



UNIVERSIDADE CATÓLICA PORTUGUESA

Effect of Covid-19 and digital technologies on remote work

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Católica Porto Business School
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by

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The completion of this dissertation is connected with the conclusion of another stage in my life. A challenging path, but above all one that was of great learning and will certainly be useful for the future and for the new stages that will arise.

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Abstract

Due to the outbreak of the Covid-19 pandemic, companies around the world have undergone a significant transformation in their operations. With the implementation of social distancing measures, companies have had to embrace remote working practices and heavily rely on digital technologies to ensure business continuity. This unprecedented situation has shifted the traditional work culture, compelling companies to quickly adapt to the “new normal”. This thesis seeks to examine the impact of the Covid-19 pandemic and the increased use of digital technologies on companies' working practices, focusing on remote work. The exploratory research will analyse how businesses have adjusted their operations and identify the benefits and challenges that have arisen as a result. Furthermore, the study will provide feedback about the implementation of remote work from companies of different business areas, which may become useful for other studies and companies seeking to enhance their working methods and better prepare for future disruptions.

After data analysis, it was concluded that remote work is a growing trend since the pandemic, once it was proven to bring some benefits, especially from an employee perspective. So, it is possible to admit that Covid-19, combined with the development of digital technologies, has accelerated the adoption of remote work in companies across different industries.

The analysis is based on qualitative data on a limited number of companies, which enabled the understanding of each particular context, but limiting the generalisation possibilities. Furthermore, it contributes to the literature as it explores the benefits, downsides, and barriers to the adoption of remote work.

Keywords: Covid-19; remote work; hybrid work; digital
Word count: 6241

Resumo

Devido ao contexto pandémico, empresas em todo o mundo sofreram uma transformação significativa nas suas operações. Com as medidas de distanciamento social, as empresas tiveram de adotar práticas de trabalho remoto, provocando uma mudança na cultura de trabalho tradicional e ficando dependentes das tecnologias. Esta tese procura examinar o impacto da pandemia das tecnologias digitais nas práticas de trabalho das empresas, com foco no trabalho remoto. A investigação exploratória analisará a forma como as empresas ajustaram as suas operações e identificará os benefícios e desafios que daí resultaram. Além disso, o estudo fornecerá o feedback de empresas de diferentes áreas de negócio relativo ao trabalho remoto, o que poderá tornar-se útil para outros estudos e empresas que procurem melhorar os seus métodos de trabalho e preparar-se melhor para futuras adversidades.

Após a análise de dados, concluiu-se que o trabalho remoto apresenta uma tendência crescente desde a pandemia, uma vez comprovados os seus benefícios, especialmente quando analisado do ponto de vista do empregado. Assim, é possível admitir que o Covid-19, combinado com o desenvolvimento das tecnologias digitais, levou à aceleração da adoção do trabalho remoto em empresas de diferentes indústrias.

Esta análise baseia-se em dados qualitativos de um número limitado de empresas, o que levou à compreensão de cada contexto em particular, mas limitando as possibilidades de generalização. Além disso, contribui para a literatura ao explorar os benefícios, desvantagens e barreiras à adoção do trabalho à distância.

Palavras-chave: Covid-19; trabalho remoto; trabalho híbrido; digital

Número de palavras: 6241

Table of contents

Acknowledgments.....	v
Abstract	vii
Resumo.....	ix
Table of contents	xi
List of tables and appendices	xiii
List of abbreviations	xv
Introduction.....	17
Chapter 1. Literature Revision	20
1.1 Digital Transformation	20
1.2 Remote Work.....	21
1.3 Hybrid Work	23
1.4 Impact of Remote Work.....	24
Chapter 2. Methodology.....	28
2.1 Research Strategy.....	28
2.2 Description of the participants	29
Chapter 3. Results and Data Analysis	31
3.1 Introduction.....	31
3.2 Data and Analysis.....	31
3.3 Overall Analysis.....	38
3.4 Discussion	39
Chapter 4. Conclusion	41
Bibliography	44
Appendix	48

List of tables and appendices

Table 1: Comparison of studies on the impact of remote work.	26
Table 2: Companies' general information.....	29
Table 3: Representation of the percentage of workers practicing remote work before and after Covid-19.....	31
Table 4: Changes experienced in productivity due to the adoption of remote work.....	33
Table 5: Changes made by each company to implement remote work	34
Table 6: Barriers identified by each company to the implementation of remote work	35
Table 7: Identification by each company of the downsides of implementing remote work	36
Table 8: Identification by each company of the advantages of implementing remote work	37
Appendix 1, table 9: Interview guide.....	48
Appendix 2, table 10: detailed data from the five companies interviewed...	50

