

## Digital Remote Work Influencing Public Administration Employees Satisfaction in Public Health Complex Contexts

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**Abstract.** The purpose of this study is to describe and analyze whether digital remote work in times of Covid-19 is influencing the satisfaction of Public Administration employees. Based on the objective of this study, an online survey was conducted in the Portuguese Public Administration, for a sample of 70 individuals, working at home due to the situation of Public Health caused by the Coronavirus. Digital remote work is being applied massively worldwide and is a specific form of work organization supported by information and knowledge. Digital remote workers carry out their activities at home and using digital technologies, depending on the nature of the tasks and work situations. To understand the satisfaction of Public Administration employees, an empirical study was carried out, supported by data collection through an online survey. The main conclusions were that despite the constraints (resistance of top management, organizational culture, autonomy, and flexibility of workers, among others) that existed before the health and socioeconomic crisis caused by the Coronavirus pandemic, digital remote work is a given in the life of organizations, public or private, and of workers with reflection at various levels in society and particularly in the professional fulfillment and satisfaction of employees. According to the analysis carried out on the data collected to support the conclusions of this study, the degree of satisfaction of Public Administration employees is influenced in different ways by the influencing factors studied: autonomy at work, conditions at work, and income. However, regarding the factor of quality of life at work, this link has not been established. Thus, it was possible to conclude that satisfaction increases positively and strongly with autonomy at work. Technological specialization and productivity still have a positive influence, but with low intensity contribute to the satisfaction of AP employees. Working conditions also negatively influence satisfaction, although at an average intensity. However, the average degree of job satisfaction varies according to the different age groups, with employees aged 35 or more having a higher satisfaction average than employees whose ages vary between 34 and the beginning of their working lives.

**Keywords:** Health Contexts; Digital remote work; Digital technologies; Covid-19; Social Isolation; Public Administration

## 1. Introduction

The change in Public Health in just a few months with Coronavirus making all the persons all over the world going online a working remotely is only possible because of the radical changes in technology, the development of organizations, the change in relations between employees and employers, and mainly government intervention enforcing digital remote work.

Currently, the main objective is to maintain the Public Services working to help the countries to overcome this critical situation. Digital technologies are now the solution to keep the economies working, in a context of social isolation worldwide.

The concept of digital remote working, created by Jack Nilles in 1973, is considered by the European Union as "the work carried out by a digital remote worker, mainly or much of the time, in a place other than the traditional place of work, for an employer or a client, involving the use of advanced computer technologies as a central and essential element of the work". In the current context, digital technologies provide the necessary basis for the development of digital remote work. In Portugal the introduction of digital remote work has been slow, because, on the one hand, the bureaucratic business culture was still an obstacle, conditioning the workers' autonomy and flexibility. On the other hand, social factors such as equal rights and social protection may, in a first analysis, be pointed out as primary factors of resistance to digital remote work by workers.

However, at the business level, other factors may assume high importance in conditioning the implementation of digital remote work during the past years, such as the characteristics of the managers, the attitude of the managers towards the change in work relations, the organizational culture itself. Managers have always taken a skeptical position regarding the benefits of digital remote working, when these are compared with certain constraints, such as the difficulty in controlling and supervising digital remote workers and the possible decrease in their loyalty to the company. However, now the government had a decisive influence on the speed with which digital remote working spread within Portuguese public organizations, placing all PA workers, whose functions allowed them to work in digital remote situations, as a preventive measure for the dissemination of Covid-19. Thus, and after 3 weeks of isolation of PA workers, to follow the orders of social distance, this study aims to analyze the degree of satisfaction of these workers, based on the variable's autonomy in digital remote work, routine in digital remote work, and quality of life in digital remote work. The study addresses the perspective of the worker and privileges the subordinate digital remote work of the workers of the Portuguese PA.

The structure of this article is divided into the sections that are described below: first section review of the literature on the current organizational context (derived from the public health situation experienced in 2020), and on the constructs digital remote work and job satisfaction remote; the second section presents the methodology used, followed by the section with data analysis and presentation of results; finally, the main conclusions, limitations and future perspectives for research on the topic of digital remote work are identified and discussed.

## 2. Literature Review

### 2.1. Digital Remote Work Conceptualization

Digital remote working is seen as the work that results from digital remote services and digital remote activities, consequently covering the various sectors, using the digital remote transmission of data, images, texts (in short, knowledge).

The concept of digital remote work does not necessarily imply the execution of tasks done exclusively from home (however this idea was reinforced only in the context of the pandemic), but essentially its execution in any place other than the formal place of the employer, during a period at least 4 days a week or full time [1].

The definition of digital remote work and other expressions also used, such as telework or telecommuting, is based on the definition given by the European Framework Agreement on Digital remote work 2002, according to which Telework is a form of organization and/or work, using in-formation technologies, within the scope of a contract/employment relationship, in which the work, which can also be carried out on the employer's premises, is carried out outside these premises. installations regularly ". [2].

However, the origin of the digital remote working concept arose from the need to solve the problem of the displacement of workers from home to their offices, resulting in loss of hours, energy, and other precious resources. In addition to the waste of these resources, there was also the problem of the endless traffic queues that this displacement caused mainly during rush hours. However, this need did not arise suddenly and with the same intensity in the various industries, commerce, and services existing in the market, but it came about when Jack Nilles, in the '70s, designer of space vehicles and communication systems for the United States Air Force and NASA, began to think about how tele-communications could enable employees to perform their duties close to or even from their home [3].

