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Benefits and Challenges of Teleworking for a Sustainable Future: Knowledge Gained through Experience in the Era of COVID-19

Ioanna Simeli, Georgios Tsekouropoulos, Anastasia Vasileiou * and Greta Hoxha

Department of Organisation Management, Marketing & Tourism, International Hellenic University, 57400 Thessaloniki, Greece; simeli@ihu.gr (I.S.); geotsek@bua.teithe.gr (G.T.); anvasileiou@del.auth.gr (A.V.); iwannachotza@gmail.com (G.H.)

*   Correspondence: anvasileiou@del.auth.gr

Abstract: Since the outbreak of the Covid-19, working from home has become the norm for millions of workers worldwide. The current research focuses on the benefits and challenges of teleworking in the administrative sectors of greek healthcare units, with a view to harnessing the knowledge gained through experience, in order to create the frame for sustainable behaviors. Anyways, the implementation of teleworking requires complex and dynamic changes in technical and behavioral aspects. Therefore, a systematic review was also conducted to identify the relationships between telecommuting and organizational behavior, with the aim of achieving sustainable development in businesses. Moreover, an important positive aspect of telework that emerged from this literature review appears to create opportunities for potential direct or indirect linkages between telework and many SDGs areas, based on the fact that telework appears to be a community-friendly form of work. In summary, this research strongly suggests that leaders facilitate telecommuters to adopt green practices and volunteerism that can consequently contribute to the SDGs. However, in order to meet the challenges arising from unprecedented times, the leaders of the organizations will have to redesign their policies, while the states will have to focus on guaranteeing the rights and freedoms of the workers.

Keywords: telecommuting**;** SDGs; organizational behavior; sustainable behaviors; living & working environment; leadership 4.0; digitalization

1. Introduction

Since the term *telecommuting* was first coined in the 1970s, scholars and practitioners have debated the merits of working away from the office, as it represents a fundamental shift in the way organizations have historically operated105.

The year 2020 was an unplanned milestone in the progress of digital transformation. Due to the social distancing required due to Covid-19, many workers have been led to telecommute and take advantage of new technologies even in administrative areas of hospitals. In the aftermath of the global health crisis, the world has finally begun to open its doors again and now faces the new realities of a new era. As telework and hybrid work continue to increase 250, it is crucial to investigate the long-term sustainability impact of these options.

At the same time, businesses and organizations were given the opportunity to adapt their business models to the requirements of the new era. In this context, questions such as the following arise:

What are the implications of these rapid digitalization technological changes in terms of teleworking?

Could telecommuting have a future as a good practice for achieving sustainability?

What is the role of leadership and organizational behavior management in the post-Covid-19 era?

Through which mechanism can teleworking have positive results from the perspective of the individual, the organization and society?

The purpose of this paper is to investigate the challenges and perspectives of leadership in the era of digital transition through the case study of telecommuting among employees in administrative positions in greek health care units during the Covid-19 era. In particular, the implementation of teleworking requires complex and dynamic changes in technical and behavioral aspects. Therefore, it will analyze the changes in question that permeate all areas of life, pushing companies and organizations to undertake extensive transformation processes and focusing on the development of new leadership skills in the new era.

While conducting the literature survey, we also identified that studies on the relationships between telework and sustainability have increased significantly in recent years. However, the final sample of relevant literature was still relatively small. For this reason, a systematic review was also carried out to identify the relationships between teleworking and organizational culture, with the aim of achieving sustainable growth in companies.

Many authors consider that a research in this direction makes a significant contribution to the academic body of knowledge in an area that intersects a wide range of economic, social and environmental interests. It is further intended that this paper will contribute to informing practitioners, leaders and policy makers who seek to better understand the wider implications for long-term telework and help them to mitigate any negative consequences, while at the same time it would be reasonable to promote the positive aspects of teleworking. In any case, the hybrid model that is expected to prevail requires a rethinking of the way work is performed, coordinated and regulated at both corporate and societal levels 40.

1.1. Impact of Teleworking

Remote work is a type of flexible working arrangement that allows an employee to work from remote location outside of corporate offices. There are several different terms used to define this concept. Telework and telecommuting are used interchangeably along with other terms such as also work-from-home (WFH), e-work, flexible work, home office, home-based telecommuting, mobile work and virtual workplace 35,85,86.