List of abbreviations

RW - Remote Work

KPI - Key Performance Indicator

Introduction

The outbreak of Covid-19 has led to significant changes in the way people work, communicate, and collaborate (Héry et al., 2022; OECD, 2020). Social distancing, lockdowns, and travel restrictions caused by the pandemic have forced many organizations to adopt remote work as a viable alternative to working on-premises. This shift has been facilitated by digital technologies, which have enabled employees to work from home or other remote locations. So, although the adoption of remote work was already happening before the pandemic, it was accelerated due to Covid-19 (Kudyba, 2020).

Remote work has emerged as a popular working method that may offer several advantages to both employees and employers. For employees, it provides a better work-life balance, and reduced commuting time and expenses (Gajendran & Harrison, 2007; Ozimek, 2020). For employers, it allows them to reduce office-related costs, increase employee productivity, and increase their range to hire qualified workers (Breugh & Farabee, 2012).

However, the adoption of remote work does not come without barriers and downsides as companies may face a loss of communication, knowledge sharing, and innovation (Allen et al., 2015).

Having this in consideration, this dissertation aims to delve deeper into the implementation of remote work fuelled by Covid-19 and digital technologies. This will require an understanding of companies' processes regarding their working methods, and the necessary changes due to the pandemic and digital transformation. As this represents a recent change in the working paradigm, it is important to understand its real impact on companies' operations. Furthermore, it will be useful to understand if the expectation of change will become effective.

The adoption of new working methods is an important current issue and might be essential to the survival of companies in these challenging times. Therefore, research on this topic will be beneficial for companies to understand how they may adapt to change and consequently may lead to an increase in companies' value. Taking this into account, the research question is **“How did Covid-19 and the use of digital technologies lead to a change in companies' working methods?”**, and it will be subdivided into two sub-questions:

- **How did shifting to remote work change companies' overall performance?**
- **How are companies adapting to the use of digital technologies within the change in the working methods?**

It was used a qualitative research method to collect and analyse data and to understand companies' working methods, before and after the pandemic, the changes that occurred, as well as the viability of remote work as a growing trend.

Overall, this study contributes to the growing literature on remote work relating it to the global pandemic that was experienced. Organizations wanting to implement remote work or enhance their current working methods may find the research's conclusions helpful.

This dissertation is structured into four chapters, in which the first provides a literature review of relevant aspects such as digital transformation, remote work and its effects, and hybrid work. The second chapter presents the methodology used in the research, as well as a description of the sample. The third chapter details the questionnaires' findings and contrasts them with the existing literature. The fourth chapter discusses conclusions, investigation limitations, and recommendations for future studies.

Chapter 1

Literature Revision

1.1 Digital Transformation

Digital transformation means introducing new technologies to perform existing activities, but also a process of re-designing the whole business model. (Capriglione, et al., 2019)

More and more, industries have to cope with the rapid development of technology, and consequently, there is a need to adapt the working methods to optimize business performance, which is also perceived as the need for digital transformation. However, if companies are directly affected by this digital evolution, it is also possible to perceive the appearance of new opportunities, which could lead to an adjustment to their business models.

Digital transformation is mostly based on innovations that are related to internet and cloud technologies, also known as digital technologies (Henriette et al., 2015). This concept is most of the time implemented through digitization, which is the “ability to turn existing products or services into digital variants, and thus offer advantages over tangible products” (Gassmann et al., 2014, page 10).

Digital transformation (DT) in operations is a process that started before the pandemic. It was being adopted in a steady course of action. However, due to Covid-19, this digital transformation was accelerated (Kudyba, 2020), and changes that had been identified as likely to occur within five to ten years are now considered likely to occur very soon or have even already occurred during the health crisis (Héry et al., 2022). The digitalization efforts were rushed during the pandemic to an emergency speed in order to ensure the continuity

of business, and organizations were left with little time for adaptation of their structures, processes, and culture to the new environment (Reuschl et al., 2022).

This digitalization was important to enable remote value co-creation, however, this acceleration of procedures led to “incomplete DT in the absence of adequate time to implement solid change activities and clear requirements of the post-pandemic economy and society” (Reuschl et al., 2022, page 1). So, the global pandemic, causing the acceleration of digital transformation, has created the need for many firms to transform their operations and structures to support the change. However, this process of change can also lead to inefficient practices, and as such, it makes sense to study and verify its impact on companies. Having this in consideration, changes must be considered part of digital transformation, being aligned with the strategy of the company (Reuschl et al., 2022).