At the beginning of the concept, this way of working, seen with great suspicion on the part of managers, was implemented in a very slow way by some companies and not always in the best way. The mentality of management and of managers in changing the way companies operate were obstacles of great importance for the expansion of digital remote working or working from home. As Nilles commented [3] the problem is not in management supervision where workers must be controlled by the company in their workplace, but in the effective management of people.

The appropriate level of management, whether telecommuting or working in the office, has to do with the agreement and commitment signed between management and workers in delivering quality work and with previously defined objectives. For this to happen, people need not only to have the professional skills required for the performance of their tasks, but also the tools, conditions, and necessary and adequate training to deliver the final work, with the established quality criteria, within the agreed time.

Whether in the office or at home, responsibility for job delivery is shared between managers and employees. Managers must offer all the necessary conditions for workers to perform their part in delivering the requested work.

Nowadays, office work is often supported by Internet connections and can be done from anywhere at any time. [4].

On the one hand, companies need to guarantee computer support, which was already part of their duties in the traditional office, as well as computer security, but in this case for work done outside the headquarters, with the addition of providing digital remote access to the information system. With the relocation of companies to an increasingly competitive and globalized market, the need for workers' mobility has long been an important point for these tasks to be assured.

The Covid-19 pandemic brought the imperative need to stay at home and at the same time the need to carry out the tasks that could be carried out in that context. Companies, even those that did not yet have digital remote work systems in place, had to address these issues to overcome this phase and adapt to the digital transformation of their business models and their employees.

On the other hand, workers also need to have physical conditions, habitability in their homes or the chosen location to be able to carry out the assigned tasks.

Despite the emergence of new mobile technologies that make digital remote work much easier, such as smartphones and tablets, there are still many managers who prefer their employees to work in offices, such as Yahoo CEO Marissa Mayer, who in the summer of 2013 said that on principle she preferred to have his workers in the offices, despite having a digital remote work policy in place [4].

Also, digital remote work is a means of excellence for attracting talent outside of large cities and who would otherwise never have access to belonging to important companies. It is a strategy used to overcome the challenges of talent acquisition and regional development, contributing to lower unemployment levels outside the main cities [1].

This new way of working supported by technology and carried out regardless of location is part of the revolution that digital transformation operates in the relationship between paid work and personal life [4].

Keeping employees connected and working productively became critical during the COVID-19 pandemic, because digital remote work is not an option, but an imposition on non-essential jobs that can be done from home. Social distance has eliminated face-to-face meetings, with the need for new digital tools to help collaboration between teams [5].

Thus, companies must have a mentality of openness to this type of work, because, in addition to the challenges that arise, there are mutual benefits. A compromise must be made between management and workers. Both parties need to solve the problems that arise in the implementation of digital remote work.

The future of labor relations will no longer be the same after the end of the Covid-19 pandemic. The digital transformation that was taking place before the health crisis triggered by the pandemic has accelerated the way work is viewed. Many companies like Facebook (who do not expect to have more than half of employees in offices in the next decade), Ford Motor Co. (which told employees a year after the pandemic began that they could continue to work from home indefinitely), allowing them to only use the offices when they need it) or companies like Deutsche Bank AG (which is creating a hybrid system, partly in the office, partly at home) are examples of how companies see the future of industrial relations [6].

On the workers' side, several factors can impact the performance of digital remote work starting with the limits of private life with office work. The people in the companies are leveled in the working conditions and these same people performing the same type of tasks in digital remote work will have home environments with different factors (family size, marital status, electricity, Wi-Fi, dedicated laptop with the

necessary software, noise, other distractions, etc.) that will contribute to different performances, especially when the main needs are not met. [7].

## **2.2. External and Internal Context of Public Organizations – Implications of COVID-19**

Currently, competing on an equal footing and overcoming competition are goals that companies seek to achieve, which they will hardly achieve if they remain attached to habits inherent to Taylorist models (scientific work organization), characterized by the division of tasks, a rigid hierarchical chain, and a flow vertical information.

Technical development at the level of ICT has created new types of jobs and companies specializing in these technologies. Major transformations have already started, and the heads of organizations are now responsible for their continuity, in a policy of making organizational systems more flexible. The diffusion of workgroups, in the company and abroad, outsourcing strategies, the emergence of flexible structures, and the expansion of digital remote working are facts that must be considered by managers.

Digital remote working reinforces and accelerates changes in the world of work and the information society, in which the quality and speed of information are key factors for competitiveness. We are therefore living in a period of great change and ways must be found to manage the risks and maximize the benefits.

Authorities must assume the responsibilities of establishing protection and social cohesion, workers must take a long-term view, which implies a cohesive approach with other actors in the labor market (companies, digital remote workers, social partners, governments, digital remote work organizations). The option is clear: to work together, politically, economically, and socially.

Thus, this chapter aims to present an overview of the conditions that underlie the emergence of digital remote work. The changes that have been generated in the business world, leading to the birth of new forms of organizations, the evolution in the level of information and communication technologies, and the economic changes that have taken place in the last decades of the millennium that is now ending, lead the creation of new concepts inherent to work.

