stress ICT	0.27	0.00	0.33	0.00
28	Overtime	0.22	0.00	0.28	0.00
10	Familiar with ICT	-0.22	0.00	-0.26	0.00
13	Controlled	0.21	0.00	0.26	0.00
15	Isolated coworkers	0.20	0.00	0.25	0.00
24	Better WLB	-0.19	0.00	-0.24	0.00
34	Flexibility	-0.18	0.01	-0.23	0.01

Represented in Figure 4.10 and Figure 4.11 are the visual representations of the calculated crosstabulation between "Job mostly" and "Work rearrangement" portraying the relationship between them.

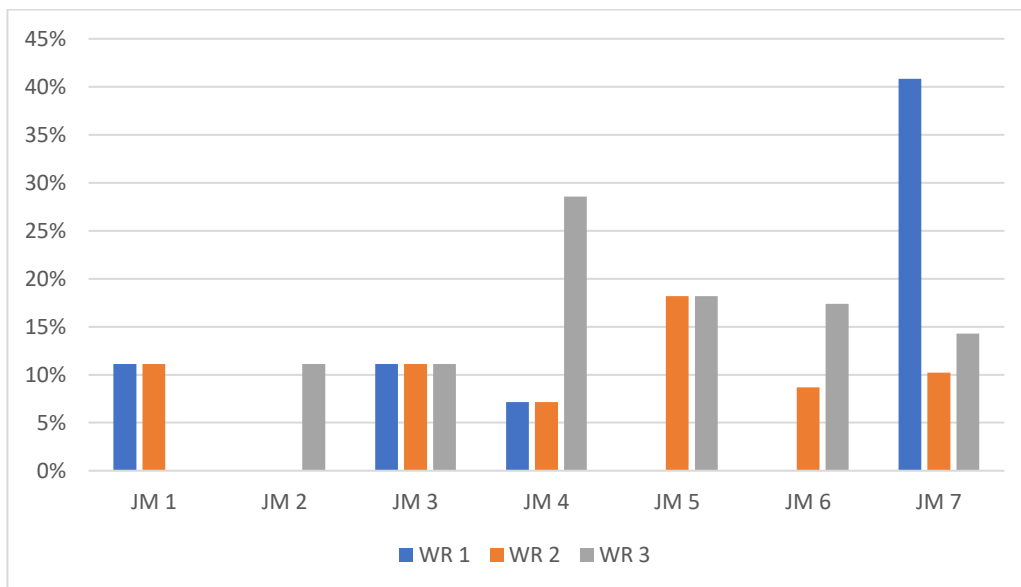


Figure 4.10 Work Rearrangement vs Job Mostly, Levels 1 to 3

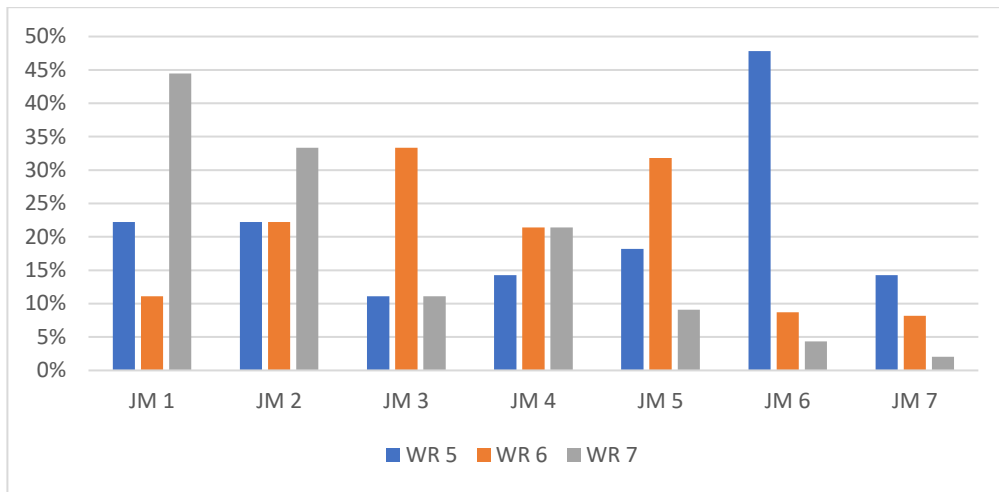


Figure 4.11 Work Rearrangement vs Job Mostly, Levels 5 to 7

Table 4.13 Crosstabulations Work Rearrangement vs Job Mostly

	WR 1	WR 2	WR 3	WR 4	WR 5	WR 6	WR 7	Total
JM 1	11%	11%	0%	0%	22%	11%	44%	100%
JM 2	0%	0%	11%	11%	22%	22%	33%	100%
JM 3	11%	11%	11%	11%	11%	33%	11%	100%
JM 4	7%	7%	29%	0%	14%	21%	21%	100%
JM 5	0%	18%	18%	5%	18%	32%	9%	100%
JM 6	0%	9%	17%	13%	48%	9%	4%	100%
JM 7	41%	10%	14%	10%	14%	8%	2%	100%

4.2.4 Has telework largely impacted teamwork?

Visual analysis of the data pertaining to question 31 does not show any clear trend, we can see that approximately 32%, (marked by levels 1 and 2) strongly disagree with the statement “I feel teamwork has suffered due to telework.” and around 37 % are neutral towards it, believing that it has remained relatively the same.

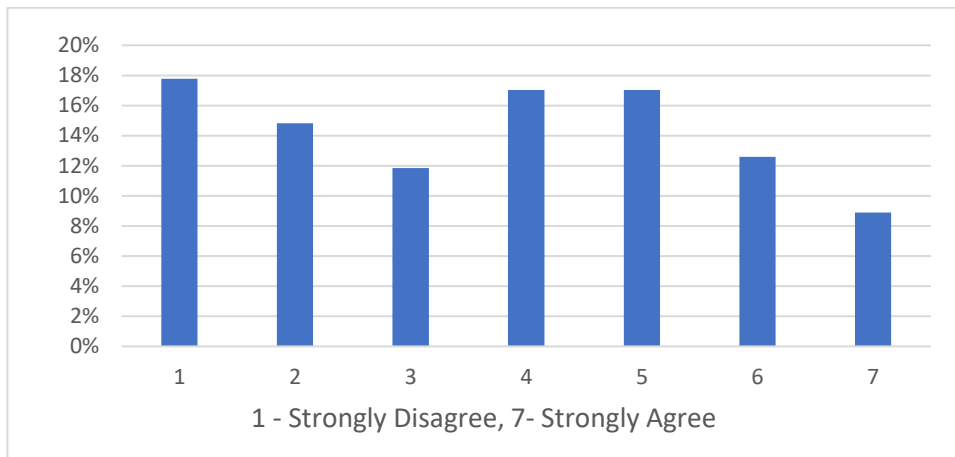


Figure 4.12 Answer distribution for: "I feel telework has suffered due to telework"

Testing for the null hypothesis H_{07} : "Telework hasn't largely impacted teamwork" with $\mu=4$ with the alternative hypothesis H_{17} : "Telework has largely impacted teamwork" with $\mu \neq 4$. resulting in a p-value of 0.12, therefore, we cannot reject the null hypothesis with a significance level of 95%.

Table 4.14 t-test scores for: "I feel teamwork has suffered due to telework"

	t	df	p-value
H_{07} Teamwork has suffered	-1.56	134	0.12

With these results not having yielded any conclusions, further analysis is necessary. Primarily, a similar association to the previous question was attempted, correlating the variable pertaining to the degree teamwork has suffered (TS) with both occupations and grouped occupations, where both Kendall's τ -b and Spearman's ρ resulted in p-values greater than 0.05 and thus showed no significant correlations at a level of significance of 95%.

Table 4.15 Correlation between "Teamwork Suffered" vs "Grouped Occupations"

N = 135		Grouped Occupation
Kendall's τ -b	Correlation Coefficient	0.87
	p-value	0.213
Spearman's ρ	Correlation Coefficient	0.105
	p-value	0.088

Further correlations with other variables were investigated, to which results are displayed on Table 4.16 representing all significant correlations with a significance level of 99%.

Table 4.16 Significant correlations to Teamwork Suffered

	Kendall's τ -b correlation coefficient
Communication adequate (CA)	-0.425
Continue teleworking	-0.381
Work rearrangement	0.357
Not commuting positive influence on work-life balance	-0.338
Stress using ICT	0.331
Tech is adequate	-0.326
Isolated co-workers	0.323
Communication improved	-0.302
	N=135

Out of the variables present on Table 4.16 found to be correlated with "Teamwork suffered", only "Communication adequate" and "Work rearrangement" were furtherly investigated by the means of crosstabulations, to which results were represented in graphical form and can be found on Figure 4.13 to Figure 4.16. For Figure 4.13 and Figure 4.14 the variable TS was recoded through *SPSS* to improve its visualization and analysis, with "TS1" representing "Teamwork has suffered" and "TS7" meaning "Teamwork hasn't suffered". Source data for the construction of the figures pertaining to this question can be found under Appendix Table 2 and Appendix Table 3.

Represented in Figure 4.13 are those who believe that teamwork has suffered with telework when compared to office work. Even though these individuals feel that teamwork has suffered, they report that that communication between team members is mostly adequate. In Figure 4.14, it can be observed that higher levels of comms adequacy correspond to high levels of teamwork. Meaning that responders who feel that communications are adequate also report good levels of teamwork during telework.

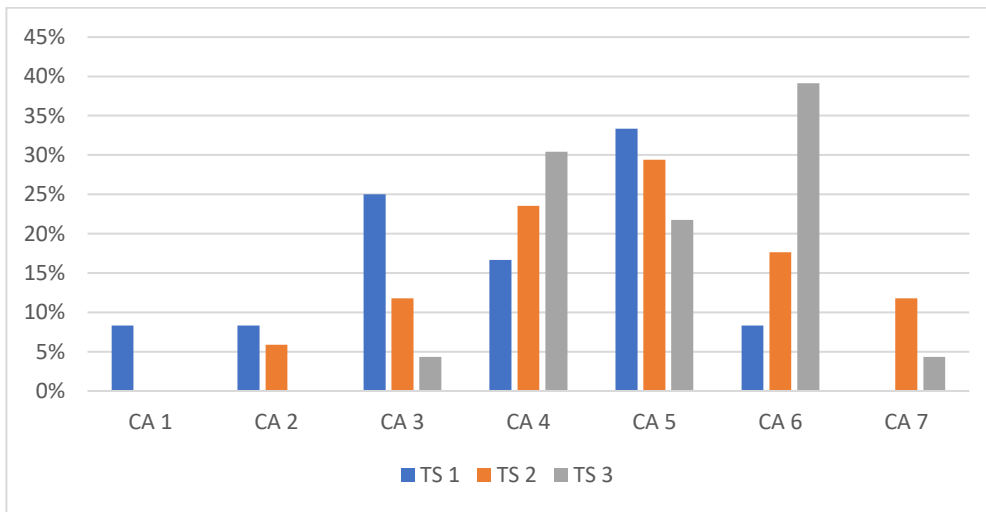


Figure 4.13 Crosstabulation visual representation TS vs CA, levels 1 through 3

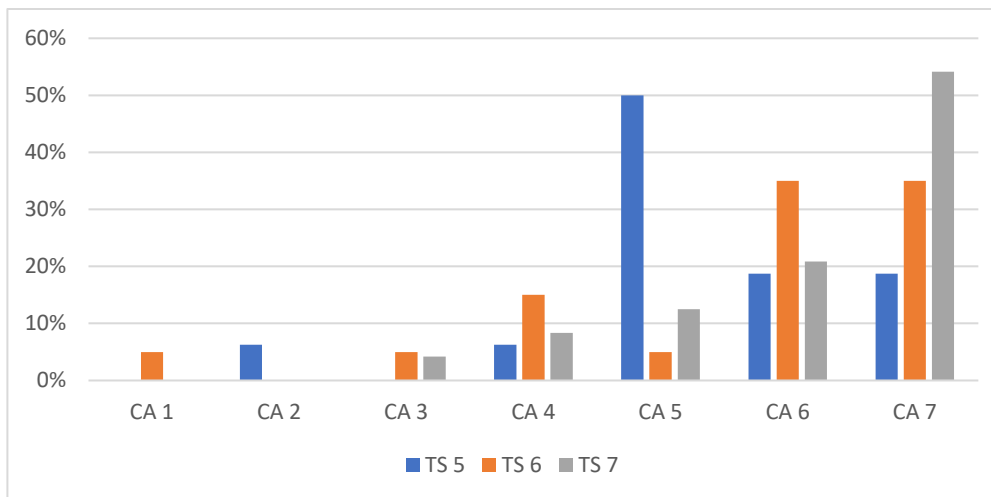


Figure 4.14 Crosstabulation visual representation TS vs CA, levels 5 through 7

Table 4.17 Crosstabulations of Teamwork Suffered vs. Communication Adequate

	CA 1	CA 2	CA 3	CA 4	CA 5	CA 6	CA 7	Total
TS 1	0%	0%	4%	8%	13%	21%	54%	100%
TS 2	5%	0%	5%	15%	5%	35%	35%	100%
TS 3	0%	6%	0%	6%	50%	19%	19%	100%
TS 4	4%	0%	13%	35%	17%	26%	4%	100%
TS 5	0%	0%	4%	30%	22%	39%	4%	100%
TS 6	0%	6%	12%	24%	29%	18%	12%	100%
TS 7	8%	8%	25%	17%	33%	8%	0%	100%

Figure 4.15 and Figure 4.16 represent a visual representation of the crosstabulation between the variables "Teamwork suffered" and "Work rearrangement". There is a high percentage of responders to whom teamwork hasn't suffered (represented by TS1), who report that there was little of no need for work rearrangement (WR1), as shown on Figure 4.15. On the other end of the spectrum, those of report high levels of team having suffered also report high levels of work rearrangement needs (WR5 to WR7).