1.2 Remote Work

In this context, the rapid digital transformation brought a change in the organizational culture, which means changing values, norms, attitudes, opinions, and ways of thinking. These changes also influence the workforce’s behaviour, impacting their working methods and ways of thinking (Capriglione, et al., 2019).

One big development that the new technologies brought was the adoption of the agile work concept, which is a type of work that allows employees to manage their schedules and work from anywhere, not requiring them to be present in the workplace, which is also known as flexible work (Capriglione, et al., 2019).

Following the significant developments in working methods, remote work is another impactful change, which is defined as work that employees accomplish

at home utilizing information and communication technologies in order to support these flexible working practices (Ng et al., 2022; Elshaiekh et al., 2018). This type of work is facilitated by new technologies, which allowed companies to improve their communication and coordination of work, internally and externally, and it began to be adopted more and more, since the Covid-19 pandemic. However, the factors that influence its effectiveness are still unexplored (Ng et al., 2022).

It is important to study the use of remote work before Covid-19, in order to get a better understanding of its use during the pandemic (OECD, 2020). The aggregation of the insights regarding the period previous to the pandemic and during the pandemic will benefit the achievement of greater effectiveness in the implementation of remote work.

When comparing periods, “the use of telework during the crisis may only be partly transferable to telework during ‘normal times’” (OECD, 2020, page 4), as during the pandemic it was imposed full remote work, with all tasks needed to be done from home. In the present, the format of remote work is similar to the one practiced before Covid-19, once the most adopted format is remote work that is done only occasionally or regularly but with only some tasks done remotely. The previous idea is consistent with Hilberath et al (2020), that refer to the hybrid model as the new remote work, in which the combination of both remote and presential work will be key for the success of companies.

In a survey conducted with managers about their experiences during Covid-19, 61.9% of the interviewees say that their workforce will become more remote in the future (Ozimek, 2020). Within the same survey, concerning full-time remote work, it was concluded that its expectation of growth over the next five years has doubled, from 30% to 65%.

However, despite the many expectations regarding remote work, over time, the jobs that are more productive if done remotely will go remote, and those

that are less productive will not (Ozimek, 2020), and that will highly depend on the type of industry, and differ across firms (Monteiro et al., 2019). The specifications of jobs will have to be taken into account while developing the implementation of remote work, as each sector has different needs. This perspective is in line with what was registered in the period previous to the pandemic, where the adoption of remote work registered a high variation “across countries, sectors, occupations and firms” (OECD, 2020, page 2).

1.3 Hybrid Work

The development of remote work led to the appearance of hybrid work, which is a model that combines working in the workplace and working from home (Microsoft, 2021), or a “mix of in-person and remote work” (Martine Haas, 2022).

The expectation is that hybrid work continues to be the most adopted type of remote work (Hilberath et al., 2020; OECD, 2020). A survey conducted by PwC (2021) corroborates this idea, by finding that 55% of executives planned to adopt a hybrid model of working, suggesting that many organizations are adopting hybrid work as a permanent feature of their operations. Additionally, a Harvard Business School (2021) survey found that 61% of respondents, who were employees, preferred a hybrid work model, implying that employees are also accepting and encouraging a hybrid work model. In summary, there is a growing trend of adoption of hybrid work, which is becoming the most common form of remote work, with organizations and employees favoring a model that combines remote work with work on-premises.

However, Martine Haas (2022) pointed out that although hybrid work has an expectably positive future, there are also some concerns about it. The author

titled the concerns as the “5C challenges”, as companies need to be careful about the following factors regarding the adoption of hybrid work: communication; coordination; connection; creativity; and culture. Achieving successful approaches to these five factors might benefit the adoption of hybrid work. Although the author approached the remote work thematic, it only focused on the hybrid work challenges, not analysing remote work.

1.4 Impact of Remote Work

As it is a recent change in the working methods, remote work can be seen from several points of view. Some authors, like Battisti et al (2022), believe that the majority of companies are still not capable to implement an effective model that benefits remote work. They have been forced to do so by Covid-19, and “some of the negative effects (...) are certainly due to firms’ lack of capacity and resources” (Battisti et al, 2022, page 47).

This change also led to a growing interest in how it affects employee creativity and communication, which is essential for innovation. Several studies have explored this topic and have produced a range of findings. Besides these two factors, also knowledge sharing is highlighted in several studies. As reported by Allen et al. (2015), loss of communication, innovation, and knowledge sharing are three major downsides of remote work. Olson & Primps’ (1984) article also investigated the downsides associated with working at home, which led to the confirmation that it can lead to decreased communication and knowledge sharing.