The implementation of new forms of work organization always implies profound cultural changes and management styles and methods, which require a long time to be adopted and incorporated. They change the way of working, the relationship between workers and, in some cases, the function of each one.

We are currently moving towards a networked society, based on telecommunications and information technologies, where people participate in projects with a certain level of independence, initiative, and creativity. All aspects of business life are being affected by technological and social developments: the working methods used, where and when the work is organized, carried out and what is its content.

It is necessary to develop a business reality in which the work is carried out in such a way that the individual needs, as well as the needs of the company, are met (time for family life, exploration of individual knowledge and skills, opportunities that arise in the market and time of companies).

In this context, the concept of telecommuting is increasingly discussed and, although it does not have a specific technical definition, it is usual to frame it as a set of new ways of working, using ICT as tools (tasks and communication) and the digital remote

worker as an individual who spends at least part of the time outside the traditional environment of the company.

At the European level, digital remote working is beginning to be a way to open up new opportunities to increase competitiveness, promote employment, and improve the quality of work. According to the European Commission document “European Digital remote work - Digital remote work 97”, digital remote working will grow rapidly over the next five years due to the following set of factors.

### **External and Internal Context of Public Organizations – Implications of COVID-19**

**Macroeconomics:** globalization in terms of trade and investment, privatizations that open the way to international competition in previously inaccessible sectors of activity. Globalization leads to the need to improve services and support for clients, the flexible networks that digital remote work can provide.

**Microeconomics:** the local economy is very important, as a company's location no longer depends only on road access or distance, but on the level and quality of its services and available infra-structure. Above all, business success depends on the entrepreneurial and creative spirit of its workers and is closely linked to the competitiveness of the local economy, to which digital remote work can make a significant contribution [8].

**Work Organization:** companies seek to adapt to the demands of current markets, reducing their costs, through means such as downsizing, outsourcing, de-layering, and “reengineering”. Organizational structures have become more horizontal, management has become more entrepreneurial and goal-oriented, challenging concerning the rules and norms traditionally usual in the organization of work. ICT facilitates the creation of work teams, reduces hierarchical rigidity, and stimulates the emergence of so-called “virtual organizations”. Such vectors allow digital remote work to flourish.

**Public Services and Government:** the liberalization of public monopolies and the search for new (and lower cost) public services. In this context, digital remote working can increase the quality and efficiency of existing services, as well as facilitate the emergence of new services.

**Work Content:** in all sectors of the economy, information, and know-how, as well as individual skills, have become factors that lead to success. Information and know-how can be shared across networks by digital remote workers. Individual skills and involvement can be optimized by empowerment. Digital remote working provides a framework for the emergence and exploitation of new opportunities.

**Worker:** the desire for greater control over their work reflects a more prosperous society, with higher levels of education and more qualified workers. For those who use the current technology to communicate, there are no constraints for the adoption of digital remote working situations. This allows them to choose their lifestyle, instead of adapting their lifestyle to the obligations imposed by traditionally developed work.

**Labor Relations:** in the last 10 years, the labor market has undergone several and important trans-formations, which have led to job insecurity, at all levels. This led employers, together with workers (or their union representatives) to look for new ways to combine the benefits of flexibility for the organization, ensuring individual security. Telecommuting allows opportunities to emerge to achieve these goals.

**National and European policies:** job creation is a major concern and digital remote working can help create more jobs (including across borders).

Thus, the dissemination of digital remote work is the result of the evolution of the markets and the policies implemented, and the effects resulting from its application also contribute to the transformations in the environment of the organizations and the policies developed. Given these organizational changes in the implementation of digital remote working, favorable and unfavorable conditions may arise, as identified below [8].

### 2.3. Work Satisfaction theories

Thus, the dissemination of digital remote work is the result of the evolution of the markets and the policies implemented, and the effects resulting from its application also contribute to the transformations in the environment of the organizations and the policies developed. Given these organizational changes in the implementation of digital remote working, favorable and unfavorable conditions may arise, as identified below [8].

The global framework assumptions underlying the statistical measures used are:

- H1: Satisfaction in digital remote work varies with income;
- H2: Satisfaction in digital remote work varies with autonomy at work;
- H3: Satisfaction in digital remote work varies with WORK-COND at work;
- H4: Satisfaction in digital remote work is related to productivity, specialization, and quality at work.

### Work Organization

The overall productivity and quality of a business process depend on the effectiveness of coordinating and managing formal and informal tasks in an integrated and coherent manner while prioritizing and organizing work according to effective time management is crucial to achieving the defined objectives.

In the work organization process, the manager is faced with tasks such as: - definition of objectives and elaboration of action plans; - organization, supported by the identification of resources, defining standards, and structuring the entire work process; - evaluation of the objectives achieved and respective feedback; - promoting the development of people, building strong work teams, and stimulating interest; - time management and ensuring compliance with deadlines.

A study done by Xerox in the United Kingdom identified six factors of work organization necessary for the successful implementation of digital remote work. These were: - need to be adaptable instead of rigid; - the tendency to decrease overhead costs; - the need to highlight individual contributions; - the need to enhance creativity; - the need to be organic and to involve people; - the need to motivate production and the quality of work.