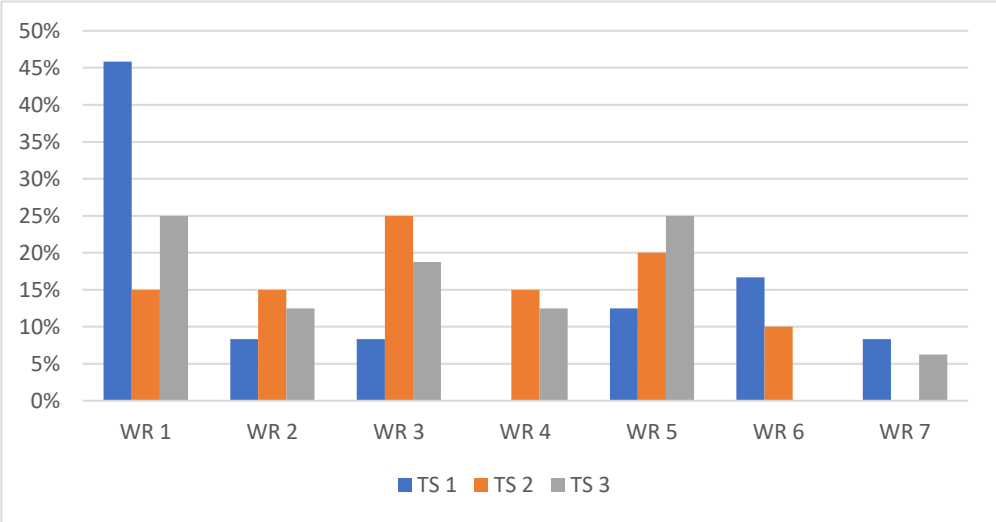


Figure 4.15 Crosstabulation visual representation TS vs WR, levels 1 through 3

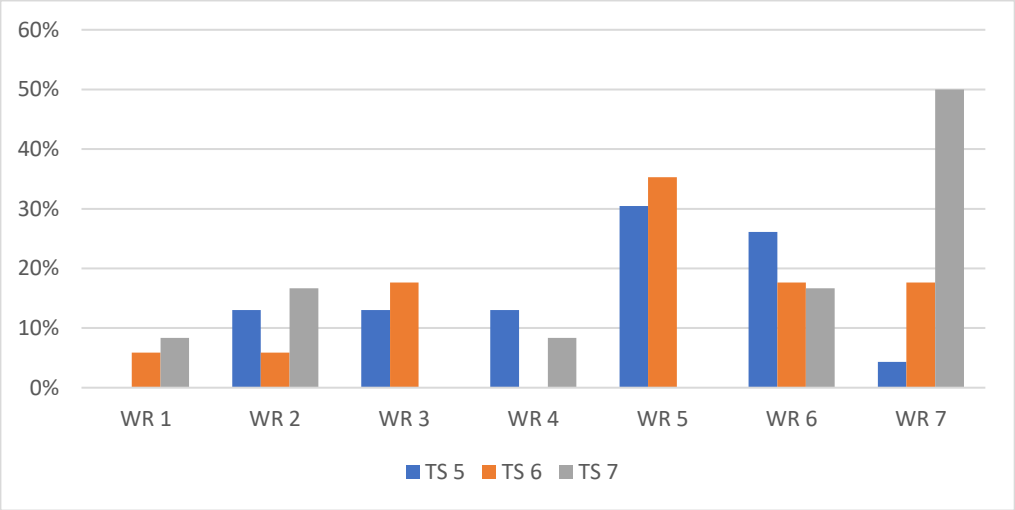


Figure 4.16 Crosstabulation visual representation TS vs WR, levels 5 through 7

Table 4.18 Crosstabulations of Teamwork Suffer vs. Work Rearrangement

	WR 1	WR 2	WR 3	WR 4	WR 5	WR 6	WR 7	Total
TS 1	46%	8%	8%	0%	13%	17%	8%	100%
TS 2	15%	15%	25%	15%	20%	10%	0%	100%
TS 3	25%	13%	19%	13%	25%	0%	6%	100%
TS 4	13%	4%	22%	9%	22%	22%	9%	100%
TS 5	0%	13%	13%	13%	30%	26%	4%	100%
TS 6	6%	6%	18%	0%	35%	18%	18%	100%
TS 7	8%	17%	0%	8%	0%	17%	50%	100%

4.3 Company performance as viewed by employees

This section is comprised of the analysis of Portuguese companies' performance in regard to telework from the viewpoint of their employees.

A total of eight questions were selected according to relevance and to whether they are related to company led initiatives and measures and were subsequently tested as to ascertain their correlation. As evidenced by Kendall's τ -b (Table 4.19) scores correlating questions 13, 14, 25, 26, 27, 32, 33, and 34 we can make the case that these item's correlations are significant and measure a company's telework performance as perceived by their employees.

Table 4.19 Kendall's τ -b scores regarding questions 13, 14, 25, 26, 27, 32, 33, and 34

		Tech is adequate	Company is flexible	Meetings are regular	Supervisor cares about mental well-being	Supervisor welcomes feedback	I feel controlled by my employer	Company fosters group dynamics
Company goals are clear	Correlation Coefficient	0.452**	0.408**	0.352**	0.462**	0.427**	-	0.425**
	p-value	0.000	0.000	0.000	0.000	0.000	-	0.000
Tech is adequate	Correlation Coefficient		0.509**	0.211**	0.302**	0.385**	-	0.328**
	p-value		0.000	0.003	0.000	0.000	-	0.000
Company is flexible	Correlation Coefficient			0.243**	0.400**	0.395**	-0.204**	0.265**
	p-value			0.000	0.000	0.000	0.004	0.000
Meetings are regular	Correlation Coefficient				0.446**	0.429**	-	0.329**
	p-value				0.000	0.000	-	0.000
Supervisor cares about mental wellbeing	Correlation Coefficient					0.676**	-	0.400**
	p-value					0.000	-	0.000
Supervisor welcomes feedback	Correlation Coefficient						-0.146*	0.331**
	p-value						0.038	0.000
Legend	** Correlation is significant at the 0.01 level. Two tailed							
	* Correlation is significant at the 0.05 level. Two tailed							

Furthermore, by performing a t-test for the null and alternative hypothesis listed below can evaluate how is the sentiment among those inquired towards these specific topics.

- H0₈: "I feel my company isn't clear about our goals." with $\mu=4$
- H1₈: "I feel my company is clear about our goals" $\mu\neq 4$
- H0₉: "The technology/tools provided are not adequate." with $\mu=4$
- H1₉: "The technology/tools provided are adequate." with $\mu\neq 4$
- H0₁₀: "My company is flexible towards my needs." with $\mu=4$
- H1₁₀: "My company is flexible towards my needs." with $\mu\neq 4$
- H0₁₁: "I don't have regular meetings with my supervisor." with $\mu=4$
- H1₁₁: "I have regular meetings with my supervisor." with $\mu\neq 4$
- H0₁₂: "My supervisor doesn't care about my mental well-being." with $\mu=4$
- H1₁₂: "My supervisor cares about my mental well-being." with $\mu\neq 4$
- H0₁₃: "My supervisor doesn't welcome my input/feedback." with $\mu=4$
- H1₁₃: "My supervisor welcomes my input/feedback." with $\mu\neq 4$
- H0₁₄: "I feel more controlled by my employer when teleworking." with $\mu=4$
- H1₁₄: "I don't feel more controlled by my employer when teleworking." with $\mu\neq 4$
- H0₁₅: "My company doesn't foster group dynamic/discussions." with $\mu=4$
- H1₁₅: "My company fosters group dynamic/discussions." with $\mu\neq 4$

Table 4.20 t-test scores for questions: 13, 14, 25, 26, 27, 32, 33 and 34

	t	p-value
H08 Goals clear	7.642	0.000
H09 Tech adequate	13.568	0.000
H010 Flexibility	9.055	0.000
H011 Meetings regular	7.372	0.000
H012 Supervisor mental wellbeing	4.333	0.000
H013 Feedback	10.343	0.000
H014 Controlled	-1.329	0.000
H015 Group dynamics	5.935	0.000

Table 4.21 Means, Std. Deviations, Skewness, and Kurtosis statistics for 13, 14, 25, 26, 27, 32, 33, and 34

	Mean	Std. Deviation	Skewness	Kurtosis
H0 ₈ Goals are clear	5.07	1.622	-0.621	-0.246
H0 ₉ Tech adequate	5.71	1.465	-1.320	1.380
H0 ₁₀ Flexibility	5.40	1.796	-0.909	-0.220
H0 ₁₁ Meetings are regular	5.13	1.786	-0.706	-0.487
H0 ₁₂ Supervisor mental well-being	4.77	2.066	-0.470	-1.098
H0 ₁₃ Feedback	5.44	1.614	-0.911	0.148
H0 ₁₄ Controlled	2.39	1.649	1.197	0.648
H0 ₁₅ Fosters group dynamics	4.90	1.755	-0.403	-0.960

As per Table 4.20 detailing the p-values for hypotheses H01 through H08, the null hypotheses can be rejected with a level of significance of 99%.

Combining the rejection of the null hypotheses and their respective means (Table 4.21), we can establish that those inquired:

- Don't feel controlled by their employers.
- Their companies foster group dynamics.
- Meetings with supervisors are regular.
- Supervisors care about the mental wellbeing of their subordinates.
- Supervisors welcome inputs and feedback.
- Company goals are clear.
- ICT solutions are adequate.
- Their companies are flexible towards their needs.

Furthermore, frequency tables pertaining to the data previously analysed shows that:

- 77% answered levels 1 to 3 to question 13 - "I feel more controlled by my employer when teleworking."
- 58% answered levels 5 to 7 to question 14 - "My company fosters group dynamic/discussions."
- 65% answered levels 5 to 7 to question 25 - "I have regular meetings with my supervisor."

- 57% answered levels 5 to 7 to question 26 - "My supervisor cares about my mental well-being."
- 74% answered levels 5 to 7 to question 27 - "My supervisor welcomes my input/feedback."
- 67% answered levels 5 to 7 to question 32 - "I feel my company is clear about our goals."
- 81% answered levels 5 to 7 to question 33 - "The technology/tools provided are adequate."
- 68% answered levels 5 to 7 to question 34 - "My company is flexible towards my needs."

For a more in-depth visualization of the data, bar-graphs similar to Figure 4.17 detailing response data to the items above can be found under Appendix B.2.

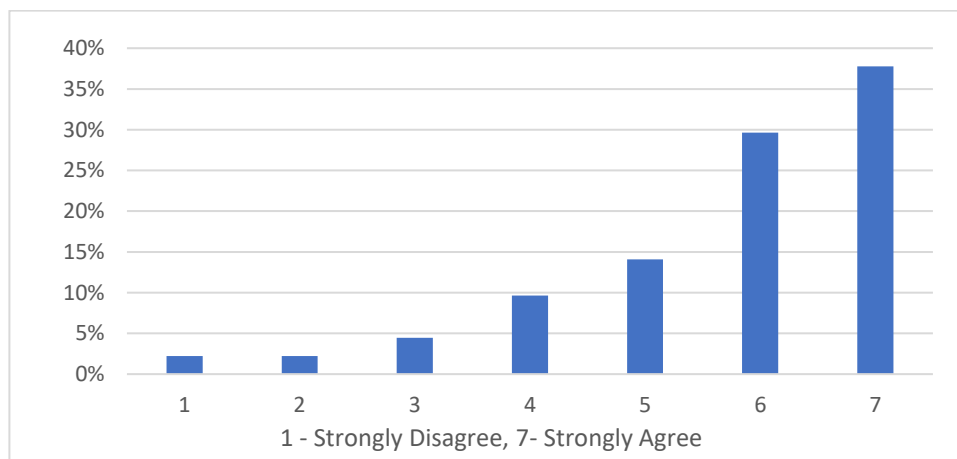


Figure 4.17 Answer distribution for: "The technology/tools provided are adequate"

4.4 Open ended questions

Three open ended questions were introduced in the survey giving responders a chance to voice their experience on the most important advantages, disadvantages, and communication aspects.