On the other hand, according to Gajendran & Harrison (2007), working from home increase productivity, lower absenteeism, and boost employee retention. It is also a method that improves the work-life balance while consuming less

energy for companies. This is in line with Breugh & Farabee (2012), which found that remote work boosts productivity, reduces traditional offices' costs, could positively affect job satisfaction which may lead to job retention, and also may lead to an improvement of companies' attractiveness.

Still on this matter, according to the survey conducted by Ozimek (2020), the greatest perceived benefits of remote work are the reduction of unnecessary meetings, reduced distractions at the office, and lack of commute. So, the existence of many benefits is leading businesses to significantly increase their plans to expand the implementation of remote work.

In summary, as we can see above in table 1, remote work can benefit companies in several ways: financially by increasing productivity, and by not requiring the presence of employees, therefore saving traditional offices' costs; operationally by lowering absenteeism, boosting employee retention, reducing unnecessary meetings and distractions at the office, and not requiring commute, but can also cause negative impacts such as loss of communication, innovation, and knowledge sharing.

Effects of remote work			
Impact	Source	Description	Type
Positive	Ozimek (2020)	Reduction of unnecessary meetings and distractions at the office, and lack of commute.	Operational
	Gajendran & Harrison (2007)	Increased productivity, and reduction of consumption of energy Lower of absenteeism, enhanced recruitment and retention of employees	Financial Operational
	Breaugh & Farabee (2012)	Boost of productivity, and reduction of offices' costs Job retention	Financial Operational
Negative	Allen et al. (2015)	Loss of communication, innovation, and knowledge sharing	Operational
	Olson & Primps (1984)		

Table 1: Comparison of studies on the impact of remote work.

Source: from the author

Remote work has been shown to increase output (Fonner & Roloff, 2010), as workers' performance increased by 13% as a result of this shift, according to a study by Bloom et al. (2015). This study is based on a survey by Ctrip, a Chinese travel agency with 16 000 employees. The implementation of remote work had a huge impact, improving total factor productivity between 20 to 30% and saving about \$2 000 a year, per employee working from home.

Fayzieva et al (2020, page 39), corroborated this point of view in their study, concluding that remote work has a “strong and positive relationship with

employee' labour productivity and the effectiveness of the entity". However, the same authors also realised that the studied working method affects the socio-emotional environment of the work team, and also raises difficulties in managing teams.

Furthermore, analysing from an employee-based perspective, the appeal of working from home is based on the flexibility in scheduling work hours and accommodating family demands, as well as on the elimination of daily travel that is meant to reduce work-family friction (Lautsch et al., 2009). So, the idea of working from home may entice more qualified people to join the company (Kerrin & Hone, 2001).

Chapter 2

Methodology

2.1 Research Strategy

This exploratory research, with a qualitative approach, was carried out among Portuguese companies, with the data collection taking place during February 2023. The interviews were conducted in different formats, previously agreed with each company: online platforms (Zoom and Microsoft Teams) or in person, and had an average duration of 35 minutes. The interviews were semi-structured and followed the interview guide included in Appendix 1, table 9. This guide was developed based on the literature review and had the objective to answer the proposed research question “How did Covid-19 and the use of digital technologies lead to a change in companies’ working methods?”, and the respective sub-questions. Therefore, question 1 of the interview guide aimed to seek a direct connection between remote work and the pandemic, answering the aforementioned research question, while questions 2, 6, and 7 had the goal to answer the first sub-question “How did shifting to remote work change companies’ overall performance?”. The second research sub-question “How are companies adapting to the use of digital technologies within the change in the working methods?” was planned to be answered based on the answers given to questions 3, 4, and 5 of the interview guide.

2.2 Description of the participants

The sample consisted of five companies operating in different business areas (see table 2), that were represented by their leaders or heads of Human Resources. This diversity of areas enriched the analysis by providing different contexts, which provided a more complete perspective of each company's experience. All participants were volunteers, recruited via private networks. Among the sample, only one company had already practiced remote work before the pandemic, and only one company decided not to continue remote work after the pandemic. In Appendix 2, table 10 includes detailed data from the five companies.

	Company A	Company B	Company C	Company D	Company E
Foundation Year	1999	2007	1985	1987	1992
Dimension (number of workers)	300	50	105	130	6
Business Area	Insurance mediation and brokerage	Business consulting and software development	Electrical and mechanical components industry	Design, production, and implementation of software for vertical markets	Accounting, tax, and human resource management

Table 2: Companies' general information.