Remote working has exploded in the year 2020, with estimates suggesting that almost 40% of people employed in the EU started teleworking fulltime as a result of Covid-19, according the European Commission 81. In other words, this year changed the world economy and the world of work in an unprecedented way. In addition, the mass adoption of telecommuting has been a vital business shift since the virus outbreak. The sudden demand for working from home has given significant impetus to the digital transformation of the workforce 90.

According to Beňo 7 provides more positive than negative evidence, as more than half of the studies cited flexibility, productivity, efficiency and satisfaction as advantages. Nevertheless, in many studies the results are contradictory and many implications remain unknown regarding how it affects the employee experience, which can be considered one of the paradoxes of telecommuting 102. In any case, this way of working is not for everyone, as the perception of difficulties leading to the implementation of teleworking was influenced by socio-demographic characteristics.

Moreover, the impact of telecommuting can be multifaceted 17,38:

1. Individual
2. Organizational
3. Social

New data, technological developments and a globally connected world make it clear that telecommuting will play a critical role in the future of the workplace.

Based in this context, the following hypotheses were established.

Research Hypothesis 1. *The perception of difficulties during COVID-19 that led to the implementation of teleworking were heterogeneous by sociodemographic characteristics (e.g. gender, age and education level).*

Research Hypothesis 2. *The educational level of employees affects their intention and attitude towards teleworking.*

1.2. Challenges to the implementation of telework

Teleworking during the pandemic poses additional challenges. New home-workers are probably not used to being isolated from their co-workers and may not have a home office or work-friendly area. Besides, getting virtual meeting technology to work well is not always easy. It just seems like another chore, which however is necessary to social distancing. With other family members potentially also at home, including children or a partner, avoiding distractions and interruptions can be nearly impossible. This challenge concerns especially women due to parenting 97.

Teleworkers may not have a home office or work-friendly area. To find privacy, employees might find themselves in the awkward situation of conducting meetings and their duties from their bedrooms or kitchens. And getting virtual meeting technology to work well is not always easy. All these changes can originate anxiety, fear of job loss, anger, sadness, or frustration 99100.

Based in this context, the following hypotheses were established.

Research Hypothesis 3*: The educational level of workers affects having the necessary equipment and space at home, as well the required technological support for the implementation of teleworking.*

Research Hypothesis 4: *There are factors of organizational stress that can predict the acceptance of sustainable development through telework.*

The potential factors associated with teleworking in the COVID-19 era are categorized as follows 99:

1. Environmental: the economic uncertainty that accompanies the health crisis is a stressful factor, due to the fear of losing a job. Simultaneously, a technological change is taking place.
2. Organizational: with the assumption of responsibilities, the work role of teleworkers is overloaded, while there is a lack of social support, space problems and distraction.
3. Personal: this is the case of conflict of family-professional responsibilities.

As a consequence of work stress, the following symptoms are observed, which impede efficiency and productivity:

- Physiological: e.g. headaches, high blood pressure, chronic diseases.
- Psychological: eg job dissatisfaction, depression, uncertainty about future prospects due to pandemic, insufficient conditions for well-being.
- Behavioral: e.g. nervousness, absenteeism.

Regarding the responses to job dissatisfaction of the teleworker can be categorized as follows 82:

- Exit.
- Voice.
- Loyalty.
- Neglect.

The above-mentioned conditions may have a negative impact on business in the following aspects:

1. Decreased productivity: as a result of low performance and deviant behavior at work due to lack of job satisfaction.
2. Low degree of internal business communication/cooperation: given the work inclusion experienced in teleworking conditions, there is a high possibility of misunderstandings within the company and time delays.
3. Poor services/products quality: as a consequence of the above problems such as low morale and the increase in the number of errors, the project provided may not meet the specifications of the company 98.

Regarding the organizational measures that would be proposed in the management of the stress of the teleworker in our case are the following:

- **Training**: training in the form of seminars can help support and improve self-efficacy.
- **Employee involvement**: the employee must be involved in matters related to his/her job performance (eg making decisions or submitting proposals for improvements).
- **Organizational communication**: due to the isolation of the individual it would be useful to increase the formal organizational communication in order to properly manage issues and reduce stress.
- **Leave and wellness programs**: for exhausted employees, it is important to take leave for their rejuvenation and to have access to psychological support programs.