4.4.1 Advantages

Question number 8 - "What are the main advantages you have seen/experienced when teleworking?", had 104 responders out of 135 participants, distributed across 31 categories.

Table 4.22 Valid and missing responses to question 8 - Advantages

Valid Responses		Missing		Total
N	Percent	N	Percent	N
104	77	31	23	135

Table 4.23 lists the reasons that were chosen nine or more times, with the first four accounting for 80% of the percent of cases (percent of cases is defined by the number of responses to each question divided by the number of total responders, counted as Valid responses on Table 4.22).

Out of all selections: No time commuting, Flexibility, Work-life balance, Time management, and Concentration, were the most valued Advantages of teleworking making up 102% of cases.

Table 4.23 List of advantages with N≥7

Reasons	N	Percent of responses	Percent of cases
No commuting time	44	21	42
Flexibility	17	8	16
Work-life Balance	16	8	15
Time management	15	7	14
Concentration	14	7	13
Comfort	10	5	10
Less distractions	10	5	10
More free time	9	4	9
Commuting costs	9	4	9
Life quality	7	3	7
Productivity	7	3	7
Work scheduling	7	3	7

A complete list of responses to question number 8 can be found under Appendix B.3.

4.4.2 Disadvantages

Question number 9 - "What are the main disadvantages you have seen/experienced when teleworking?" with 94 responders out of a total 135 participants, distributed across 31 categories.

Table 4.25 lists the disadvantages that were valued 7 or more times by those inquired, with the first five items account for 80% of all cases.

Table 4.24 Valid and missing responses to question 9 - Disadvantages

Valid responses		Missing		Total
N	Percent	N	Percent	N
94	69.6	41	31.3	135

Table 4.25 Top 10 disadvantages list

Reasons	N	Percent of responses	Percent of cases
Social connections	20	13	21
Isolation	18	12	19
Co-worker relation	18	12	19
Costumer contact	14	9	15
Work-leisure spillover	8	5	9
Faded Work hours	8	5	9
Lack of communication	7	5	7
Teamwork	7	5	7
Team contact	7	5	7
Overtime	7	5	7

4.4.3 Communication

Questions number 19 - "Communication with co-workers has improved." and 20 - "Why/How?" were relative to if and how communication had improved due to telework, with most responders having answered that it hadn't changed as evidenced by Figure 4.18, with 60% clustered around level 4.

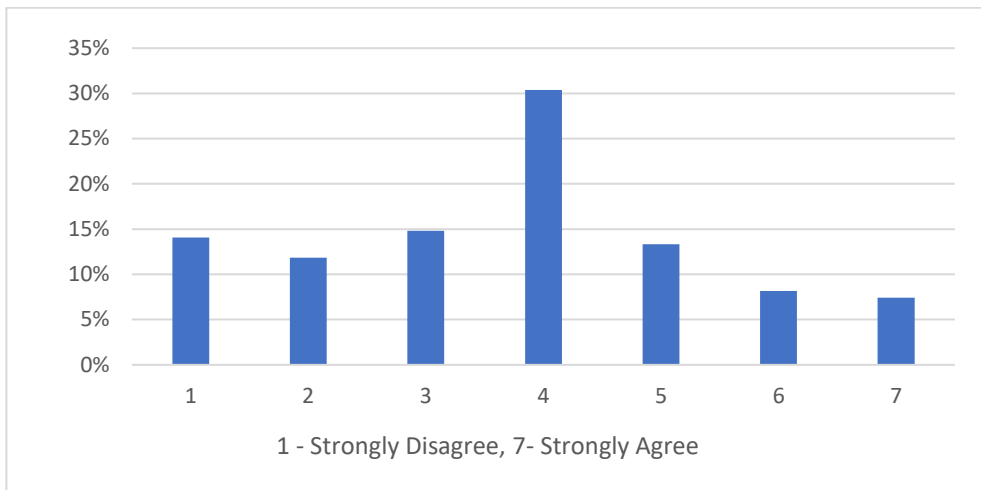


Figure 4.18 Answer distribution for: "Communication with co-workers has improved."

Question 20 had a relatively small number of responders, 24 out of 135, which is to be expected due to question 19 results, with those that have answered signalling that communication had improved due to conciseness and quality.

Table 4.26 Valid and missing responses to question 20: "Why/How has communication improved"

Valid		Missing		Total
N	Percent	N	Percent	N
24	18	111	82	135

Table 4.27 List of communication improvements $N \geq 3$

Reasons	N	Percent of responses	Percent of Cases
Concise	10	24	42
Higher quality	8	20	33
Improved info relay	3	7	13
Less interruptions	3	7	13
Frequent	3	7	13
Effective	3	7	13

4.5 Set of principles

Scoring was achieved by corresponding the survey questions to the items present in the set of principles according to Table 4.28.

Table 4.28 Correspondence matrix: Survey question - Set item

Item N°	Business	Item N°	Communication
1	32 - I feel my company is clear about our goals.	5	18 - Communication between members of the organization is adequate and concise.
2	25 - I have regular meetings with my supervisor.	6	27. My supervisor welcomes my input/feedback.
3	22. I feel that most meetings are productive.		
4	14 - My company fosters group dynamic/discussions.		
	Physical		Psychological
7	33 - The technology/tools provided are adequate.	8	34 - My company is flexible towards my needs.
		9	21 - My company has implemented / encouraged online or offline social meetups.
		10	26 - My supervisor cares about my mental well-being
		11	28 - I do more overtime when teleworking when compared to office-based work.

Set of principles scoring was based on *SPSS's* mean output, and overall score was calculated by the arithmetic mean of the individual scores. Individual item score is presented on Table 4.29 and resulted in an overall score of 4.9 out of 7, or 69.6% as illustrated on Table 4.30.

Table 4.29 Set of principles Item Score

Business		Score	Communication		Score
1 - Clear goals		5.07	5 - High Quality		5.13
2 - Status update meetings		5.13	6 - Feedback from employees		5.44
3 - High quality meetings		4.89			
4 - Foster group discussions		4.90			
Physical			Psychological		
7 - Provided ICT		5.71	8 - Flexibility		5.40
			9 - Promotion of wellbeing		4.53
			10 - Mental welfare check-ins		4.77
			11 - Overtime		2.66

Table 4.30 Set of principles Final Score

Business	5	Communication	5.29
Physical	5.71	Psychological	4.34
Overall Score: 4.9/7 ≈ 69.6%			

DISCUSSION

5.1 Research Questions

5.1.1 Does telework increase productivity?

Productivity increase is one of the main reported advantages found in literature and thus warranted it being the first research question to be answered "Does telework increase productivity?". Performing a t-test for the null hypothesis H_0 : "There is no productivity increase" $\mu=4$ yielded a p-value of 0.0, meaning it can be rejected with a significance level of 99%. Further tests were also conducted, with skewness and kurtosis measures indicating that data was distributed to the right of the mean, meaning respondents clearly agreed with statement "I felt an increase in productivity when teleworking". Simply put, there is a perceived productivity increase when teleworking.

As introduced in the previous section, where it was hypothesized that the perceived productivity increase can be the result of other factors such as the decreased time spent doing non-essential activities and results showed that this was indeed the case, that at least part of this increase is explained by this factor.

T-test score for the variable describing the time those inquired spent in non-essential activities meant we can reject the null hypothesis and affirm that in a telework arrangement less time is spent in these activities. To correlate the two variables, Kendall's τ -b, Spearman's ρ correlation coefficients were obtained, having had positive results, meaning, these two variables are correlated with a significance level of 99%. This result suggests that although productivity increase is significant, it can be partly explained by the decrease in frequency of non-essential activities performed during the working day.

Furthermore, those inquired have also directly stated via the open-ended questions, that less distractions, comfort, and concentration are among the top ten advantages felt, thus can be interpreted as being of great importance. These advantages can also be said to play an integral part in explaining the perceived productivity increase.

5.1.2 Does adopting telework require extensive work reorganization?

Analyses performed in the pursuit of an answer to research question number 3 - "Does telework require extensive work reorganization?", as is the case of hypothesis analysis and normality tests weren't capable of delivering conclusive answers. With the t-test performed having yielded a p-value of $1 > 0.05$ meaning that we could not reject the null hypothesis that no work reorganization was necessary due to telework. Due to these results and in an attempt to answer the third research question, investigation as to whether this variable is impacted by others was necessary. With the first logical association having to do with the nature of one's work, and if there is a positive correlation between the two variables.

Correlating work rearrangement (WR) with the 18 individual occupations did not yield any conclusive results due to individual sample size, as such, occupations were aggregated into five smaller groups, as detailed in the previous section. Kendall's τ -b and Spearman's ρ correlations show us that these two variables are positively correlated with a level of significance of 0.01 proving the assumption to be true, however they cannot indicate any trend in the data that would illustrate their relationship.

As such, to further understand the underlying relationship between the two variables, a bar graph (Figure 4.9) with its relationship was constructed. Visual analysis does not indicate any clear relationship both within and between groups with exception of high reports of occupations marked as requiring a high degree of rearrangement (WR7) inside group 5 as expected due to the previous grouping reasoning. Table 4.10 displays the results of all other significant correlations to WR, with "Job mostly" having yielded the highest absolute values for both Kendall's τ -b and Spearman's ρ correlation coefficients where a negative correlation coefficient implies an inverse relationship between the two variables. Similar to the previous analysis, bar-graphs were drawn to visualize the relationship between the two. While other variables are shown to have a significant correlation to "Work rearrangement", these cannot be said to have a causal relationship as this type of correlation doesn't indicate cause-effect, it can only be deduced that they themselves are influenced by the worker's need to rearrange their working practices.

Figure 4.10 Work Rearrangement vs Job Mostly, Levels 1 to 3 and Figure 4.11 depict the relationship between the necessity for WR and whether an occupation can mostly be fulfilled with recourse to telework. From Figure 4.10 depicting jobs that require lower levels of WR (levels 1 through 3), we can observe that, higher response percentage is located to the right of the graph, meaning that jobs that are more likely to be "teleworkable" require low reorganization.

Figure 4.11 illustrates jobs that require higher degrees of reorganization represented by the variable WR levels 5 through 7. It can be observed that jobs that require the highest degrees of reorganization (WR7) have a clear inverse relationship with the degree to which they can be fulfilled in a telework arrangement. While reports pertaining to variables that represent somewhat high needs for work rearrangement seem to have contradicting conclusions. It can be observed that these jobs, although they have high needs for WR they can be fulfilled using telework.

From these two figures two particular trends can be identified, jobs at either end of the spectrum for work reorganization needs (WR1 and WR7), have a direct inverse relationship to teleworking ability. In the case of WR1, response frequency increases as teleworkability (JM) increases and in the case of WR7, as teleworkability increases response frequency decreases.

These findings are not contradictory, rather, according to the available data they show that we cannot conclude that there is a clear-cut relationship between these two variables as detailed in the previous section.

There is no global discernible trend when it comes for the need of work rearrangement in relation to teleworkability, highly teleworkable occupations may still require extensive reorganization and/or process reengineering. Indicating that although a given profession has high degrees of teleworkability, there are job and company specificities and constraints that result in different degrees of work rearrangement.

5.1.3 Has telework impacted teamwork?

With regards to research question number four, 4 "Has telework largely impacted teamwork?", visual analysis did not show any particularly relevant trend nor did testing for the null hypothesis with a p-value of 0.12 outside the significance interval.

Akin to the previous question, correlation with the respondents' occupation was conducted so as to investigate if particular occupations were more or less likely to losses in teamwork efficacy. In the case of the variable "Grouped Occupation", as this variable is the result of the combination of "Occupations" and "Job teleworkability" it could prove to be of relevance due to the added significance of this combination. Both correlations proved not be statistically significant with p-values greater than .05, with the variable "Occupation" yielding a p-value of $p \approx .5$, part of the reason for this was likely due to individual sample sizes being small with an $n < 20$. Correlation with the variable "Grouped Occupations", although insignificant, yielded

considerably better results with p-values of $p = .088$ and $p = .213$ for Spearman's ρ and Kendall's τ -b, respectively.

As such, further analysis by means of correlations with other study variables was necessary in an effort to answer the question posed. Listed in Table 4.16 are the variables with significant correlation to Teamwork. 13 correlations were shown to be significant, with "Communication adequate", "Continue teleworking" and "Work rearrangement", having yielded the highest coefficients. "Communication adequate" and "Work rearrangement" were selected for further analysis by means of crosstabulations, as the variables "Stressed due to ICT" and "Tech is adequate" were not further investigated as the majority of responses are highly located to the left indicating that stress isn't a relevant factor (see Appendix Figure 8), and to the right of the mean indicating that technology is adequate to the job at hand (see Appendix Figure 7), respectively.