Source: from the author

- **Company A** is a specialized company in advising and managing the risk of people and property, through insurance mediation and brokerage founded in 1999;
- **Company B** is a company founded in 2007, specialized in the development of custom, content-driven interactive experiences, queue management, and digital signage projects;

- **Company C** is a company founded in 1985, that operates in the areas of precision metalworking and accessories for medium and low-voltage networks;
- **Company D** is a company founded in 1987 with its focus on software design, production, and implementation for vertical markets (social economy, optics, textile industry, and healthcare units);
- **Company E** was founded in 1992 and is a company specialized in accounting, tax, and human resource management.

Chapter 3

Results and Data Analysis

3.1 Introduction

In this section, the data collected will be analysed, aiming to recognise some patterns and the most significant factors and link them with the research question. Having this into consideration, it will be presented in the following paragraphs, the answers collected in the interviews.

3.2 Data and Analysis

1. *What was the percentage of workers practicing remote work before Covid-19? What about in the post-pandemic period?*

	Company A		Company B		Company C		Company D		Company E	
% of workers on remote work (RW)	Pre-Covid	Post-Covid	Pre-Covid	Post-Covid	Pre-Covid	Post-Covid	Pre-Covid	Post-Covid	Pre-Covid	Post-Covid
	-	IT dep.	-	+50%	-	-	70%	100%	-	100%

Table 3: Representation of the percentage of workers practicing remote work before and after Covid-19.

Source: from the author

When questioned about the percentage of workers in remote work, companies clarified that the numbers provided are influenced by the percentage of workers who are available to practice remote work. In other words, there may be workers within the provided percentages that can work remotely but may decide not to do it.

The results vary depending on the business area, as we can see in table 3. **Company B** and **Company D**, two companies in the technology sector, have a high percentage of workers adopting remote work:

- **Company B** did not record any remote work previous to the pandemic, while now it has more than 50% of its workers on a format of hybrid work, working four days on the premises and one day remotely;
- **Company D** had adopted a hybrid work format previous to the pandemic, but it increased since the start of Covid-19 and nowadays it applies hybrid work to all its workers, requiring the majority of its people a two days' work on the premises per week.

The other companies in the sample are **Company A**, **Company C**, and **Company E**, each in distinct business areas, and also distinct approaches to remote work:

- **Company A** like **Company B** did not have remote work before the pandemic, and now adopted hybrid work in the IT area, requiring just one day in the office per week, also applying to the generality of workers in case of family assistance due to illness;
- **Company C** only adopted remote work during the pandemic and then decided to return to work on the premises for everyone, even though one-third of its workers are office workers;
- **Company E**, as companies **A** and **C**, started to adopt remote work forced by the pandemic, but this company decided to maintain remote work for every employee on a rotative basis, as face-to-face interaction with the client is needed. The rotative system consists of two employees working on-premises and four working remotely, changing every two weeks.

2. How would you rate your company's experience with remote work from a productivity standpoint?

	Company A	Company B	Company C	Company D	Company E
Factors to highlight regarding productivity	No significant changes	No significant changes	No significant changes	No significant changes	No significant changes

Table 4: Changes experienced in productivity due to the adoption of remote work.

Source: from the author

According to the data collected from the interviews, which are shown in table 4: **Company B** and **Company D** do not have metrics to measure the change in productivity following the adoption of remote work, as they do not pretend to directly control workers. **Company E** also does not have metrics to measure productivity but can understand the direct influence on productivity by the meeting of deadlines, and it has not recorded any difference regarding that metric. On the other side, **Company A** realizes a result-oriented evaluation of workers and did not register significant differences with the adoption of remote work.

Regarding **Company C**, although it did not continue with remote work after the pandemic, it was perceived that the forced shift to remote work during the pandemic did not have a negative impact on its productivity. Their decision to not proceed with remote work was only related to the company's proximity culture.

3. *What organizational changes have been introduced or planned to better accommodate remote working?*
4. *Has there been any adaptation in the technologies used or adoption of new ones, to facilitate or increase the possibility of remote work?*

	Company A	Company B	Company C	Company D	Company E
Changes to implement RW	Equipment acquisition Improvement of the productivity control system Online format courses	Equipment acquisition Implementation of a new working platform	Equipment acquisition	Equipment acquisition Implementation of a new platform focused on contact with clients	Equipment acquisition

Table 5: Changes made by each company to implement remote work.
Source: from the author

When replying to organizational changes, companies also mentioned changes in technology, so we decided to analyse both questions together. Therefore, both answers to questions 3 and 4 are displayed in table 5.