At least, sustainable development is inextricably linked to employee participation, giving particular importance to determining attitudes and behavior in the workplace. For this reason, it must be emphasized that employee engagement practices are, in their purest form, exercises in innovation, but also commitment at the same time. Therefore, to attract employees and benefit from it, the organization must invest not only in meeting the needs of employees but also in engagement practices in order to drive and sustain growth 58.

1.3. Telework and Sustainable Development

The Global Goals and the 2030 Agenda for Sustainable Development is a chain of reflection, commitment and concerted action that seek to end poverty and hunger, realize the human rights of all, achieve gender equality and empower all women and girls, and ensure the sustainable protection of the planet and its natural resources 87. Sustainable development is a dynamic and constantly evolving concept, and refers to meeting the needs of the current generation without jeopardizing the future of the next 6364.

More specifically, social sustainability is about the quality of an organization's relationships with its stakeholders. In this context, teleworking can be seen as a way of working that can be used to propose organizational transformations aimed at the seventeen sustainable development and social sustainability goals set by the United Nations. The specific social, economic and environmental objectives aim to improve human well-being and environmental health 15,41.

In particular, the positive aspects of telecommuting include aspects related to the long-term impact on sustainable development issues. The scoping review of Moglia et.al. 45 identified the link between telecommuting and sustainability outcomes from many previous academic studies. In particular, there seems to be a connection with the following 9 SDGs 66:

- No 3. Ensure healthy lives and promote well-being for all at all ages;
- No 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all;
- No 5. Achieve gender equality and empower all women and girls;
- No 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;
- No 9. Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation;
- No 10. Reduce inequality within and among countries;
- No 11. Make cities and human settlements inclusive, safe, resilient and sustainable;
- No 12. Ensure sustainable consumption and production patterns;
- No 13. Take urgent action to combat climate change and its impacts.

More specifically, diverse impacts and research opportunities were identified across a range of areas on the impacts of the SDGs with a greater impact on goals No 9-3-8-11-13 and relatively smaller impacts on goals No 5-4-12-10, in line with the above literature review. The increased rates of teleworking may therefore contribute positively to the SDGs related with e.g. good health and well-being, gender equality, reducing social inequalities, mitigating the effects of environmental issues, as well as challenges for the future in sustainable cities and resilient communities 45.

Based in this context, the following hypothesis was established.

Research Hypothesis 5. *The impact of telecommuting during the COVID-19 crisis is perceived in various aspects (social, economic, environmental) of the lives and careers of hospital workers.*

1.4. Telework and the frame for sustainable behaviors

Notably, there is another positive aspect of telework, which appears to create opportunities for potential linkages between telework and other additional SDG areas. According to Kamerade & Burchell 34 telecommuting appears to be a community-friendly form of work, as a counterbalance to the position that it leads to social distancing. The results show that telecommuters tend to report involvement in both volunteer/philanthropic and political/union activities more than non-telecommuters, after controlling for demographic and labor market variables.

More specifically, the specific study 34 shows that telecommuting can make volunteering possible, since working from home and avoiding a commute gives professionals time to give back to their communities. Therefore, volunteering related to telecommuting can, for example, contribute either to the fight against poverty, or to ensuring food for the hungry, or to caring for the homeless, or to adopting abandoned pets, or to getting involved in solving environmental problems.

Similarly, the contribution of volunteering to the successful management even of phenomena such as an energy transition can be mentioned, given that such changes require the acceptance and support of citizens. Active participation in the community and the local energy system is therefore important. For instance, rather than participating as simple consumers of energy, community members can now take on a number of different roles within the energy system, as they are able to influence the ways and extent to which energy is produced. Moreover, the importance of civil society groups for transformations towards an environmentally friendly energy system has been emphasized in countries such as the UK, Germany and the USA 1332.