Supported by the correlation coefficients and based on Figure 4.13 and Figure 4.14 depicting the correlation between "Teamwork having suffered" (TS) and "Communication Adequate". On Figure 4.13 representing the crosstabulation between low levels of teamwork having suffered and the adequacy of communication in the responder's organization it can be said that although teleworkers have felt that teamwork has indeed suffered, they report that communication between them is adequate.

Figure 4.14 depicts the responses from those whom teamwork hasn't suffered and where the majority of responses is located in increasing numbers to the right of the mean, indicating that where teamwork hasn't suffered there is a high degree of adequacy in the communication within their organization.

The relationship between "Teamwork having suffered" (TS) and "Work Rearrangement" (WR), depicted in Figure 4.15 and Figure 4.16, where TS1 and WR1 correspond to low levels of teamwork having suffered and work rearrangement needs, respectively.

Figure 4.15, represents work rearrangement levels 1 through 3, (i.e., lower perceived levels), with data showing a positive relationship between work rearrangement and teamwork having suffered, low levels of teamwork suffering correspond to low levels of work reorganization as evidenced by a higher percentage of responses by those inquired. On Figure 4.15 where we can find high levels of teamwork having suffered, we can observe that there is a high percentage of responses to the right of the mean and that the bar representing TS7 vs WR7 accounts for 50% of responses. As such, it can be said that teleworkers who feel that there was a high degree of work reorganization also report high levels of teamwork disruption. These results

allow for the statement that professionals who have experienced high levels of work rearrangement has proven detrimental to their ability to work as a team. Which is concurrent with the conclusions regarding those on the other end of the spectrum, where low levels of work rearrangement are linked with low levels of teamwork having suffered.

5.1.4 Does adopting telework result in better work-life balance?

A positive answer can be given to research question 2 - " Does adopting telework result in better work-life balance." Telework does improve people's work-life as well as their work-family balance as show by the analysis of the previous chapter, where those inquired gave overwhelmingly positive answers to questions 24, 29 and 30, as confirmed by the hypothesis testing applied.

The elimination of time spent commuting can be said to play a significant role in this improvement, as it was by far the most common answer among the responders having been referenced 51 times, more than twice when compared to flexibility the second most with 22 mentions (See Table 4.23). For context, the average worker spends 17.5 days commuting annually, considering an average of 1.5 hours per day, 56 weeks per year, which makes up 80% of the minimum vacation time required by law in Portugal (22 days).

Additional evidence of the positive impact telework can have in people's lives either in their work or personal sphere is brought by the remaining advantages listed, as more free time, time management and flexibility were among the top answers. Moreover, flexibility towards one's needs was evaluated through question 34, having yielded positive results as evidenced by the hypothesis test.

One can clearly see a connection between the advantages found in the extant literature and the ones observed by those inquired in the Portuguese market, as out of the ten advantages listed by the author as being the most often highlighted and significant in the telework environment, five were selected 9 or more times by the responders: no time commuting, work-life balance, concentration, productivity, and freedom from interruptions.

Of the disadvantages revealed during the literature review, responders identified among the top 9: social connection, team contact, isolation, and overtime.

Data from question 15, indicates that 60% of those enquired agree with the statement "I feel isolated from my co-workers", and 78% agree with the statement "My company fosters group dynamics".

These two seemingly contradictory results in combination with the responses to question 33 - "The technology/tools provided are adequate" where 91% agreed with the statement, indicate that company efforts and/or the provided ICTs are not targeting this issue.

As evidenced by responders, special focus must be paid in regard to work boundaries, as 3 out of the 9 most listed disadvantages (namely overtime, work-leisure spillover, and faded work hours) have to do with management and working culture.

Technostress was not of concern to responders as evidenced by question 12, where 67% of responders disagreed with the statement "I feel stressed managing too many inputs". However, one cannot conclusively say that technostress is not felt or present as evaluation of this health hazard must be conducted by licenced professionals, must follow specific methodologies and classification tables. Another underlying reason behind this, has to do with one's ability to differentiate between "regular" stressors and those of a more technological nature

5.2 Company performance as viewed by employees

According to those inquired, Portuguese market's companies telework performance is of good overall quality.

Portuguese teleworkers have a good relationship with their managers, judging by the fact that they maintain good levels of contact (65.2% agreeing with the statement from question 25), they feel their managers care about their mental wellbeing (57.8% in agreement from question 26), their opinions are valued and welcomed (74% in agreement from question 27), and that control levels don't exceed those exerted when not teleworking with 77.8% disagreeing with the statement from question 13. Although not measured, supervisory control may not be felt by those inquired when taking into consideration the overwhelmingly positive result of question 13.

Regarding their companies, it can be said that efforts are being made in order to make workers feel as they are part of a group as well as maintaining company spirit. With answers clearly agreeing that theirs and the company's goals are clear, one can deduce that those inquired have a good understanding of their roles and objectives within the company, meaning managerial practices are in good standing when considering present and future and teleworking practices. Clear goals and control levels combined, offer further insight into their management style, signifying that managing is done through task delegation and goal setting which is in direct agreement with good business practices identified through the literature review.

Additionally, flexibility, which is also an integral part of successful teleworking practices is evaluated as good, with 58% having answered levels 6 and 7 clearly agreeing with the statement.

Regarding ICT solutions implemented, findings are contradictory. A majority of 67% having answered levels 6 and 7, signifying that ICTs implemented are adequate towards fulfilling their job descriptions, but answers to question 15 indicate that 60% agree that they feel isolated from their co-workers. These two statements combined are a sign that companies may not be putting enough efforts to combat their workers isolation and that the implemented ICT solutions, although adequate for their job, do not perform as good when it comes to keeping the workforce seamlessly interconnected, which suggests that the software's degree of telepresence is not satisfactory.

5.3 Set of principles

The set of principles yielded a score of 4.9 out of 7, or 68%, a moderately positive result with 10 out of 15 items having been evaluated.

These survey-Set of principles scores signify that Portuguese teleworkers view their companies as having adapted quite well to this work arrangement.

With a Business score of five out of seven, their perception is that their company's efforts and practices are sufficiently well aligned with their expectations as to what an organization is supposed to do to foster good work relationships and teamwork. Items nº1 and 2 are evidence into an organization's managing practices, as making the company's goals are broadcasted to and understood by employees is a must in order to involve them in the company strategy and thus enabling faster decision making which in turn improves the end product.

As said in previous chapters, to bring about change and improvements to any system, it must be looked at and acted upon not as separate entities or parts, but as a whole and thus combining the results in the Business and Communication sections offers further insights into the managing practices, more specifically into how things are done. That meetings, group discussions and sessions are being done in the right way, that managers accept and expect their employees to participate in the process instead of simply being "managed" and that communication between colleagues is adequate and of good quality.

With a score of 5.7, the physical section tells us that employees feel that the solutions in terms of communication and collaboration tools are sufficiently good towards fulfilling their responsibilities as well as connecting them their colleagues.

On the Psychological side, teleworkers feel their mental wellbeing is valued and appreciated, that they are given enough flexibility to respond to unexpected and mentally taxing occurrences, that their managers actively promote team interconnectedness by arranging social events, and that they are vigilant and care about their employee's mental health. In great contrast to the other items in the psychological section, Overtime, was given a concerningly low score of 2.66 out of 7, indicating that teleworkers are engaging in high levels of overtime. There are several reasons that can be behind this issue, from the managers' expectations for constant availability, employees low perceived visibility inadvertently causing them to work longer hours, to work-leisure spillover where the division between work hours and/or workspace becomes faded and intrudes into the employees' personal sphere.

CONCLUSION

From the outbreak of the Covid-19 pandemic in early 2020, telework was put in the spotlight and viewed as the solution to all businesses across the globe. Soon thereafter, ever increasing numbers of organizations began to realize that telework could be utilized as a viable business practice in the sense that it gave them broader opportunities and wider reach, either in terms of talent scouting and employee retention or tapping into new markets.

However, it must be said that telework cannot be looked at as a solution that fits all companies or a sole business practice for a single company. It is, if well applied a great tool to expand an organization's current capacity, as means to develop new opportunities, and more importantly, help employees feel more appreciated and happier as a fulfilled employee can be one of the organizations biggest assets.

Remote working can also bring far reaching implications and a must needed edge in some of the great challenges of the 21st century, achieving a more sustainable world, either in terms of mental and physical health, and to the decentralization and reduction of our carbon footprint.

This work aimed to develop a set of principles to aid in the implementation of telework and through which current practices could be evaluated, as well as answering four research questions. The foremost interrogative was which was the effect of telework in the worker's productivity, to which the answer was clear, telework produces an increase in productivity in those who practice it brought upon by compounding effects that lead to this result, effects as the decrease in non-work-related tasks, additional personal and family time due to non-existent commutes, and increased comfort.

Research questions number two and three, did not yield such clear and conclusive results but awarded further evidence into these issues, with results leading to the conclusion that these two questions are indeed correlated and bear much of the same confounding factors and influences.

With regards to work reorganization, one could deduce that there is not a direct link between the implementation of telework and the need to overhaul an organization's way of working.

To the case of teamwork disruption, it was also discovered that it bears a high correlation to how people communicate within a company, and that companies where people connect in a good way their teamwork is less likely to suffer. Teamwork is in itself highly influenced by several factors and, much like work reorganization, is highly influenced by the type of industry wherein a company operates, high variability can even occur within a single company, furthermore, they are highly dependent on the job specifics of the individual teleworker and team-working requirements.

The most positive result to arise from the present work, is the degree to which telework bolsters work-life and work-family balance, three questionnaire items enquired teleworkers about whether they felt an improvement in their work-life and work-family spheres and whether they felt that not having to commute was an important influencing factor. Where results showed overwhelmingly positive answers in concurrence with the data obtained through open-ended questions where the most mentioned advantage was not having to commute. To highlight this result, one need only look at the time the average worker spends in transit, seventeen and a half days per year, which is almost the full length of vacation time in Portugal.

To the advantages that telework can bring in such diverse areas of a person's life, from comfort, concentration, and the ability to better balance their spheres, less positive results were also evidenced in this work. Portuguese teleworkers feel a lack in team contact and social connections and to a degree, that they are isolated from their co-workers. Managerial practices also have room for improvement as those who engage in remote work feel that work-leisure boundaries are being eroded and work is seeping into their personal time in addition to experiencing increased levels of overtime when compared to office work. A word must also be said when it comes to the ICT solutions that those enquired use, evidenced by the reports of general isolation and isolation from co-workers and from reports that the technology used is adequate for the job at hand. These seemingly isolated issues offer evidence into the limitations of the technology in use, that although it has sufficient capabilities to accomplish the required job, it is lacking in telepresence degrees and in bridging the geographical gap between co-workers.

Companies operating in the Portuguese market can be said to be performing well overall, as indicators about supervisor-worker relations are within positive levels. Board members and managers transmitting and setting their goals clearly, which combined with perceived control levels signifies that management is being done through task delegation - a good indicator of managerial practices. Furthermore, they are providing their employees with seemingly enough flexibility, which can be said to play a significant role in their mental health and has a central

role in overall job performance and quality. Additionally, the Portuguese teleworkers' assessment of their managers is that they indeed care about this aspect of their lives.

From the outset there was a gap in the extant literature of telework, the non-existence of a set of principles that could aid companies in applying and evaluating this seemingly futuristic way of working that is Telework, as such it was defined as one of the main goals of the present work. Four areas of intervention were identified - Business, Communication, Psychological, and Physical - as being keys to the success of an organization as well as being interconnected and indissociable.

With a final score of 4.9 out of (69%), it can be said that Portuguese teleworkers evaluate their company's efforts and practices in a good manner. In the Business section, evaluating managing practices and teleworkers expectations, teleworkers feel that companies are striving to achieve 21st century managing practices, and current practices are well aligned with their perceptions of good practices, on the Communication area, data speaks to the quality of the discourse between colleagues and managers and that it is adequate, frequent and proper, while in the Physical area the quality of ICT solutions implemented is evaluated, with data showing that those inquired report that it is adequate for their jobs. The Psychological area tells us that workers are in good standing and feel appreciated by their managers, and more importantly, they feel that their needs are met, however one of the indicators, Overtime had results far below the average. Indicating generalized high levels of overtime, this is a reason for concern due to the far-reaching implications this has on a person's mental and physical health as well as being an indicator of managing deficiencies.

The application of the set of principles within this work does not capture its full potential, as the items therein could not be fully tested and evaluated in the context of a master's thesis and limited reach into private and public companies. However, it may lay some of the groundwork into a future generalized telework framework and a more standardized practice.

Future research must deepen the understanding into this topic and the effects it has in businesses across the globe, more specifically their bottom line, office centre distribution, carbon footprint, workforce distribution, and opportunities for those who live in rural and less developed urban areas. Multinational corporations will certainly be increasingly open to new hire talent independent of distance to its headquarters.