All companies registered some changes to better accommodate the new working method. All changes were made during the pandemic, fuelled by Covid-19 and the measures imposed by the government, but four out of the five companies decided to “follow the flow” and continue with the changes applied. All companies that adopted remote work had to invest in new equipment for all their workers that still did not have the necessary equipment: computers; monitors; supports for computers; and providing internet. Furthermore, the companies that continued with remote work did some more changes: both **Company B** and **Company D** implemented a new working platform: **Company B**, a general platform for all workers, which conceded the necessary tools to manage every task in real-time, guaranteeing access to all the information

needed, and **Company D** a platform for contact with clients. The first was already working on the new platform before Covid-19, but its adoption was accelerated by the pandemic. **Company A** enhanced its existing productivity control system and changed the format of its mandatory courses to online.

Regarding **Company E**, there were no more changes identified because although they were not applying remote work for their workers, they were already using it for delivering services, which ease the transition, as they already had developed their platform.

5. *Do you identify any barriers regarding the use of remote work in your company?*

	Company A	Company B	Company C	Company D	Company E
Barriers to RW	Company's proximity culture Necessity of physical presence	Necessity of physical presence	Necessity of physical presence Company's proximity culture	Necessity of physical presence	Necessity of physical presence

Table 6: Barriers identified by each company to the implementation of remote work.

Source: from the author

When asked about barriers to the adoption of remote work, the answers were similar, even considering the different business areas. As we can analyse in table 6, **Company A**, as the majority of its operational areas require contact with customers, is not able to apply remote work to a great percentage of its workers. However, it could apply it more, but it chose not to, justifying with the proximity culture of the company, which intends to tighten the relations of its workers and enhance communication inside teams for a better workflow and with other sectors in order to create a good organizational environment. Company A's first barrier is also identified by **Company B**.

Meanwhile, in **Company C**, two-thirds of workers are required to work on the premises due to the nature of their jobs, but the other third are office

workers. Management decided that these office workers would work on the premises, not adopting any kind of remote work due to the companies' proximity culture and the prioritisation of a culture of constant communication between sectors. To highlight that this company had the infrastructures and the technical knowledge to continue with remote work, so its decision to not proceed with remote work was only due to the aforementioned factors.

Company E states that their only barrier is the necessity of physical presence to interact with the client and receive documents.

6. *Overcoming the barriers, what are the downsides for your company, arising from remote work?*

	Company A	Company B	Company C	Company D	Company E
Downsides of RW	Decreased communication and exchange of ideas	Decreased communication Difficulty in controlling workers Difficulty in managing schedules between teams	-	Loss of connection with the company's culture Decreased communication between teams	-

Table 7: Identification by each company of the downsides of implementing remote work.
Source: from the author

When asked about the negative impacts that the adoption of remote work may cause, there was some consensus in the answers, as we can see in table 7. **Companies A, B, and D** highlighted the loss of communication as the main downside of remote work. This loss of communication is not only related to the communication between team members but also to the communication between different teams, which leads to a better flow of work. It was also pointed out the loss of informal conversations among workers, which may lead to a loss of creativity. Furthermore, **Company B** also referred to the difficulties in the

workers' management among teams, due to schedules' flexibility, while **Company D** called attention to the loss of connection with the company's culture, which may be prejudicial to employee retention. On the other hand, **Company E** did not record any downside, as they managed to maintain formal and informal communication through different channels.

7. *On the other hand, what do you consider to be the advantages of remote work for your company?*

	Company A	Company B	Company C	Company D	Company E
Advantages of RW	Greater flexibility of schedule Greater focus on individual tasks	Greater focus on individual tasks	-	Increased competition in the capture of talent Greater focus on individual tasks	Employees' satisfaction Greater focus on individual tasks

Table 8: Identification by each company of the advantages of implementing remote work.

Source: from the author

Once again, the answers regarding this topic are homogeneous, with every company that adopted remote work registering a higher individual focus of each employer in their assigned tasks – table 8. **Company A** points out the flexibility of schedules, in which workers may manage their working hours, **Company D** considers that adopting remote work led to greater retention of employees and an increase in the capture of talent, and **Company E** states that the adoption of remote work led to greater satisfaction among workers, by originating a better work-life balance.

3.3 Overall Analysis

Among the five companies in the sample, only one had already adopted remote work, however, every company was forced to adapt its working method during the pandemic, which influenced their decision to implement remote work after it.