In this way, telecommuting can act as a framework for promoting sustainable behaviors among citizens-teleworkers, who offer voluntary work to solve social problems. Therefore, since volunteering is an inherently multidimensional phenomenon 2728, it can be said that teleworking can be directly or indirectly linked to solving problems related to the remaining 8 areas of the SDGs, which are the following 66:

- No 1. End poverty in all its forms everywhere;
- No 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture;
- No 6. Ensure availability and sustainable management of water and sanitation for all;
- No 7. Ensure access to affordable, reliable, sustainable and modern energy for all;
- No 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development;
- No 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss;
- No 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels;
- No 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

At the same time, according to Jones (2010), employees could respond to the socially responsible business practices of their company. These hypotheses derive from organizational identity and social exchange theories and refer to company volunteering programs, through which employees could spend volunteer time during their paid work hours. The effects of these socially responsible business practices appear to be linked to the benefit of companies and their employees. In other words, telecommuting could potentially act as an opportunity for volunteering for the employee (e.g. contributing to sociality and well-being 26), while simultaneously there could be a benefit for the image of the company, as a corporate social responsibility that aims to achieve the SDGs.

In short, teleworking as a framework of sustainable behaviors may potentially contribute significantly in a direct (as suggested in the literature review of Moglia et.al. 45) or in an indirect way

(as mentioned by Kamerade & Burchell 34 to the achievement of all of the United Nations SDGs, for the benefit of humanity.

Therefore, the framework of sustainable behaviors could concern most workers in teleworkable sectors. After all, during the covid-19 crisis, the majority of them showed a willingness to cooperate for the common good, regardless of socio-demographic factors. A human characteristic could be considered the intention to cooperate, help each other and show compassion catastrophe (in other words to show understanding and extending prosociality under crisis89), even at personal cost 88 (eg sacrificing free time for volunteering).

Based in this context, the following hypothesis was established.

Research Hypothesis 6. *Employees' intention to telework during times of crisis in order to support the needs of hospital administrative departments is not influenced by sociodemographic factors.*

1.5. The role of leaders on remote work

The sudden need to teleworking is driving the digital transformation of the workforce and the evolution of the work environment at unprecedented speed 90. Furthermore, it is leading to radical changes in business models, organizations and work design. For managers, this means that they increasingly have to relinquish power in favor of more democratic models of leadership 9594,93.

This fact goes hand in hand with the empowerment of their employees for self-action and responsibility, through a behavior oriented towards human relations, mentoring and networking. In addition, digitization leads to changes in the skills required for management tasks, such as agility, willingness to change and remote leadership. Digitization also means that employee performance is more transparent to managers and that presence in the workplace can be used less as a means to performance today, since interest in exploiting digital workplaces is growing. Therefore, result orientation plays a key role, while the right implementation of smart technologies in the workplace is required so that the business benefits of digital workplaces bring positive results 91. Also, to prevent workers from being hindered in their productivity by the increasing pressure in the context of digitization, leadership should focus on the health and well-being of teleworkers 72.

Moreover, a proposed type of leadership of the new era is that of transformational leadership, thanks to the various advantages of its application so far. As a trust-building concept it can successfully shape change processes, creating commitment from employees. On the contrary, obstacles to the implementation of transformational leadership must be pointed out, such as leadership distance, which increases with digitalization. Since the digitization of the world of work places new skill demands on managers, the established model needs to be re-evaluated and supplemented in a different background. The addition of the model leads to a focus on future sustainability and the SDGs and can ideally minimize some of the problem areas 7292.

In addition, from the managers' point of view, it is of prime importance to promote ICT (information and communications technology) lifelong learning (as it relates to telework and digitization) to keep up with the latest developments since they can act as one of the most important factors in achieving the SDGs in 2030 96.

It is noteworthy, however, that while in developed countries, regulation of telework is a common practice, this is not the case in some Asian countries (eg Indonesia, China), and where long leadership distance emphasizes on increased supervision and punishment among many workers and often is a preferred management style. Nevertheless, the existence of socio-cultural barriers in these countries can hinder the utilization of the advantages of teleworking 25.

2. Literature Review and Conceptual Framework

As various studies have attempted to determine whether telecommuting is ultimately a positive or a negative thing for many years, the findings are often contradictory and much remains unknown about how it affects the employee experience 102. In fact, some researchers have labeled this "gray zone" as the "telework paradox of mutually incompatible consequences for employees"14103. If telecommuting enhances perceived autonomy and reduces work-family conflict, this, in turn, will

have a positive impact on work attitudes, performance, and stress. At the same time, if telecommuting harms relationships with colleagues and supervisors, this would mean that the positive effects mentioned above come at the expense of social bonds 14103 and by extension the achievement of SDGs. Therefore, the different perspectives of the individual, the organization and society will then be presented in the form of a literature review (see Table 1).