Following on this thesis work, application of the proposed set of principles in such a time where the pandemic effects have eased can prove beneficial to evaluate how businesses have evolved in terms of their teleworking practices as perceived by their employees. Data gathering within

the companies themselves to evaluate the gap between the implemented measures and worker perception can prove beneficial in order to evaluate their effectiveness.

BIBLIOGRAPHY

- [1] S. E. Harpe, 'How to analyze Likert and other rating scale data', *Curr. Pharm. Teach. Learn.*, vol. 7, no. 6, pp. 836–850, Nov. 2015, doi: 10.1016/j.cptl.2015.08.001.
- [2] C. Croux and C. Dehon, 'Influence functions of the Spearman and Kendall correlation measures', *Stat. Methods Appl.*, vol. 19, no. 4, pp. 497–515, Nov. 2010, doi: 10.1007/s10260-010-0142-z.
- [3] 'Contingency Tables and Log-Linear Models - ScienceDirect'. <https://www.sciencedirect.com/science/article/pii/B0123693985001481> (accessed Jul. 08, 2022).
- [4] G. M. Sullivan and A. R. Artino, 'Analyzing and Interpreting Data From Likert-Type Scales', *J. Grad. Med. Educ.*, vol. 5, no. 4, pp. 541–542, Dec. 2013, doi: 10.4300/JGME-5-4-18.
- [5] T. F. Guerin, 'Policies to minimise environmental and rebound effects from telework: A study for Australia', *Environ. Innov. Soc. Transit.*, vol. 39, pp. 18–33, Jun. 2021, doi: 10.1016/j.eist.2021.01.003.
- [6] P. Rietveld, 'Telework and the transition to lower energy use in transport: On the relevance of rebound effects', *Environ. Innov. Soc. Transit.*, vol. 1, no. 1, pp. 146–151, Jun. 2011, doi: 10.1016/j.eist.2011.03.002.
- [7] S. Milasi, J. Hurley, E. Fernández-Macías, and M. Bisello, 'Who can telework today? The teleworkability of occupations in the EU', European Union, 2020. Accessed: Sep. 17, 2021. [Online]. Available: https://ec.europa.eu/jrc/sites/default/files/policy_brief_-_who_can_telework_today_-_the_teleworkability_of_occupations_in_the_eu_final.pdf
- [8] B. N. Ilag, 'Tools and Technology for Effective Remote Work General Terms', *Int. J. Comput. Appl.*, vol. 174, pp. 975–8887, Feb. 2021, doi: 10.5120/ijca2021921109.
- [9] International Labour Organization, 'Teleworking arrangements during the COVID-19 crisis and beyond', 2021.
- [10] European Trade Union Confederation, 'European Framework Agreement on Telework'. 2002.
- [11] A. Aguilera, V. Lethiais, A. Rallet, and L. Proulhac, 'Home-based telework in France: Characteristics, barriers and perspectives', *Transp. Res. Part Policy Pract.*, vol. 92, pp. 1–11, Oct. 2016, doi: 10.1016/j.tra.2016.06.021.
- [12] T. A. Bentley, S. T. T. Teo, L. McLeod, F. Tan, R. Bosua, and M. Gloet, 'The role of organisational support in teleworker wellbeing: A socio-technical systems approach', *Appl. Ergon.*, vol. 52, pp. 207–215, Jan. 2016, doi: 10.1016/j.apergo.2015.07.019.

- [13] P. Pyöriä, 'Managing telework: risks, fears and rules', *Manag. Res. Rev.*, vol. 34, no. 4, pp. 386–399, Mar. 2011, doi: 10.1108/01409171111117843.
- [14] J. Nilles, 'Telecommunications and Organizational Decentralization', *IEEE Trans. Commun.*, vol. 23, no. 10, pp. 1142–1147, Oct. 1975, doi: 10.1109/TCOM.1975.1092687.
- [15] J. Stiles, 'Strategic niche management in transition pathways: Telework advocacy as groundwork for an incremental transformation', *Environ. Innov. Soc. Transit.*, vol. 34, pp. 139–150, Mar. 2020, doi: 10.1016/j.eist.2019.12.001.
- [16] T. Alvin, *The Third Wave*. William Morrow (US), 1980.
- [17] Y. Baruch and N. Nicholson, 'Home, Sweet Work: Requirements for Effective Home Working', *J. Gen. Manag.*, vol. 23, no. 2, pp. 15–30, Dec. 1997, doi: 10.1177/030630709702300202.
- [18] J. Messenger, *Telework in the 21st Century*. Edward Elgar Publishing, 2019. doi: 10.4337/9781789903751.
- [19] 'Milasi et al. - 2020 - Telework in the EU before and after the COVID-19 .pdf'. Accessed: Jun. 30, 2021. [Online]. Available: https://ec.europa.eu/jrc/sites/default/files/jrc120945_policy_brief_-_covid_and_telework_final.pdf
- [20] E. Glenn Dutcher, 'The effects of telecommuting on productivity: An experimental examination. The role of dull and creative tasks', *J. Econ. Behav. Organ.*, vol. 84, no. 1, pp. 355–363, Sep. 2012, doi: 10.1016/j.jebo.2012.04.009.
- [21] Y. Chang, C. Chien, and L.-F. Shen, 'Telecommuting during the coronavirus pandemic: Future time orientation as a mediator between proactive coping and perceived work productivity in two cultural samples', *Personal. Individ. Differ.*, vol. 171, p. 110508, Mar. 2021, doi: 10.1016/j.paid.2020.110508.
- [22] P. Peters and R. Batenburg, 'Telework adoption and formalisation in organisations from a knowledge transfer perspective', *Int. J. Work Innov.*, vol. 1, no. 3, p. 251, 2015, doi: 10.1504/IJWI.2015.074169.
- [23] D. E. Bailey and N. B. Kurland, 'A review of telework research: findings, new directions, and lessons for the study of modern work', *J. Organ. Behav.*, vol. 23, no. 4, pp. 383–400, Jun. 2002, doi: 10.1002/job.144.
- [24] E. S. Butler, C. Aasheim, and S. Williams, 'Does telecommuting improve productivity?', *Commun. ACM*, vol. 50, no. 4, pp. 101–103, Apr. 2007, doi: 10.1145/1232743.1232773.
- [25] E. Kitou and A. Horvath, 'External air pollution costs of telework', *Int. J. Life Cycle Assess.*, vol. 13, no. 2, p. 155, Jun. 2007, doi: 10.1065/lca2007.06.338.
- [26] R. S. Gajendran and D. A. Harrison, 'The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences.', *J. Appl. Psychol.*, vol. 92, no. 6, p. 1524, 2007, doi: 10.1037/0021-9010.92.6.1524.
- [27] V. J. Morganson, D. A. Major, K. L. Oborn, J. M. Verive, and M. P. Heelan, 'Comparing telework locations and traditional work arrangements: Differences in work-life balance support, job satisfaction, and inclusion', *J. Manag. Psychol.*, vol. 25, no. 6, pp. 578–595, Jan. 2010, doi: 10.1108/02683941011056941.
- [28] C. Athanasiadou and G. Theriou, 'Telework: systematic literature review and future research agenda', *Heliyon*, vol. 7, no. 10, p. e08165, Oct. 2021, doi: 10.1016/j.heliyon.2021.e08165.
- [29] A. Pinsonneault, M. Boisvert, A. Pinsonneault, and M. Boisvert, 'The Impacts of Telecommuting on Organizations and Individuals: A Review of the Literature', <https://services.igi->

- global.com/resolvedoi/resolve.aspx?doi=10.4018/978-1-878289-79-7.ch010*, Jan. 01, 1AD. <https://www.igi-global.com/gateway/chapter/www.igi-global.com/gateway/chapter/30255> (accessed May 16, 2022).
- [30] V. Illegems and A. Verbeke, 'Telework: What Does it Mean for Management?', *Long Range Plann.*, vol. 37, no. 4, pp. 319–334, Aug. 2004, doi: 10.1016/j.lrp.2004.03.004.
- [31] L. Leung and R. Zhang, 'Mapping ICT use at home and telecommuting practices: A perspective from work/family border theory', *Telemat. Inform.*, vol. 34, no. 1, pp. 385–396, Feb. 2017, doi: 10.1016/j.tele.2016.06.001.
- [32] E. Baker, G. C. Avery, and J. Crawford, 'Home Alone: The Role of Technology in Telecommuting', *Inf. Resour. Manag. J.*, vol. 19, no. 4, pp. 1–22, Oct. 2006, doi: 10.4018/irmj.2006100101.
- [33] P. M. A. Baker, N. W. Moon, and A. C. Ward, 'Virtual exclusion and telework: Barriers and opportunities of technocentric workplace accommodation policy', *Work*, vol. 27, no. 4, pp. 421–430, 2006.
- [34] 'Educating Learners about the Pros and Cons of Telework', *Acad. Radiol.*, vol. 26, no. 10, pp. 1432–1433, Oct. 2019, doi: 10.1016/j.acra.2019.07.008.
- [35] P. L. Bagley, D. W. Dalton, C. K. Eller, and N. L. Harp, 'Preparing students for the future of work: Lessons learned from telecommuting in public accounting', *J. Account. Educ.*, vol. 56, p. 100728, Sep. 2021, doi: 10.1016/j.jaccedu.2021.100728.
- [36] J. Kuruzovich, W. "Patch" Paczkowski, T. D. Golden, S. Goodarzi, and V. Venkatesh, 'Telecommuting and job outcomes: A moderated mediation model of system use, software quality, and social Exchange', *Inf. Manage.*, vol. 58, no. 3, p. 103431, Apr. 2021, doi: 10.1016/j.im.2021.103431.
- [37] A. Suh and J. Lee, 'Understanding teleworkers' technostress and its influence on job satisfaction', *Internet Res.*, vol. 27, no. 1, pp. 140–159, Feb. 2017, doi: 10.1108/IntR-06-2015-0181.
- [38] A. Silva-C, I. A. Montoya R, and J. A. Valencia A, 'The attitude of managers toward telework, why is it so difficult to adopt it in organizations?', *Technol. Soc.*, vol. 59, p. 101133, Nov. 2019, doi: 10.1016/j.techsoc.2019.04.009.
- [39] F. Miele and L. Tirabeni, 'Digital technologies and power dynamics in the organization: A conceptual review of remote working and wearable technologies at work', *Sociol. Compass*, vol. 14, no. 6, p. e12795, 2020, doi: <https://doi.org/10.1111/soc4.12795>.
- [40] G. Sewell and L. Taskin, 'Out of Sight, Out of Mind in a New World of Work? Autonomy, Control, and Spatiotemporal Scaling in Telework', *Organ. Stud.*, vol. 36, no. 11, pp. 1507–1529, Nov. 2015, doi: 10.1177/0170840615593587.
- [41] R. P. Vega, A. J. Anderson, and S. A. Kaplan, 'A Within-Person Examination of the Effects of Telework', *J. Bus. Psychol.*, vol. 30, no. 2, pp. 313–323, Jun. 2015, doi: 10.1007/s10869-014-9359-4.
- [42] S. Kaplan, J. C. Bradley-Geist, A. Ahmad, A. Anderson, A. K. Hargrove, and A. Lindsey, 'A Test of Two Positive Psychology Interventions to Increase Employee Well-Being', *J. Bus. Psychol.*, vol. 29, no. 3, pp. 367–380, Sep. 2014, doi: 10.1007/s10869-013-9319-4.
- [43] 'Fit for the postpandemic future: Unilever's CHRO Leena Nair on reinventing how we work | McKinsey'. <https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/fit-for-the-postpandemic-future-unilevers-leena-nair-on-reinventing-how-we-work> (accessed Dec. 15, 2021).