Thus, to optimize the organization of work, in digital remote working situations, the numerous variables that involve the definition of workflows must be considered, including the available resources, the necessary knowledge, the time needed to perform the tasks, the location of the digital remote workers, customers, and equipment, among others. The establishment of an agreement between managers and digital remote workers about the expectations expected for the project, considering factors such as quality, quantity, and deadlines is essential.

### **Supervision and Control Systems for Digital Remote Worker Activity**

Contrary to what was expected, digital remote working has not spread rapidly, possibly because it does not fit into the predominant organizational structures, which are very hierarchical, with strict control over the performance of workers.

Digital remote working calls into question the style of classical management. It implies achieving objectives without having direct control of the procedures and the time of presence of individuals, thus assuming a climate of trust that managers have difficulty adapting to.

This form of work organization is seen as a decrease in control and even as a loss of managers' power over their subordinates. The control function is seen by many organizations as the first duty of managers, and rewards and incentives are often based on factors related to it. Some companies that have already adopted digital remote working situations use work quality control and objective analysis systems.

ICT has a predominant role at this level, as it can increase control, remotely monitoring the use of equipment, the working hours of the machines, and the deadlines to be met. However, the electronic surveillance process can cause problems in terms of confidentiality and information security.

Traditionally, certain quantitative control techniques have been applied, the main objectives of which are: to elaborate work programs; determine costs to serve as a basis for budgets; determine the performance of people and machines.

Although these techniques have so far proved to be a fundamental tool for the decision-making process, with the adoption of new forms of work organization, management control must necessarily be replaced by work coordination.

The role of managers must be to lead workers and to be facilitating elements in the work development process. However, the culture that exists in most organizations is not open enough to allow such procedures on the part of management bodies and management by objectives instead of direct performance supervision is a strategic option that many companies have not yet taken.

### **Supervision and Control Systems for Digital Remote Worker Activity**

Leadership is the ability to lead groups and individuals to cooperate, which involves sharing information and objectives and resolving conflicts. However, a problem arises concerning the coordination of objectives, tasks, and behaviors so that team members are in tune with the rules and ideas about the organization.

About digital remote workers, the situation becomes more complex, since as they are isolated, there is a tendency to create their own rules and to take a different approach to work. So that digital remote workers do not deviate from the objectives, procedures such as the creation of periodic reports with information about the projects being developed, the action plans, and the new company policies, for example, must be developed.

Digital remote working thus requires the transition from spontaneous coordination in the workplace to more planned coordination, where ICT plays an important role. Godehard, in a study he carried out in 1994, concluded that "most companies do not seem to need new forms of coordination. On the contrary, they feel obliged to apply the existing coordination regulations, in terms of planning and control, but more carefully".

The manager in his role of leader must be the mentor and the inspiration both at the individual level and at the level of teams. However, it is not very easy to exercise these



influences in an organization with a network structure and where workers are not physically present. Methods such as “on the job training” will have to be replaced by others, such as - feedback to reinforce positive behaviors; - advice via communication tools; - contact the digital remote worker regularly to communicate promptly how the development of his work is going and the necessary changes; - establish a career plan, regularly reviewed with the worker to measure their progress.

Traditional management uses external motivating mechanisms to get workers to perform their duties efficiently and effectively. However, the digital remote worker finds himself alone, without the direct support of these mechanisms. To address this problem, training sessions should be held to teach the digital remote worker how to set goals, devise a plan to meet those goals, and solve the most common problems that may arise.

It is also essential that, in the selection process of the digital remote worker, self-motivation is considered a prerequisite since he will have to resort to internal mechanisms of motivation to perform his tasks with the necessary quality and within the defined deadlines.

The company's participation in motivating the digital remote worker must include providing information about his work and the objectives achieved by the company itself, in the form of graphics and communications. According to [9], the motivating factors that are important in a company with digital remote working situations are - mission (giving people something they believe in); - autonomy in the performance of work (feedback); - values (financial data, awards, public recognition); - learning (development of new knowledge); - reputation (opportunities to highlight each other's achievements).

The manager as the leader of the work teams is therefore responsible for integrating people with different backgrounds and providing networking, using empowerment instead of command and control from the hierarchy.

### **3. Methods**

This investigation will be carried out based on quantitative analysis methodologies, based on the elaboration, and applied a survey to Portuguese PA workers, with the data subsequently analyzed using statistical techniques using IBM SPSS 24 software.

It is intended to verify whether the satisfaction of PA workers to perform work is correlated with the variable's autonomy at work, WORK-COND at work, quality of life at work, and income. Job satisfaction is presented as a dependent variable and the remaining variables are independent or explanatory.

Thus, an online survey was applied to a sample of PA workers, to collect data that allow analyzing what are the variables that influence workers' satisfaction.

### **4. Data Analysis and Results**

Analyzing and describing data using appropriate statistical procedures increases the credibility of scientific research and its empirical usefulness.

The global framework assumptions underlying the statistical measures used are:

- H1: Satisfaction in digital remote work varies with income.
- H2: Satisfaction in digital remote work varies with autonomy at work.

- H3: Satisfaction in digital remote work varies with conditions at work.
- H4: Satisfaction in digital remote work is related to productivity, technological specialization, and quality of life in digital remote work.