Table 1. Advantages (+) & Disadvantages (-) of Telework.

Part 1: The individual/teleworkers' perspectives	
+ Autonomy / independence 22. + Flexible working hours 221967. +Improving time management, professional flexibility 22. +Saving time and travel expenses 222684. +Flexibility in organizing care for family members/relatives 22402073. + Job satisfaction 38869. + Personalised workspace and chosen silence: it concerns workers with their own workplace, which promotes well-being, concentration and few distractions. It allows you to work from anywhere 1242. + Reduced stress from arriving late for work - Less travel time will reduce travel stress 207440. + Teleworkers were able to develop greater social support relationships with certain colleagues, especially other teleworkers, while simultaneously allowing them to distance themselves from negative work relationships 104.	- Reduced sense of belonging 22. - Professional and social isolation, lack of face to face, in person interactions and emotional support from colleagues, negative effects on co-worker relationships, less visibility, observation 2231421479. - Hyperavailability Syndrome- Work-life imbalance - Employees struggle to separate work and home life22764031. - Need for self-discipline & motivation 2231. - Lack of professional support 2280. - Performance Control, loss of data security and equipment accountability 3125. -The increased use of electronic monitoring and surveillance methods by employers can increase employee anxiety and stress levels and increase the invasion of teleworkers' privacy 4210723. - Legal issues, loss of legal rights (e.g. teleworkers' right to log off, unpaid overtime hours 245. - Reduced employment opportunities - Teleworking negatively affects career aspirations due to inadequate managerial assessments 22677475. - Lack of skills - Inadequate training 4084. - Technostress, digital exhaust, technology dependence and sedentary life as impacts on workers' mental and physical health and safety 42,49939. - Long working hours and a lack of adequate work space and ergonomically adapted equipment and furniture at home can also increase risks to teleworkers' physical health 42,499.
Part 2: The organizational perspectives	
+ Increase in productivity 223178. + Secure retention, strengthen organizational commitment and improve performance within the organization 78. + Increased supply of human resources 2231. + Significant reduction in absenteeism and delays 2231. + Savings on direct costs 2231. + Increased motivation and satisfaction 2272. + Creation of a positive corporate image 22. + Reductions in office space requirements, capital + Retention of rare skills and talents 3172.	- Implementation difficulties for centrally managed organizations 2272. - Investments in training and new methods of supervision 2272. - Challenges for managers 2272. - Potential damage to engagement and identification with the organization due to complex communication 2272. - Changes in working methods 2272. - Costs associated with moving to teleworking 22. - Legal issues 2231.

	- Internal HR Policies - If these policies are not designed and implemented, employees will only depend on the management support 2438. - Difficulties in selecting suitable work activities and people. -Teleworking may apply to some employees 222073. - Loss of data security and equipment accountability 31.
Part 3: The societal & SDG perspectives	
+ Reduction of environmental damage223110641. + Reduce traffic/congestion 223110641. + Solutions for population groups with special needs or health problems 22. + Reduces discrimination (i.g. gender, sexual orientation, religion, skin color or nationality). Perceived discrimination may be reduced since telecommuting, by definition, reduces physical, face-to-face interaction 443674. + Saving of infrastructure and energy 3110641. +Regeneration for rural or marginal areas. Through Internet access and the trend of digital nomads, a town could get an economic boost 624210. +Benefits for the family. Parents can prioritize family and have more time for their children or themselves 20237340. +Health living (i.e. lessens fast food consumption) 3754. +Telecommuting appears to be a community-friendly form of work, because telecommuters tend to report involvement in both volunteer and political/union activities 34. +Benefits the military spouse population, which is an underutilized and underemployed group of educated or experienced professionals. Due to their frequent movements and need for flexibility, many remain unemployed 3116. +Extends career beyond retirement. It also allows retirees to maintain their savings while remaining professionally and physical active in giving back to their communities and families 6740. +Improves Public Health as it can help keep people healthy (e.g. during Covid-19) 849.	-Social distancing 22. -The existence of socio-cultural barriers (e.g. particularly in autocraticasian societies) may hinder the utilization of the benefits of teleworking 25. -Home energy consumption patterns may offset the benefits of teleworking[45,6]4247. -Dependency on technology 42. -Effects on the mental and physical health and safety of workers may have an impact on society 42255045. - Women who telecommute from home also face increased risks of digital harassment and domestic violence 42. - Degradation of labor rights 45. - It can lead to further urban sprawl and gentrification that would undermine environmental benefits. 45. - Fragmentation of the workforce, individualization of employment relationships and the emergence of new inequalities in the labor market between those who can work remotely and those who cannot (e.g. because not everyone has access to broadband or the necessary equipment and space at home). These inequalities are closely related to socio-economic inequalities 42.