- [44] N. P. Monteiro, O. R. Straume, and M. Valente, 'When does remote electronic access (not) boost productivity? Longitudinal evidence from Portugal', *Inf. Econ. Policy*, p. 100923, Mar. 2021, doi: 10.1016/j.infoecopol.2021.100923.
- [45] 'Definition of BEST PRACTICE'. <https://www.merriam-webster.com/dictionary/best+practice> (accessed Dec. 07, 2021).
- [46] 'best practice'. <https://dictionary.cambridge.org/dictionary/english/best-practice> (accessed Mar. 16, 2022).
- [47] A. Martínez-Sánchez, M. Pérez-Pérez, P. de-Luis-Carnicer, and M. J. Vela-Jiménez, 'Telework, human resource flexibility and firm performance', *New Technol. Work Employ.*, vol. 22, no. 3, pp. 208–223, 2007, doi: 10.1111/j.1468-005X.2007.00195.x.
- [48] D. S. Bersin Charles Sull, and Josh, 'Five Ways Leaders Can Support Remote Work', *MIT Sloan Management Review*. <https://sloanreview.mit.edu/article/five-ways-leaders-can-support-remote-work/> (accessed Jul. 01, 2021).
- [49] K. Valory, 'Council Post: Communication And Collaboration: The Keys To Successful Remote Work', *Forbes*. <https://www.forbes.com/sites/forbestechcouncil/2020/03/25/communication-and-collaboration-the-keys-to-successful-remote-work/> (accessed May 18, 2022).
- [50] 'Hybrid work: Making it fit with your diversity, equity, and inclusion strategy | McKinsey'. <https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/hybrid-work-making-it-fit-with-your-diversity-equity-and-inclusion-strategy?cid=other-eml-alt-mip-mck&hdpid=0eb2e1d2-8ef4-4d02-9933-7d00e4e551c0&hctky=12815642&hlkid=ca5480fd026c4950bdc81a37038d0056> (accessed May 26, 2022).
- [51] 'Return as a muscle: How lessons from COVID-19 can shape a robust operating model for hybrid and beyond | McKinsey'. <https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/return-as-a-muscle-how-lessons-from-covid-19-can-shape-a-robust-operating-model-for-hybrid-and-beyond> (accessed Dec. 16, 2021).
- [52] C. Castrillon, 'This Is the Future Of Remote Work In 2021', *Forbes*. <https://www.forbes.com/sites/carolinecastrillon/2021/12/27/this-is-the-future-of-remote-work-in-2021/> (accessed Dec. 15, 2021).
- [53] Y. Baruch, 'Teleworking: benefits and pitfalls as perceived by professionals and managers', *New Technol. Work Employ.*, vol. 15, no. 1, pp. 34–49, 2000, doi: 10.1111/1468-005X.00063.
- [54] S. Mann, R. Varey, and W. Button, 'An exploration of the emotional impact of teleworking via computer-mediated communication', *J. Manag. Psychol.*, vol. 15, no. 7, pp. 668–690, Jan. 2000, doi: 10.1108/02683940010378054.
- [55] J. Meister, 'The Future Of Work Is Employee Well-Being', *Forbes*. <https://www.forbes.com/sites/jeanmeister/2021/08/04/the-future-of-work-is-worker-well-being/> (accessed Dec. 15, 2021).
- [56] 'Better bosses: Changing the way we lead postpandemic | McKinsey Live | McKinsey & Company'. <https://www.mckinsey.com/featured-insights/mckinsey-live/webinars/better-bosses-changing-the-way-we-lead-postpandemic> (accessed Dec. 20, 2021).

- [57] T. A. Bentley, S. T. T. Teo, L. McLeod, F. Tan, R. Bosua, and M. Gloet, 'The role of organisational support in teleworker wellbeing: A socio-technical systems approach', *Appl. Ergon.*, vol. 52, pp. 207–215, Jan. 2016, doi: 10.1016/j.apergo.2015.07.019.
- [58] D. George and P. Mallery, 'SPSS for Windows Step-by-Step: A Simple Guide and Reference, 14.0 update (7th Edition)', *Http://st-liepiiep-Unescoorgcgi-Binwwwi32exeinepidoc1int2000026564100*, Jan. 2003.

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APPENDIX A

SURVEY

A.1 English Version

1. Age __
2. Gender
 - Male
 - Female
 - Prefer not to say
3. Level of education
 - High School but not completed
 - High School or equivalent
 - Some University
 - Bachelor
 - Master's
 - Doctorate
4. Occupation
 - IT Worker
 - Engineering
 - Education (Teacher, etc.)
 - Administrative and support services
 - Sales Representative
 - Manufacturing
 - Researcher
 - Banking, Finance, or Insurance
 - Lawyer
 - Hospitality
 - Management
 - Student

- Other.
5. have teleworked before. (During normal working hours)
- Never
 - A few hours per month
 - Some hours per week
 - 1 to 2 days per week
 - 3 to 4 days per week
 - Fully remote work

6. I want to continue teleworking.
- No.
 - 1-2 days per week.
 - 3 days per week.
 - 4 days per week
 - Full-time

7. My job can mostly be made in a telework arrangement.

1	2	3	4	5	6	7
Strongly Disagree				Strongly Agree		

8. What are the main advantages you have seen/experienced when teleworking?
(Open ended Question)

9. What are the main disadvantages you have seen/experienced when teleworking?
(Open ended Question)

10. I am familiar with Information and Communication technologies. Ex: PC, Smartphone etc.

1	2	3	4	5	6	7
Strongly Disagree				Strongly Agree		

11. Communication and collaborative tools have made my working life/processes easier. Ex: Slack, Microsoft Teams, Zoom, etc.

1	2	3	4	5	6	7
Strongly Disagree				Strongly Agree		

12. I feel stressed/overwhelmed managing so many inputs. Ex: Slack, Microsoft Teams, Email, etc.

1	2	3	4	5	6	7
Strongly Disagree				Strongly Agree		

13. I feel more controlled by my employer when teleworking.

1	2	3	4	5	6	7
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Strongly Disagree							Strongly Agree
14. My company fosters group dynamic/discussions.							
1	2	3	4	5	6	7	
Strongly Disagree							Strongly Agree
15. I feel isolated from my co-workers.							
1	2	3	4	5	6	7	
Strongly Disagree							Strongly Agree
16. I spend less time doing non-essential activities. Ex: coffee breaks, chatting etc.							
1	2	3	4	5	6	7	
Strongly Disagree							Strongly Agree
17. I had to change the way I work due to telework.							
1	2	3	4	5	6	7	
Strongly Disagree							Strongly Agree
18. Communication between members of the organization is adequate and concise.							
1	2	3	4	5	6	7	
Strongly Disagree							Strongly Agree
19. Communication with co-workers has improved.							
1	2	3	4	5	6	7	
Strongly Disagree							Strongly Agree
20. Why/How? (Open ended question)							
21. My company has implemented / encouraged online or offline social meetups.							
1	2	3	4	5	6	7	
Strongly Disagree							Strongly Agree
22. I feel that most meetings are productive.							
1	2	3	4	5	6	7	
Strongly Disagree							Strongly Agree
23. I felt an increase in productivity when teleworking.							
1	2	3	4	5	6	7	
Strongly Disagree							Strongly Agree

24. I was able to maintain a better work-life balance.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

25. I have regular meetings with my supervisor.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

26. My supervisor cares about my mental well-being.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

27. My supervisor welcomes my Input/feedback.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

28. I do more overtime when teleworking when compared to office-based work.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

29. Not having to commute had a positive impact on my work-life balance.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

30. Not having to commute impacted the balance between my work and family life.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

31. I feel teamwork has suffered due to telework.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

32. I feel my company is clear about our goals.

1	2	3	4	5	6	7
Strongly Disagree						Strongly Agree

33. The technology/tools provided are adequate.

1	2	3	4	5	6	7
Strongly Disagree				Strongly Agree		

34. My company is flexible towards my needs. (Leaving earlier, taking time during the day)

1	2	3	4	5	6	7
Strongly Disagree				Strongly Agree		

A.2 Portuguese Version

1. Idade __
2. Género
 - Masculino
 - Feminino
 - Prefiro não dizer
3. Nível de educação
4. Ocupação
 - Trabalhador de IT
 - Engenharia
 - Educação (Professor, etc.)
 - Administrativo e suporte
 - Representante de vendas
 - Manufatura
 - Investigador
 - Setor da saúde
 - Advocacia
 - Hotelaria
 - Quadros de Gestão
 - Estudante
 - Banca, Finanças ou seguros
 - Outros.
5. Já teletrabalhei antes. (Durante horário normal de trabalho)
 - Nunca
 - Algumas horas por mês
 - Algumas horas por semana
 - 1 a 2 dias por semana

- 3 a 4 dias por semana
 - Remoto a tempo inteiro
6. Quero continuar em teletrabalho
- Não
 - 1-2 dias por semana
 - 3 dias por semana
 - 4 dias por semana
 - Tempo inteiro

7. O meu trabalho pode, na sua maioria, ser feito em teletrabalho.

1	2	3	4	5	6	7
Discordo Totalmente					Concordo Totalmente	

8. Quais são as vantagens que viu/experenciou em teletrabalho? (Questão aberta)

1	2	3	4	5	6	7
Discordo Totalmente					Concordo Totalmente	

9. Quais são as desvantagens que viu/experenciou em teletrabalho? (Questão aberta)

10. Sinto-me confortável a utilizar tecnologias de informação e comunicação. Ex: PC, Smartphone, etc...

1	2	3	4	5	6	7
Discordo Totalmente					Concordo Totalmente	

11. Ferramentas de comunicação e colaborativas facilitaram a minha vida e processos no trabalho. Ex: Slack, Microsoft Teams, Zoom, etc.

1	2	3	4	5	6	7
Discordo Totalmente					Concordo Totalmente	

12. Sinto-me stressado/assoberbado a gerir tantas plataformas. Ex: Slack, Microsoft Teams, Email, etc.

1	2	3	4	5	6	7
Discordo Totalmente					Concordo Totalmente	

13. Sinto-me mais controlado pelo meu empregador. (Quando em teletrabalho)

1	2	3	4	5	6	7
Discordo Totalmente					Concordo Totalmente	

14. A minha empresa promove/encoraja dinâmicas/discussões de grupo

1	2	3	4	5	6	7
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Discordo Totalmente						Concordo Totalmente
15. Sinto-me isolado dos meus colegas de trabalho.						
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente
16. Despendo menos tempo a realizar tarefas não essenciais. Ex: Pausas para café, Conversar. etc.						
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente
17. Tive de alterar a forma como trabalho devido ao teletrabalho						
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente
18. A comunicação entre membros da organização é adequada e concisa						
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente
19. A comunicação entre colegas melhorou.						
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente
20. A comunicação entre colegas melhorou. Como/Porquê? (Questão aberta)						
21. A minha empresa implementou/encoraja encontros offline/online.						
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente
22. Sinto que a maioria das reuniões são produtivas.						
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente
23. Senti um aumento da produtividade quando em teletrabalho.						
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente
24. Consegui manter um melhor equilíbrio entre a vida pessoal e profissional.						
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

25. Tenho reuniões regulares com o meu supervisor.

1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

26. O meu supervisor preocupa-se com o meu bem-estar mental.

1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

27. O meu supervisor agradece a minha opinião/comentários/feedback.

1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

28. Faço mais horas extra quando em teletrabalho. Quando comparado com trabalho no escritório.

1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

29. Não ter de me deslocar até ao local de trabalho teve um impacto positivo no equilíbrio entre a vida pessoal e profissional.

1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

30. O facto de não ter de me deslocar até ao local de trabalho impactou o meu equilíbrio entre trabalho e família.

1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

31. Sinto que o trabalho em equipa sofreu devido ao teletrabalho.

1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

32. Sinto que a minha empresa é clara no que toca aos nossos objetivos.

1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

33. A tecnologia/ferramentas providenciadas são adequadas.

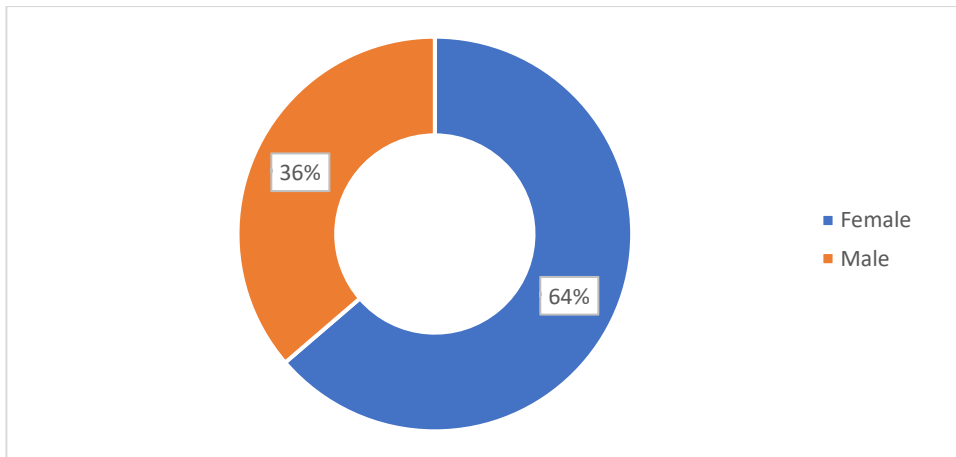
1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