#### 4.1. Sample Characterization

From the data taken from the questionnaire, a characterization of the sample of PA workers was carried out, which is summarized in the tables below.

Table 1 shows the characteristics of the sample in terms of age and number of years in the organization:

**Table 1.** Characterization of the sample of PA workers

	<b>Age</b>	<b>Number of Years in the Organization</b>
Mean	41.56	19.48
Standard Deviation	0.864	0.743
Median	41.00	20.00
Mode	35	17
Minimum	22	1
Maximum	65	37

##### 4.1.1 Antique

Seniority averages 19.48 years, the oldest employee has been with the company for 37 years and the most recent 1 year.

##### Age

Age has an average of 41.5 years, a minimum age of 22 years, and a maximum age of 65 years.

- Most employees are under the age of 45 (61.4%).
- The age difference between the highest and lowest value of the variable is 43 years.
- The most frequent age is 35 years old.
- And 50% of employees are 39 years old at the most.

##### Employees Income

The average yield is 1,082 monetary units (u.m.), with a maximum yield of 2,830 (u.m.) and a minimum yield of 680 (u.m.), having been considered as omitted cases, the yields below zero.

Most employees have an income between 680 (u.m.) and 2,830 (u.m.), exclusive.

### Sample Characterization

Seniority averages 19.48 years, the oldest employee has been with the company for 37 years and the most recent 1 year (Table 2).

**Table 2.** Income (Monthly Salary)

	Frequency	Percentage
>= 2000	68	51.1
0-699	6	4.5
1000 – 1999	47	35.3
700-900	12	9.0
Total	133	100.0

### Technological Specialization

The majority of workers identified a relatively high level of technological specialization, with the majority being in the “Very High Specialized” category (75%) (Table 3).

**Table 3.** Level of Technological Specialization

	Frequency	Percentage
High Specialized	20	15.0
Very High Specialized	100	75.2
Not Specialized	9	6.8
Low Specialized	4	3.0
Total	133	100.0

### Productivity/Goal Orientation

Most workers identified their productivity/results orientation as being high, as 49.6% have “High” and “Very High” productivity (Table 4).

**Table 4.** Productivity/Orientation to Results

	Frequency	Percentage
High	49	36.8
Low	21	15.8
Average	45	33.8
Very High	17	12.8
Very Low	1	0.8
Total	133	100.0

### Quality of Life in Digital Remote Work

Quality of life at work was classified as “High” in most cases (47%) (Table 5).

**Table 5.** Quality of Life in Digital remote Work

	Frequency	Percentage
High	62	46.6
Low	16	12.0
Average	29	21.8
Very High	22	16.5
Very Low	4	3.0
Total	133	100.0

### Gender

The number of women is higher than the number of men, respectively 91 and 42 elements (Table 6).

**Table 6.** Gender

	Frequency	Percentage
Female	91	68.4
Male	42	31.6
Total	133	100.0

### Online meetings

Many workers participate in online meetings (78.6%), which can be explained by the need to keep in touch with their bosses for guidance and monitoring of work, the remaining workers (21.4% report not having the necessary conditions to participate in the online meetings, namely, computers with video cameras and the bandwidth are also one of the justifications indicated).

## 4.2. Statistical Analysis

### Satisfaction is the Same in Different Age Groups

To verify whether satisfaction is the same in the different age groups, a simple parametric analysis of variance (OneWay ANOVA) was performed, based on the age variable, grouped into classes and the autonomy variable, as explanatory variables.

Grouping by classes allows better visualization of the distribution of workers, although there may be some loss of information. In this case, the necessary conditions for performing the One Way Anova was fulfilled: a) the distribution of the quantitative variable (DV) must be normal, in each group defined by the nominal variable; b) the variances, in the different groups, must be the same, verifying the assumption of homoscedasticity; c) the samples are independent.

Moreover, the dependent variable is Satisfaction, and the independent variables are the Age Groups, driving to the following hypothesis:

H0: In average terms, satisfaction is the same in different age groups.

Ha: In at least one of the age groups, the average satisfaction is different.

To begin the analysis was crucial to perform the test for normality - the Kolmogorov-Smirnov adherence test.

The probabilities associated with the test value for each age group, is greater than 0.05, so the hypothesis of the sample coming from a population with normal distribution is not rejected  $p_1 = 0.3889$   $p_2 = 0.5280$   $p_3 = 0.8963$   $p_4 = 0.5032$ .

There was performed a Levene test and the value of the test is 1.7703 with an associated significance of 0.161. The null hypothesis (H0) is not rejected, as the assumption of homoscedasticity is verified, that is, in average terms, satisfaction is the same in different age groups.

The decision based on a probability associated with the test value of  $p = 0.0031$  ( $p < 0.05$ ), determines that H0 is rejected, and for this level of significance, it is accepted that the average degree of job satisfaction is at least different in an age group.

Also, it was performed a Scheffé test (table 7) which allows the identification of groups whose means differ significantly, and the results are a) the group 4 average differs significantly from groups 1 and 2, and the mean of group 3 differs significantly from groups 1 and 2.