2.1. Individual / Teleworkers' perspectives on telecommuting

Many studies have sought to profile and distinguish the motivations of the teleworker, taking into account demographic characteristics and aspects such as gender, age, education, parental status, number of children, commuting time, disability status, health, occupation 456340. However, the effect of gender as a determinant of telecommuting preference remains undefined. In general, this option is chosen or appears to benefit female workers more often, since women in multiple roles (e.g. mother, wife, worker, homemaker) are usually absent from work more often than men. In addition, during telecommuting, fewer conflicts were observed between employees, as due to time flexibility they are rarely absent. They added that due to solving problems related to family obligations, they show more satisfaction and loyalty in relation to their organization 57. Furthermore, telecommuting seems to be preferred by certain age groups. For young workers who can easily use information and communication technologies (ICT), telecommuting has become a natural part of work, while for older workers it has become a form of postponing or staying after retirement 4067 (see Table 5-Part 1).

In opposition, the following can be considered as important negative aspects:: isolation, technostress, technology dependence and sedentary life as impacts on workers' mental and physical health and safety; hyperavailability Syndrome; Work-life imbalance 424993922764031.

2.2 Organizational perspective of telework

Factors such as improved productivity, improved monitoring of employee performance through digitization, reduced maintenance and operation costs in the workplace, and better employee attraction and retention are some of the benefits of telecommuting from the point of view of organizations.

On the contrary, various challenges for organizations are reported in research, such as the negative impact on the organization regarding the culture and the weakening of team spirit, lack of coordination and feedback between office workers and telecommuters, as well as the loss of time in extended online meetings 274059. Therefore, organizational changes are required to implement telework, a step that was not taken in numerous cases due to the implementation of telework forced and suddenly due to covid-19, as in the case of our study. These changes include issues such as training employees, providing equipment and support technologies to accelerate telecommuting, implementing a telecommuting program aligned with organizational culture, investing in security measures, implementing GDPR, and evaluating the features of work242659. In addition, the support of teleworkers (as they are the most important factor) at all levels (e.g. psychological, emotional, physical, technological), the strengthening of trust in order to develop capabilities is crucial for the success of the implementation of the telework project e.g. through the promotion of autonomy, self-motivation and self-organization of work for the employee 285940 (see Table 5-Part 2).

2.3. Societal & SDG perspectives of telework

In the literature there are many reports on the positive effect of telework on society and in particular as an action for the Sustainable Development Goals (SDGs). These challenges are related to issues such as global warming, travel or traffic times, natural disasters or the energy crisis, but also issues related to the possibility of teleworking for socially vulnerable groups of citizens (e.g. disabled, long-term patients, pregnant women) 73. In particular, it is considered that the above challenges can have a more positive development thanks to the possibilities offered by teleworking since the digital transformation is increasing 77. Further telecommuting is related to the transformation taking place in the form of the workplace due to the growth of jobs in various industries. These are related to ICT, education, art, design, utilities, scientific and technical services, as well as financial services, in which sectors telework seems to be easier to implement or more affected by telework. The pandemic has shown how important the application of telecommuting is to the management of crises, epidemics, natural and man-made mass disasters 45764052.

On the negative side, we should highlight the view that energy consumption patterns at home may offset the benefits of telecommuting. For example, telecommuting and associated energy use at home (e.g. for heating, cooking and lighting) may not reduce the energy used in the office (e.g. offices may continue to be heated and lit as long as before)25. Finally, telecommuting can also lead to greater (or more intense) use of digital technologies, which can, in turn, increase greenhouse gas emissions – currently data center and network infrastructure use account for 2 % of global greenhouse gas emissions6. Other important negative aspects could be: the dependency on technology42; the fact that effects on the mental and physical health and safety of workers may have an impact on society 42255045; Women teleworkers might face increased risks of digital harassment and domestic violence 42.