34. A minha empresa é flexível para com as minhas necessidades. (Sair mais cedo, tirar horas durante o dia)

1	2	3	4	5	6	7
Discordo Totalmente						Concordo Totalmente

SURVEY RESPONSES

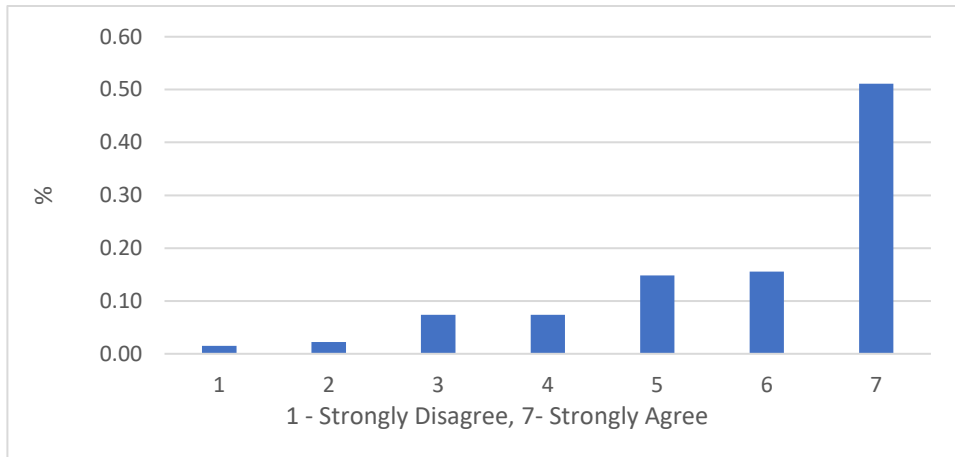
B.1 Sample description



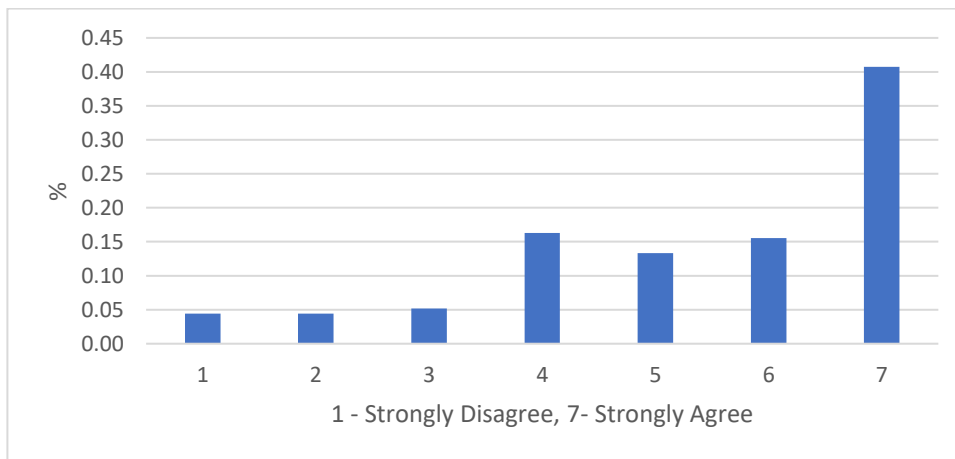
Appendix Figure 1 Gender distribution of teleworkers



Appendix Figure 2 Age distribution by classes



Appendix Figure 3 Answer distribution for: “Not Commuting has a positive influence on WLB”



Appendix Figure 4 Answer distribution for: “Not commuting affected WFB”

Appendix Table 1 Crosstabulation of Groups vs Work rearrangement

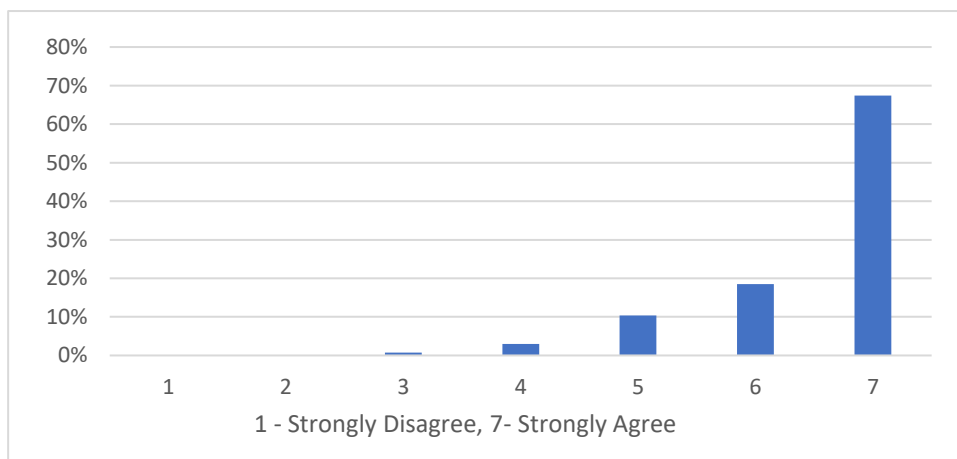
	1	2	3	4	5	6	7	Total
Group 1	26%	10%	14%	10%	21%	13%	7%	100%
Group 2	8%	18%	13%	16%	16%	18%	11%	100%
Group 3	14%	0%	14%	0%	43%	14%	14%	100%
Group 4	14%	10%	19%	14%	19%	14%	10%	100%
Group 5	10%	10%	5%	10%	14%	5%	48%	100%

Appendix Table 2 Crosstabulations between "Teamwork Suffered" and "Communication Adequate"

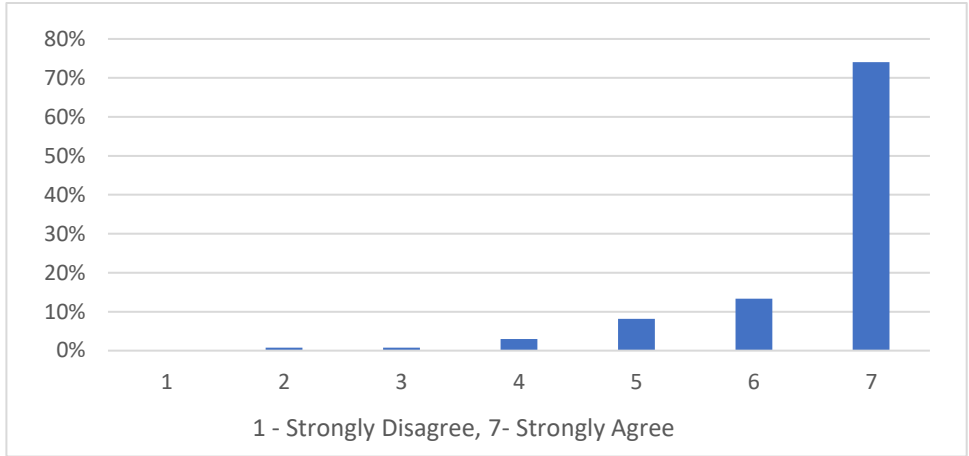
	CA 1	CA 2	CA 3	CA 4	CA 5	CA 6	CA 7	Total
TS 1	0%	0%	4%	8%	13%	21%	54%	100%
TS 2	5%	0%	5%	15%	5%	35%	35%	100%
TS 3	0%	6%	0%	6%	50%	19%	19%	100%
TS 4	4%	0%	13%	35%	17%	26%	4%	100%
TS 5	0%	0%	4%	30%	22%	39%	4%	100%
TS 6	0%	6%	12%	24%	29%	18%	12%	100%
TS 7	8%	8%	25%	17%	33%	8%	0%	100%
Total	18%	20%	63%	135%	169%	166%	128%	

Appendix Table 3 Crosstabulations between "Teamwork Suffered" and "Work Rearrangement"

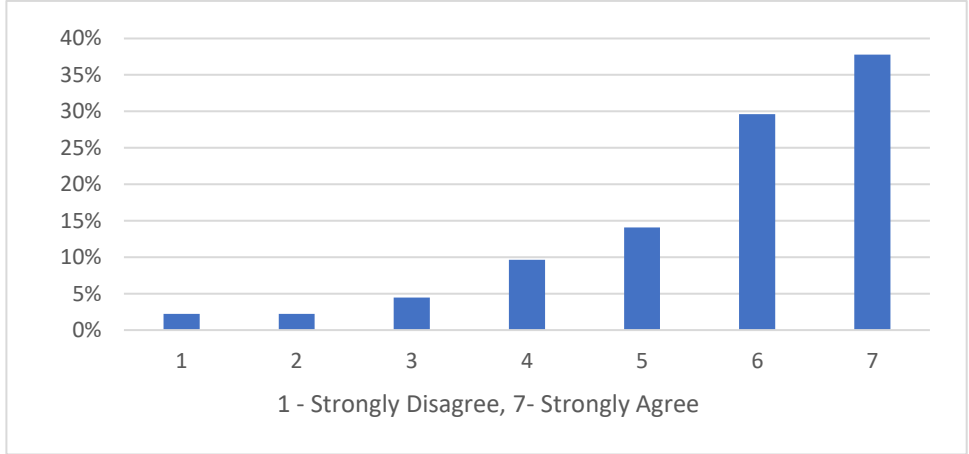
	WR 1	WR 2	WR 3	WR 4	WR 5	WR 6	WR 7	Total
TS 1	46%	8%	8%	0%	13%	17%	8%	100%
TS 2	15%	15%	25%	15%	20%	10%	0%	100%
TS 3	25%	13%	19%	13%	25%	0%	6%	100%
TS 4	13%	4%	22%	9%	22%	22%	9%	100%
TS 5	0%	13%	13%	13%	30%	26%	4%	100%
TS 6	6%	6%	18%	0%	35%	18%	18%	100%
TS 7	8%	17%	0%	8%	0%	17%	50%	100%
Total	113%	76%	105%	58%	145%	109%	95%	700%



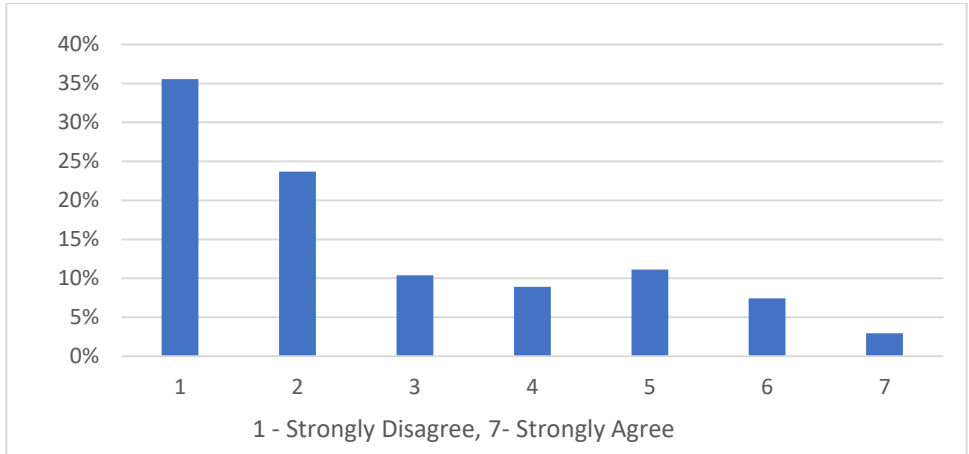
Appendix Figure 5 Answer distribution for: "My is job easier with ICT"



Appendix Figure 6 Answer distribution for: "I am comfortable using ICT"

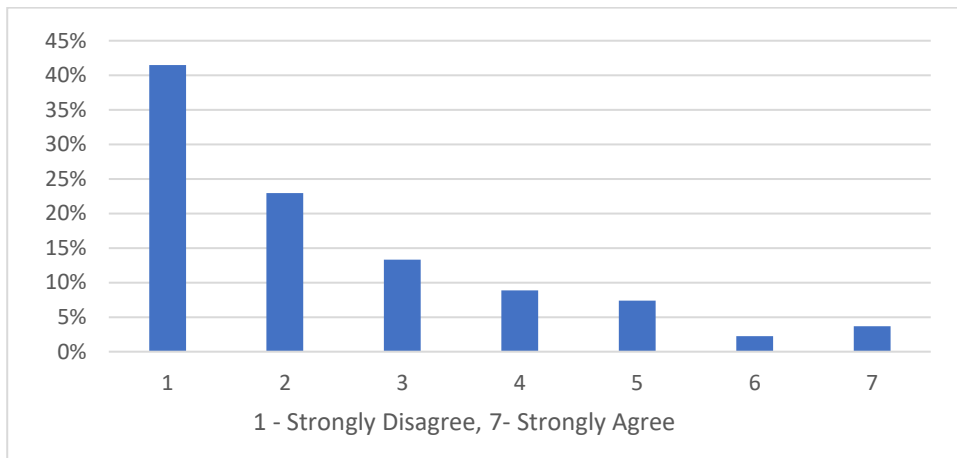


Appendix Figure 7 Answer distribution for: "The technology/tools provided are adequate."

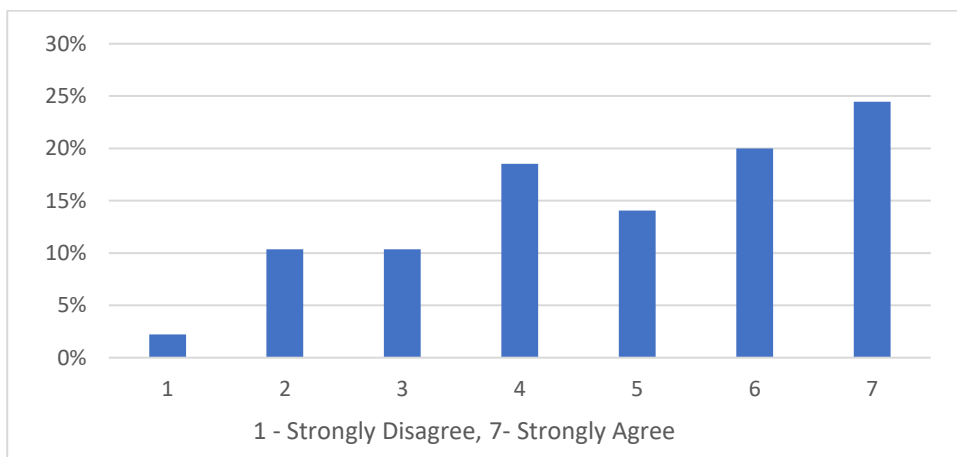


Appendix Figure 8 Answer distribution for: "I feel stressed managing too many inputs."