**Table 7.** Age Group/ Mean Satisfaction

Age Group	Mean Satisfaction
< 25	2.1250
25 – 34	2.3478
35 – 44	3.1042
>= 45	2.9444

**Correlations between Satisfaction and Autonomy, WORK-COND, Technological Specialization, Productivity, and Quality of life**

Analyzing the correlations between Satisfaction and Autonomy, WORK-COND, Technological Specialization, Productivity, and Quality of life at work to measure the strength and direction of the association between the variables.

The goal was to use correlation coefficients to describe the reliability and validity of the data, as these are reliable or valid if the coefficients are statistically significant: -1 Perfect negative correlation; 1 Perfect positive correlation. The hypothesis being tested in table 8 is H0: There is no correlation between variables (table 8):

**Table 8.** Pearson's Correlation Coefficients

	Autonomy	Work Conditions	Technological Specialization	Productivity	Quality of Life
Work Satisfaction	0.7316	-0.5617	0.4594	0.3894	0.2317
	P=0.000	P=0.000	P=0.000	P=0.001	P=0.054

Except for the variable Quality at work, all others correlate with Job Satisfaction. ( $P \leq 0.005$ , so the null hypothesis is rejected): a) Autonomy increases, Satisfaction increases - Strong correlation; b) WORK-COND increases, Satisfaction decreases -

Average correlation; c) correlations between Technological Specialization and Productivity with the Satisfaction variable are positive but weak; d) Quality of Life at Work is not correlated with Satisfaction ( $p = 0.054 > 0.05$ ).

## 5. Discussion

Observing the last decade, it is verified that hardly a science, technique, or area evolved as quickly as the Information and Communication Technologies, managing to keep its real application, not only for the technician or specialist but also for the private user, in your home and workplace, which presents information as one of the most precious assets for companies at the end of this millennium.

For this reason, technical progress in information and communication technologies does not leave anyone indifferent. The repercussions caused at an economic level, even those that most people today consider natural, such as withdrawing money at an ATM, solving a business through a mobile phone, or managing your investments through a telephone bank available 24 hours a day were, just a decade ago, very difficult situations to materialize.

Socially, a very strong technological dependence is created, sustained either by the work activity of individuals or by their needs and habits. This situation is, at the same time, driving new technical progress, at a time when accelerated technological change has become a constant in our lives.

On the other hand, the labor market is becoming increasingly diversified and decentralized (use of labor from countries where wages are lower or where the talents needed for business aspirations exist), conducive to the adoption of new ones. forms of work organization, which is progressively developed further away from the bureaucratic enterprise. A new concept of work arises, digital remote working, where people contribute with their values, being part of teams based on partnership, supported by group work, by greater autonomy and accountability of individual.

## 6. Implications for Policy

Companies should be encouraged to embark on digital remote working situations, through the adoption of measures that must be precisely targeted in terms of regions or sectors of activity.

The problem related to digital remote working is being studied by the European Commission, through the scope of its general directorates and in connection with the Union Centers and Employers' Confederations of the respective Member States. The primary objective is the issuance of directives on digital remote work, considering aspects such as those presented below:

- a legal and social framework to accelerate the development of digital remote work.
- promoting initiatives that raise awareness about the opportunities it provides.
- establish a framework for achieving broad social consensus, in Europe and a wider international context, on how to implement cross-border digital remote work.

- encourage the Member States to clarify the legal and fiscal situation of the different forms of digital remote work.
- encourage the Member States to promote digital remote working experiences.

In Portugal, a way to reduce regional asymmetries may be to resort to the implementation of digital remote work centers in rural regions, leading to compensation for isolation and the periphery of these regions. In the framework of the EU, peripheral regions can fit into regional development projects.

The role to be played by the EU will be to coordinate Member States' legislative experiences to avoid discrimination against foreign and third-country workers, as well as legislative obstacles to cross-border digital remote working.

On the other hand, for the Portuguese state to facilitate the development of digital remote work, it must adopt some policies that promote initiatives to raise awareness about the opportunities that digital remote work offers and encourage the promotion of experiences.

Although the difficulty of defining policies on digital remote working is understandable, as the concept itself is still not clarified at many levels, the Governments are defining measures to regulate digital remote work.

However, it is necessary to study all potential digital remote work situations, so that they do not lead to increased job insecurity and reduced quality of life, but development, especially at the regional level. To this end, the governments must define strategies that consider the changes that will occur in societies.

Analyzing the entire context surrounding digital remote work has the potential to open paths to employability and is a way of enhancing the fight against unemployment.

## 7. Implications for Organizations

The implementation of digital remote work in the current situation of Public Health is the best solution, but it is important to consider some critical success factors:

- Worker's Personality - Digital remote work is not appropriate for everyone. For example, poorly motivated people need the discipline of fixed working hours and face-to-face supervision. Also, for people entering the business world for the first time, a conventional work environment is beneficial. For other people, “going to work” is an important part of their lives and the workplace is where they establish their social relationships.
- Workplace - Many homes are not prepared to be used as a workplace. For example, in cases where the digital remote worker needs concentration to develop his work.
- Company Characteristics - some companies have management systems and cultures that do not adapt to the flexibility that digital remote work requires. Many managers do not feel confident in their ability to develop management/supervision activities at a distance, others do not believe in the performance of their subordinates and think that productivity decreases.
- Tasks - not all tasks can be performed in digital remote work situations. Some require a constant interaction of various resources (human or material) or benefit from synergies of joint supervision. In some cases, the team spirit and internal

motivation developed by the leaders who participate in person in the teams is an advantage.