When relating the adoption of remote work to the business area, it seems that it is more likely for companies operating in the technological sector to adopt remote work on a greater scale. Meanwhile, companies in the services sector are also adopting remote work but are more dependent on some factors such as the organizational culture and the level of proximity to the client. So, it is perceived that the implementation of remote work in this sector depends from company to company. It also appears that the industry sector is more resistant to the change in working methods, which can be justified by the necessity of manual labour in the factory or the prioritisation of a culture of constant communication.

The adoption of remote work might be influenced by the size of the company, measured by the number of employees. It can be argued that small companies might be keener to adopt remote work, which may be justified by the greater ease in managing and coordinating a smaller number of workers, while bigger companies might find more difficulties applying this method and future research can explore and analyse this.

In the study, it appears that the two main factors that prevent the wider adoption of remote work are the necessity of physical presence in some operational areas and the companies' culture of proximity. Companies believe that despite remote work increasing individual focus, it reduces communication and creativity. The first factor will always be the more significant barrier to the majority of companies when it comes to remote work, and the latter factor

means that, while there are no developments regarding remote work that positively affect communication between employers, the expectations will be that companies remain between 100% face-to-face work and a hybrid work format, with a maximum of two days on remote work.

Also, to highlight that apparently remote work can make it more challenging for teams to communicate and collaborate effectively, but on the other hand, it may benefit works that require individual focus.

3.4 Discussion

This study aims to understand the impact of Covid-19 and the use of digital technologies in companies' working methods, and how it affected companies' overall performance. The analysis carried out revealed that, in general, Covid-19 accelerated the adoption of remote work, as some companies decided to maintain remote work after they were forced to adopt a change in the working methods during the pandemic.

Although this digital transformation, specifically remote work started being utilized many years ago, it seems that only since the pandemic it has started to be widely adopted, and this is in line with Kudyba (2020), which stated that digital transformation was accelerated during the pandemic, and also Héry et al. (2022) as they found that changes likely to occur in a medium term, were stimulated due to Covid-19, which seems to be the case of remote work, that had to be massively adopted to fulfil the government restrictions. Therefore, this sudden digital transformation may have led to a not sustainable growth of remote work (Reuschl et al., 2022), so there are still few KPI to directly measure the direct impact on companies' overall performance on Portuguese companies. It seems that companies are adopting remote work, mostly justified by the

employees' point of view, as they reduce costs in transportation, save time, and improve the work-life balance. Such an argument was not found in the literature review, but future research can ascertain whether this is true.

Monteiro et al (2019) support our findings that the "success" of remote work will depend on some companies' characteristics, such as dimension, and business area. Meanwhile, according to the sample, it seems that, in general, remote work is showing a growing trend, which is in accordance with Ozimek (2020), that concluded in his study that the majority of managers believe that the workforce will become more remote in the future.

Concluding, remote work is a growing trend that was accelerated by the Covid-19 pandemic. As more and more companies have shifted to remote work it is becoming evident that remote work has various advantages, such as increased flexibility and improved work-life balance. According to the literature revision, remote work can also lead to increased productivity, however, that was not observed in the data analysis of the sample companies. While there are still challenges associated with remote work, such as difficulty with communication and collaboration, and loss of connection with companies' identity (Allen et al., 2015), many of these can be overcome with the right tools and strategies, which need to be developed in the upcoming years. Nonetheless, it is crucial to acknowledge the various aspects and types of remote work in order to understand the best suit for each company, as Bloom et al. (2015, page 172) highlight "the importance of learning and experimentation around working from home".

Chapter 4

Conclusion

The findings of this analysis contributed to shedding light on the changes that occurred in the companies' working methods due to Covid-19, and the digital changes. There is scarce literature regarding this subject, so this exploratory study hopefully will contribute to future detailed research on the topics discussed.

The comparison of the findings of empirical research conducted after the pandemic and in the period previous to Covid-19, are valuable sources for inspiring insights and thinking about the future adoption of remote work. So, it is important to analyse the past and present of remote work to better understand and predict its true potential and, in this way, develop support systems and KPI to allow it to fulfil that potential, being favorable for companies' overall performance and the welfare of the employees.

Based on the data provided, the main findings are that remote work has not yet reached its stagnation phase, as it is still evolving every year, especially since the pandemic. This change in the working method is not the same for every business area, and is even different inside an organization, depending on the operational area, which makes it difficult to reach an ultimate conclusion on the subject, however, it seems that remote work is not just a phase, it will continue in the future. Generally, it appears that companies are keeping some remote work while being attentive to the particular choices of the employees and the needs of the business.