Important issues are also the degradation of labor rights 45 and the existence of socio-cultural barriers (e.g. particularly in authoritarian societies, where increased supervision and punishment among workers is observed)25, which can prevent the benefits of telecommuting from being exploited. Therefore, our case study is of interest as it concerns workers in healthcare administration who were forced to work remotely under the covid-19 lockdown (see Table 5-Part 3).

3. Materials and Methods

3.1. Research Questions

Quantitative research was chosen by using a questionnaire to conduct the research. Quantitative research is an important and frequently used way of collecting data, which allows examining the relationship between variables, as well as collecting a large amount of data 0. The general objective of the research is to investigate the attitude and behavior of employees in teleworkable sectors of greek health care units during the covid-19 confinement period. Based on the purpose of the research, the research design focused on the following research hypotheses, which are also illustrated in the following research model (see Fig.2).
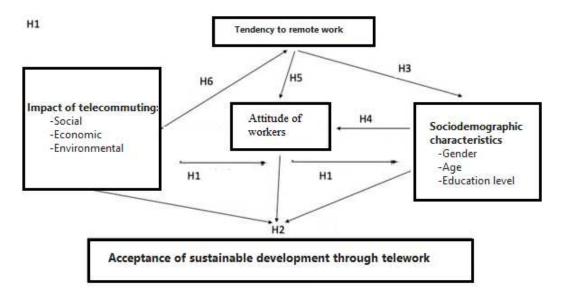

Figure 2. Research model.

3.2. Research Tool and Data Collection

The questionnaire was created in proportion to the objectives of the research, and it was based on previous research efforts of Baert et.al. 4, Raišienė et.al.57 and Schuster et.al.60. The types of closed questions mainly used are double choice, multiple choice, Likert scale and importance scale. The majority of answers to the questions are given on a 5-point Likert scale, so that the respondents can indicate the level that best represents them.

The questionnaires were distributed online to hospital administrators in Greece, at a time when teleworking was still very common due to the measures against the spread of Covid-19.The research took place in September and October 2021. Participation was voluntary and anonymous.

The questionnaire includes 23 questions (see Table 7) that are classified into 4 different groups, according to the purposes of the research, its objectives and the research hypotheses. The groups concerned the following:

1) Demographic data (Questions No.1.1-1.4 &No.2). The data of the questions No.1.1 to No.1.4 are categorical (nominal data) and concern the following: gender, age, education and years of service. While question 2 is open-ended and concerns the employment department in order to note the range of departments in which teleworking can be implemented in a hospital.

2) Questions about the circumstances that led to telecommuting and the intention for this choice (questions No.3-6).

3) Questions about the possible positive aspects of telecommuting and the impact on individual, organizational and societal level (questions No.7-12).

4) Questions about the potential challenges of telecommuting and the impact on individual, organizational and societal level (questions No.13-19).

Table 7. Structure of the Questionnaire.

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1) Demographic characteristics:

1.1. Gender
1.2. Age
1.3. Education Level
1.4. Years of service
2.   In which department do you work?

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2) The circumstances that led to telecommuting and the intention for this choice:

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3.   Have there been management difficulties in your hospital service during the time of COVID-19 that led to the implementation of telework?
4.   Before COVID-19 did you work remotely?
5.   Would you like to work remotely?
6.   During the time of COVID-19 did you work remotely?

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3) The possible positive aspects of telecommuting and the impact on individual, organizational and societal level:

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7.   Telecommuting can improve my job satisfaction and commitment to the hospital where I work.
8.   Telecommuting can improve my work performance.
9.   Telecommuting could reduce stress e.g. due to flexible working hours or reducing the spread of the virus.
10. Telecommuting could reduce burnout e.g. because of the time savings due to not commuting.
11. Telecommuting could reduce my days away from work (e.g. for special leave for parents and vulnerable social groups) because of the flexibility it offers.
12. Would you work remotely during a lockdown if you were given the option to support the needs of your department?