- Digital remote Supervision - workers lose some benefits of telecommuting when subjected to electronic digital remote supervision systems.
- Isolation - digital remote workers suffer from the isolation caused by their situation, if the managers, due to these circumstances, do not provide them with opportunities to attend training courses and participate in company meetings. These factors will have a direct connection with the quality of work and, ultimately, with career development.
- Hygiene and Safety at Work - working conditions, especially unfavorable ergonomic conditions, will impair the performance of the worker in the short term.
- Information Security - in digital remote work situations, not only security issues arise (in terms of reliability and integrity) but also intellectual copyright.
- Real Estate and Consumption Market - lower demand for real estate to settle companies and decrease consumption in small commercial units in the company's surroundings.
- Conflicts in the Company - conflicts due to the lack of information regarding the selection of digital remote workers and due to the decrease in personal contact between physically distant colleagues.
- Insufficient Technical Support - lack of equipment, poor maintenance of equipment, lack of technical support for the user.

However, none of these aspects are barriers to digital remote work. They only illustrate the possibility of difficulties arising in its implementation process if a corrective action plan is not created, supported by appropriate business management attitudes.

Specifically, there are some dimensions that should be considered for future maintenance of digital remote work situation:

### **7.1. At Organizational Level**

- Cost Reduction - overhead and space costs (work can be developed where the skills are, minimizing costs). Recruitment costs can also be reduced, as well as costs related to high turnover rates and costs related to the relocation of workers can be eliminated.
- Increased Productivity - productivity increases between 10% and 40% (according to studies by Jala, Inc.) mainly due to greater time optimization (less time wasted on trips, fewer interruptions due to the company's confusing environment).
- Increases Motivation - digital remote workers respond to the trust they are given, adopting a more independent work style and greater motivation.
- Competence Retention - attracting and retaining the best, with more talent and training, who might otherwise not be available (for example, when the family



needs to move to another region in the same country, workers who want to take a break) in their career can continue to work on a part-time basis).

- Organizational Flexibility - in a process of restructuring the company, digital remote workers do not need to move from their homes and change family life. Also, at the level of work teams, these can be made up of the most competent and experienced elements concerning a given project, regardless of their geographical location or the difference in time zones and spending a minimum of travel costs.
- Flexible Workers - In seasonal activities, digital remote workers can work a required number of hours without having to waste time on trips. Extension of working hours according to the needs of customers.
- Greater Immunity to External Disorders - companies with effective digital remote working programs have greater immunity to external disturbances, such as transport strikes, bad weather conditions or natural disasters.

## **7.2. At Individual Level**

- Reduced Travel Time and Costs - it is the most obvious benefit and, for many digital remote workers, the first motivating factor.
- Better Employment Opportunities - these are not limited by distance.
- Increased Level of Independence - workers gain confidence in themselves as a result of their ability to solve problems.
- Minor Disorders in Family Life - reduced need to move to other regions in search of better career opportunities.
- Better Management between Work and Family Life - you can spend more time with the family and participate more in family life activities. About work, you can concentrate more easily, developing higher quality work.
- Participation in Local Community Activities - time recovered from travel can be used to perform functions at the community level, such as running a club or participating in an association.
- Time Flexibility - a flexible approach to digital remote working can mean individual freedom to start and finish work according to your pace (some people are more productive at night and others are not).

## **7.3. At Social and Economic Level**

- Reduction of Urban Traffic Flows - reduction of traffic in urban centers and “rush hours” in accesses, as well as the need for less space for car parks in cities.
- Reduction of Pollution Levels - with the reduction of traffic in cities, pollution levels will necessarily go down.

- Broader Employment Market - Digital remote working will allow people living in areas with high unemployment rates to have access to employment opportunities regardless of their location.
- Access to Work for People with Specific Difficulties - disabled people with mobility problems, single parents whose mother or father needs to be at home with their child, people with responsibilities for the elderly, or with sick family members.
- Regeneration of the Economy - digital remote working as an element to be considered in economic policies at the regional and national level.

Like any technology or technique, digital remote working only benefits when framed by certain business actions and circumstances of the environment. Thus, it is necessary to consider some determining factors for the success of a digital remote working situation.

## 8. Conclusions

Despite the constraints (resistance of top management, organizational culture, autonomy, and flexibility of workers, among others) that existed before the health and socioeconomic crisis caused by the Coronavirus pandemic, digital remote work is a given in the life of public organizations or private, and workers with reflections at various levels in society and particularly in professional fulfillment and employee satisfaction.

The development of information and communication technologies in recent decades has contributed exponentially to the radical change in habits and ways of acting, both in companies and their employees and in the social life of everyone, with implications at different levels for all stakeholders active in these changes: organizations, their employees, and managers, as well as for official institutions and their policies.

In this way, governments and official institutions must educate and sensitize companies to the benefits and potential of digital remote work. Encourage, through appropriate and guiding legislation, the use of digital remote work in different sectors of activities and in the regions where companies are located. These are already a concern of the European community where Portugal is inserted and where digital remote working opportunities are presented as a way of reducing regional asymmetries and promoting the development of regions that were left behind when workers had to move to meet the needs of professional achievement.