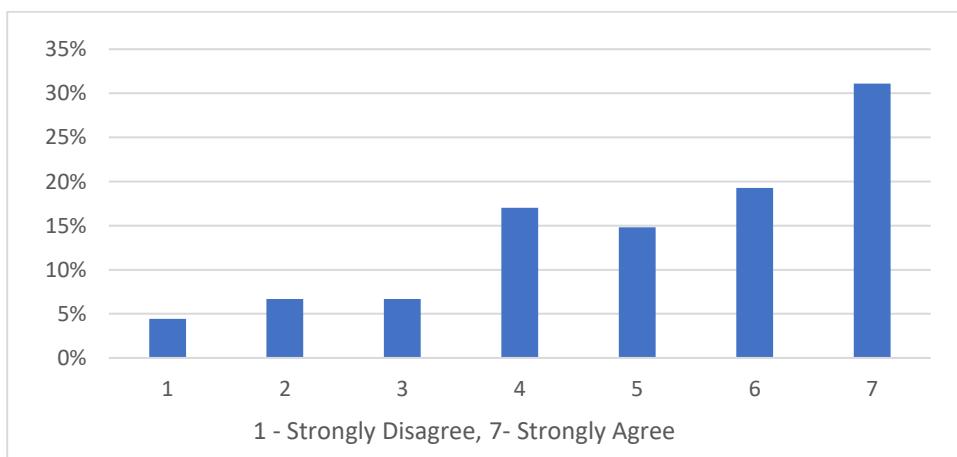
B.2 Company's telework performance



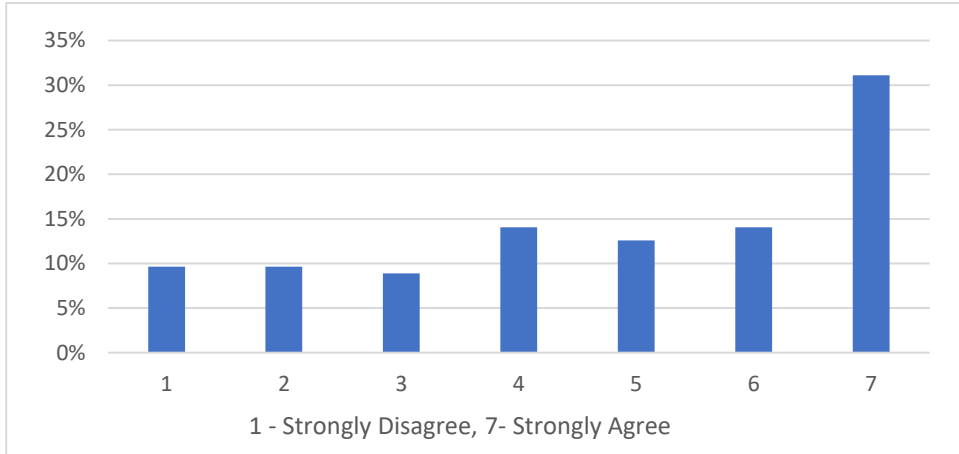
Appendix Figure 9 Answer distribution for: "I feel more controlled by my employer when teleworking"



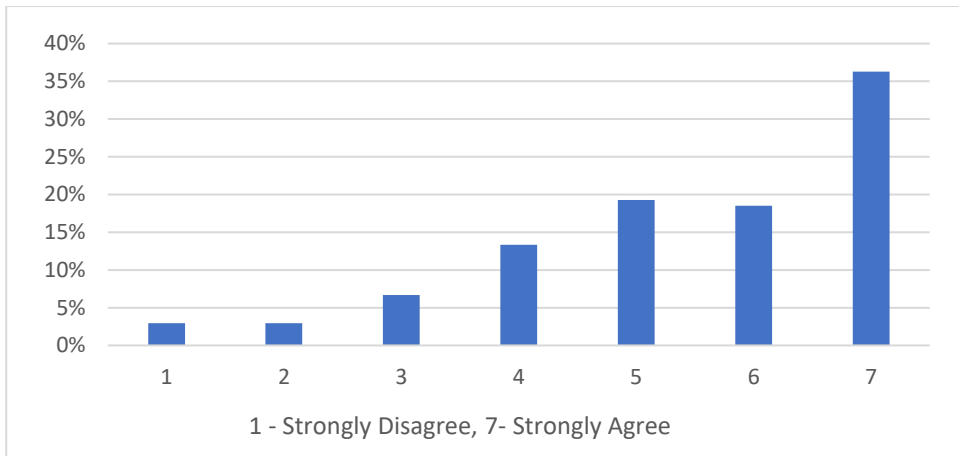
Appendix Figure 10 Answer distribution for: "My company fosters group dynamic/discussions."



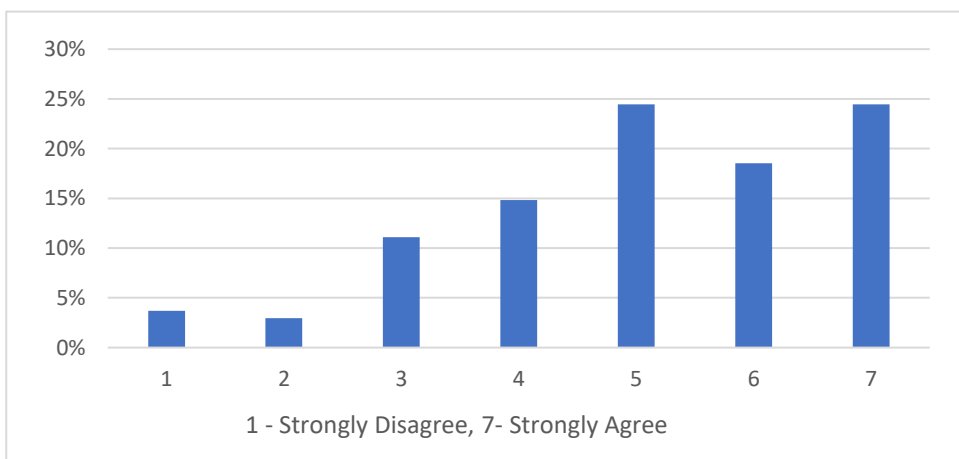
Appendix Figure 11 Answer distribution for: "I have regular meetings with my supervisor"



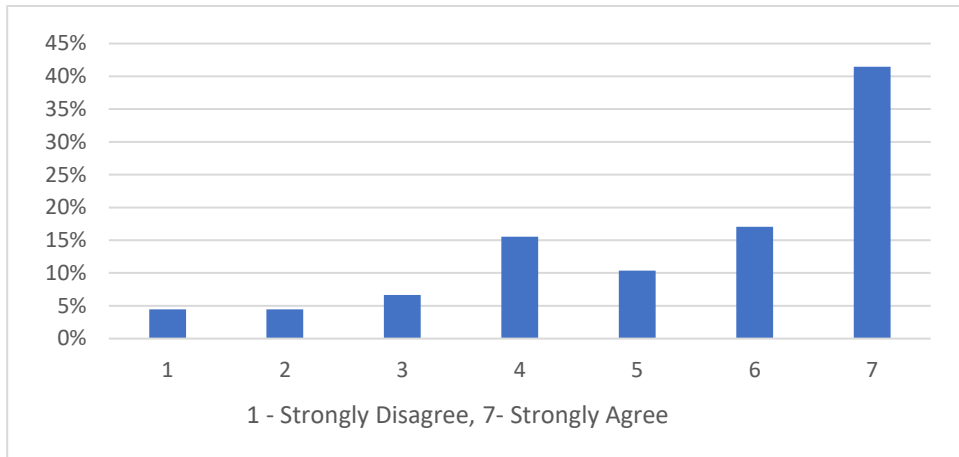
Appendix Figure 12 Answer distribution for: "My supervisor cares about my mental well-being."



Appendix Figure 13 Answer distribution for: "My supervisor welcomes my input/feedback."



Appendix Figure 14 Answer distribution for: "I feel my company is clear about our goals."



Appendix Figure 15 Answer distribution for: "My company is flexible towards my needs."

B.3 Responses to open-ended questions

Appendix Table 4 Responses to "What are the main advantages you have seen/experienced when teleworking

Reasons	N	Percent of responses	Percent of cases	Cumulative % of cases
No commuting time	51	20.3%	38.3%	38.3%
Flexibility	22	8.8%	16.5%	54.9%
Time management	20	8.0%	15.0%	69.9%
Work-life Balance	18	7.2%	13.5%	83.5%
Concentration	16	6.4%	12.0%	95.5%
More free time	13	5.2%	9.8%	105.3%
Comfort	11	4.4%	8.3%	113.5%
Commuting costs	11	4.4%	8.3%	121.8%
Less distractions	10	4.0%	7.5%	129.3%
Productivity	9	3.6%	6.8%	136.1%
Life quality	8	3.2%	6.0%	142.1%
Work scheduling	8	3.2%	6.0%	148.1%
Family Time	7	2.8%	5.3%	153.4%
Better meetings	7	2.8%	5.3%	158.6%
Stress reduction	6	2.4%	4.5%	163.2%
Work autonomy	5	2.0%	3.8%	166.9%
Efficiency	4	1.6%	3.0%	169.9%
Mental health improvement	3	1.2%	2.3%	172.2%
Accessibility	3	1.2%	2.3%	174.4%
Personal life management	3	1.2%	2.3%	176.7%
Ease share info	3	1.2%	2.3%	178.9%
Meals at home	2	0.8%	1.5%	180.5%
Access to digital resources	2	0.8%	1.5%	182.0%
Health Protection (Pandemic related)	2	0.8%	1.5%	183.5%
Relaxed attire	1	0.4%	0.8%	184.2%
Location freedom	1	0.4%	0.8%	185.0%
Healthier meals	1	0.4%	0.8%	185.7%
less non-work-related tasks	1	0.4%	0.8%	186.5%
Company cost reduction	1	0.4%	0.8%	187.2%
Better work conditions	1	0.4%	0.8%	188.0%
Work automation	1	0.4%	0.8%	188.7%
Total	251	100%	188.7%	

Appendix Table 5 Responses to "What are the main disadvantages you have seen/experienced when teleworking"

Reasons	N	Percent of responses	Percent of cases	Cumulative % of cases
Social connections	26	13%	21%	21%
Isolation	23	12%	19%	40%
co-worker relation	22	11%	18%	58%
Costumer contact	15	8%	12%	70%
Overtime	12	6%	10%	80%
Teamwork	11	6%	9%	89%
Work leisure spillover	11	6%	9%	98%
Faded Work hours	11	6%	9%	107%
Team contact	10	5%	8%	115%
Lack communication	7	4%	6%	120%
Utilities cost	6	3%	5%	125%
Physical exercise	5	3%	4%	129%
Motivation	4	2%	3%	133%
Team coordination	4	2%	3%	136%
Demoralization	3	2%	2%	138%
Concentration	3	2%	2%	141%
Productivity	3	2%	2%	143%
Social breaks	3	2%	2%	146%
Technical issues	3	2%	2%	148%
Routine break	2	1%	2%	150%
Physical health	2	1%	2%	151%
Discipline	2	1%	2%	153%
Work spillage	2	1%	2%	154%
Distractions	2	1%	2%	156%
Tech means	2	1%	2%	158%
Employee control	1	1%	1%	159%
Work Organization	1	1%	1%	159%
Synergies spillover	1	1%	1%	160%
Belonging	1	1%	1%	161%
Technostress	1	1%	1%	162%
Multitasking has dependents	1	1%	1%	163%
Total	200	100%	163%	

Appendix Table 6 Answers to "Communication with co-workers has improved. Why/How?"

Reasons	N	Percent of responses	Percent of cases	Cumulative % of cases
Concise	10	24%	42%	42%
Higher quality	8	20%	33%	75%
Improved info relay	3	7%	13%	88%
Less interruptions	3	7%	13%	100%
Frequent	3	7%	13%	113%
Effective	3	7%	13%	125%
Technology helps	2	5%	8%	133%
Focused	2	5%	8%	142%
Communication easier	2	5%	8%	150%
Availability check	2	5%	8%	158%
Faster communication	1	2%	4%	163%
Empathic communication	1	2%	4%	167%
Less conflict communicating	1	2%	4%	171%
Total	41	100%	171%	