What was perceived, after data analysis was that organizational culture is considered by companies to be more important than the respective business area, as companies value face-to-face interactions between employees. Hence,

work in the facilities remains important for Management, in order to maintain the company's identity and to maintain an environment of constant communication and mutual help.

The majority of the companies in the sample that adopted remote work gave workers the choice to decide if they want to practice remote work. The percentages provided in Appendix 2, table 10, do not take into consideration the workers' choice, which leads to the need for further studies to understand whether workers actually practice remote work when having the possibility to do so.

So, regarding the first sub-question "how did shifting to remote work change companies' overall performance?", we concluded that, according to our sample, the adoption of remote work did not cause significant changes and also there were no changes in the KPI and in the companies' concern with the indicators. In fact, the adoption of remote work did not change the company's processes and concerns related to performance. The second sub-question "how are companies adapting to the use of digital technologies within the change in the working methods?", is directly related to the research question "how did Covid-19 and the use of digital technologies lead to a change in companies' working methods?". And from this preliminary research, it seems that the global pandemic accelerated the change of traditional working methods, leading to the adoption of remote work. In addition, it also seems that this change occurred due to the existence of some digital technologies such as functional platforms to connect every worker inside the organizations or with other organizations, however, with no need of major developments of digital technologies. Therefore, it can be advanced that digital technologies did not have a determinant influence on remote work. Future research should analyse this in the same and different contexts.

The findings of this study may be important in its corporate and academic contribution, once the results may pave the way for more thorough investigations into the adoption of remote or hybrid work. This dissertation provides insights into companies that adopted remote work as well as a company that decided not to adopt it and the reason behind every choice. As the research is not focused on only one business area, the results may contribute to several areas.

The limited number of interviews that were conducted is the main investigation limitation as it only provides a few perspectives about the topic, which leads to a less comprehensive conclusion. Furthermore, the scarce literature available on the subject is another investigation limitation, so it is hoped that this investigation may be useful for future studies. Therefore, further procedures on this topic must be carried out, to investigate in detail the most effective working methods for companies, taking into account its business and operational areas, and how to support this shift. This is, the necessary organizational and digital changes to better accommodate the change in the working methods. The impact of remote work on organizational culture can be investigated, to understand how it affects the culture of a company while workers are not working on-premises, and also the role of digital technologies in a better accommodation of remote work practices.

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Appendix

1. What was the percentage of workers practicing remote work before Covid-19? What about in the post-pandemic period?

2. How would you rate your company's experience with remote work from a productivity standpoint?

3. What organizational changes have been introduced or planned to better accommodate remote working?

4. Has there been any adaptation in the technologies used or adoption of new ones, to facilitate or increase the possibility of remote work?

5. Do you identify any barriers regarding the use of remote work in your company?

6. Overcoming the barriers, what are the downsides for your company, arising from remote work?

7. On the other hand, what do you consider to be the advantages of remote work for your company?

Appendix 1, table 9: Interview guide.

Source: from the author

	Company A		Company B		Company C		Company D		Company E	
Foundation Year	1999		2007		1985		1987		1992	
Dimension (number of workers)	300		50		105		130		6	
Business Area	Insurance mediation and brokerage		Business consulting and software development		Electrical and mechanical components industry		Design, production and implementation of software for vertical markets		Accounting, tax, and human resource management	
% of workers on remote work (RW)	Pre-Covid	Post-Covid	Pre-Covid	Post-Covid	Pre-Covid	Post-Covid	Pre-Covid	Post-Covid	Pre-Covid	Post-Covid
	-	IT department	-	+50%	-	-	70%	100%	-	100%
Factors to highlight regarding productivity	No significant changes		No significant changes		-		No significant changes		No significant changes	
Changes to implement RW	Equipment acquisition Improvement of the productivity control system Online format courses		Equipment acquisition Implementation of a new working platform		-		Equipment acquisition Implementation of a new platform focused on contact with clients		Equipment acquisition	
Barriers to RW	Company's proximity culture Necessity of physical presence		Necessity of physical presence		Necessity of physical presence Company's proximity culture		Necessity of physical presence		Necessity of physical presence	

Downsides of RW	Decreased communication and exchange of ideas	Decreased communication Difficulty in controlling workers Difficulty in managing schedules between teams	-	Loss of connection with the company's culture Decreased communication between teams	-
Advantages of RW	Greater flexibility of schedule Greater focus on individual tasks	Greater focus on individual tasks	-	Increased competition in the capture of talent Greater focus on individual tasks	Employees' satisfaction Greater focus on individual tasks

Appendix 2, table 10: detailed data from the five companies interviewed.

Source: from the author