Among other aspects, the appropriate legislation should study and regulate the different aspects of digital remote working to avoid precarious work and a reduction in the quality of life of workers. It should also promote the empowerment of citizens who can contribute their work to society and who do not have the appropriate training to face these challenges. Digital remote working has the potential to pave the way for employability and is a way of enhancing the fight against unemployment.

Despite these benefits, the implementation of digital remote working poses challenges not only for governments but also for organizations at another level.

Organizations, where management systems allow such implementation, must be prepared for the difficulties that may arise and must consider in the implementation of digital remote working some critical success factors, namely the personality of each worker, the conditions for workers in their homes, which the tasks that suit this type of

work, among others. Consideration should also be given to the possibilities of social interaction that work can provide, such as training actions and company meetings, to promote the quality of the overall work carried out and the satisfaction of its workers. Good communication and good technical support are essential factors for the support of digital remote working and the fulfillment of associated objectives.

Organizations can also have benefits in terms of cost savings associated with physical space for offices and overheads, on the one hand. On the other hand, digital remote working increases the motivation and productivity of workers due to the organizational flexibility that this type of work provides, making the adaptation of family life more balanced and the time spent on travel practically non-existent. It also provides the possibility of carrying out seasonal projects, with the adaptation of workers to these projects, and is more protected from external disturbances than centralized office work.

Digital remote working also brings social and economic benefits as the imposition of workers to take off to their company offices, normally located in city centers, greatly decreases, providing an effective reduction in pollution levels as it also reduces the traffic generated previously for those displacements. This form of work also offers the possibility of combating unemployment by providing access for people with specific difficulties and access for people from areas with few jobs offered to other areas where they may be needed without having to move.

For individuals, the advantages are many, starting with the reduction of travel costs and times, as the first motivating factor for adherence to this type of work, as well as the opportunity to access better jobs. Digital remote working increases workers' confidence by the level of independence in problem-solving. It improves family life as long as the physical and temporal spaces of each situation are respected, allowing the availability of schedules for other activities, given the flexibility of hours to meet the proposed objectives.

However, like any technology or technique, digital remote working only benefits when framed when business actions and surrounding circumstances are respected and implemented. It is crucial to establish the determining factors for the success of a digital remote working situation and for the satisfaction of the people who make up the organizations.

Thus, and according to the analysis carried out on the data collected to support the conclusions of this study, the degree of satisfaction of Public Administration employees is influenced in different ways by the influencing factors studied: autonomy at work, conditions at work, and income. However, regarding the factor of quality of life at work, this link has not been established.

However, the average degree of job satisfaction varies according to the different age groups, with employees aged or more having an average higher satisfaction than employees whose ages vary between and the beginning of their working life.

Thus, it was possible to conclude that satisfaction increases positively and strongly with autonomy at work. Technological specialization and productivity still with a positive influence, but with low intensity contribute to the satisfaction of Public Administration employees.

Working conditions also negatively influence satisfaction, although at an average intensity.

This reflection opens a door for the development of the study of the different factors and circumstances that can influence the satisfaction and performance of workers in digital remote working situations.

Some of the limitations of our study are the low sample as it conditionate generalization. The findings may be dependent on the context of the respondents, creating difficulties to be considered as a reference in other contexts influenced by culture, technological development, and management practices.

The projection of implications in the medium and long term will involve the different stakeholders, in a joint effort to continue the adequate and sustainable development of digital remote work, for all stakeholders – Organizations, Workers, State and Society.

Digital remote work is a fact that is present in the day-to-day lives of organizations, public or private, and workers, which is reflected in the various levels of society, particularly in the fulfillment and professional satisfaction of employees and in the balance and achievement of business objectives. with this new working method, which is only possible due to the development of information and communication technologies.

Most organizations no longer have available only the procedures and work structures established before the imposition of digital remote work, due to the Covid-19 pandemic. Organizational processes have been modified and an attractive factor for recruiting/retaining people is the hypothesis that the digital remote work model is available in organizations. This is a short- and medium-term implication, as workers want a better balance between their private and work lives and do not want to be dependent on physical offices, with rigid schedules and little flexibility for the necessary changes, which do not contribute to their professional and personal fulfillment and satisfaction. However, they need to have the minimum conditions to carry out their duties outside these traditional offices.

For both the short and medium term, governments need to improve existing regulations and adequately legislate these new ways of working. Whether for its citizens or for those who choose their territories to come to work, as in the case of digital nomads, for example.

In the medium term, companies whose operational processes can be supported by digital remote work should incorporate a sustainable hybrid system of remote work and occasional and scheduled trips to their employees' physical offices.

It is necessary to have a culture and mentality of delivering quality work, meeting objectives previously signed in the agreement and joint commitment between managers and workers. With computer security, with adequate tools, minimum conditions, and training.

Despite the difficulties that have arisen, digital remote work brings mutual benefits, and it is possible, in the long term, to work from anywhere, deliver quality work and achieve goals, as long as the necessary and appropriate conditions are met. Whether in an office in the middle of the city, at home, traveling or outside urban centers, working on this new concept of networking. With this new way of delivering work, it is possible to improve, in the long run, the costs of operations, services and the environment.

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