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4) Demographic characteristics: The potential challenges of telecommuting and the impact on individual, organizational and societal level:

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13. Telecommuting can lead to social and professional isolation from the hospital where I work.
14. Telecommuting gives reduced opportunities to share information.
15. Telecommuting presents difficulties in separating the boundaries between work and personal time.
16. Telecommuting can force telecommuters to work overtime to prove their worth and lead to burnout.
17. The operation of technologies and virtual meetings is not always an easy task.
18. As a telecommuter, do you have an office or co-working space in your home?
19. As a telecommuter, did you receive the required technology support from your hospital?

3.3. Sampling and Participants

Sample selection refers to the taking of a number of respondents from the wider community 0. In particular, the research population is the total of possible respondents that can be selected during the research process 0. In the present survey, the target population is the teleworkable / administrative sectors of greek health and welfare units, with the final sample of the survey being 125 respondents. The selection of the respondents was made randomly from a sampling frame of healthcare worker social networking groups. Table 4.18 shows the answers of the respondents regarding their demographic characteristics. Specifically, 87.2% were women, 12.8% were men.

Regarding their age, it is observed that 5.6% were 55+ years old, 75.2% were 41-55 years old, 11.2% were 31-40 years old and 6.4% were 25-30 years old and 1.6% reported being 18-24 years old.

4. Results

4.1. Results of Descriptive Statistics

First, the results obtained using Descriptive Statistics are going to be presented. Thus, for the categorical variables, the absolute and relative frequency for each of their categories will be presented. For the ordinal variables, in addition to the absolute and relative frequencies, the median value and the interquartile range will also be presented, two statistics suitable for describing Likert-type variables.

4.1.1. Demographic characteristics

125 people took part in this research, of which 87.2% were women, 12.8% were men (Table 4.1). Regarding their age, it is observed that 5.6% were 55+ years old, 75.2% were 41-55 years old, 11.2% were 31-40 years old and 6.4% were 25-30 years old and 1.6% reported being 18-24 years old.

Also shown is the distribution of the participants' responses regarding their education. More specifically, it is found that 43.2% participants were graduates of higher education, 33.6% were holders of postgraduate degrees, 19.2% were graduates of secondary education and 4% were holders of Ph.D.

For years of service, from the Table 4.1 below, the median was 17 years, with an interquartile range of 11 years.

Table 4.1. Demographic characteristics.

Distribution of answers regarding the sample (N=125):				
1.1. Gender				
	Frequency	Percent	Valid Percent	Cumulative Percent
Female	109	87.2	87.2	87.2
Male	16	12.8	12.8	100
Total	125	100	100	
1.2. Age				
18-24	2	1.6	1.6	1.6
25-30	8	6.4	6.4	8
31-40	14	11.2	11.2	19.2
41-55	94	75.2	75.2	94.4
55+	7	5.6	5.6	100
Total	125	100	100	
1.3. Education Level				
Secondary education	24	19.2	19.2	19.2
Higher education	54	43.2	43.2	62.4
Master's degree holder	42	33.6	33.6	96
Holder of a Ph.D	5	4	4	100
Total	125	100	100	
1.4.Years of service: Median=17.00 . Interquartile Range: 11.00				

Regarding the employment section of the sample, the Table 4.2 shows that the majority of participants were administrative employees of many different hospital departments (32.8%). The departments with the highest percentage were secretarial (32%) and accounting employees (24%), while HR department (6.4%) and IT employees (4.8%) also had comparatively high rates of telecommuting.

Table 4.2. Distribution of responses to the following question (N=125): **In which department do you work?**

	Frequency	Percent	Valid Percent	Cumulative Percent
Citizen service office	1	0.8	0.8	0.8
Call center	1	0.8	0.8	1.6
Surgery warehouse	1	0.8	0.8	2.4
Secretariat	40	32	32	34.4
Office of Education	1	0.8	0.8	35.2
Program management office	1	0.8	0.8	36
Patient movement office	5	4	4	40
Supply office	3	2.4	2.4	42.4
Telemedicine design and development office	1	0.8	0.8	43.2
Dietetics department	2	1.6	1.6	44.8
Human resources management	1	0.8	0.8	45.6
Material Management Department	1	0.8	0.8	46.4
Hospital director	3	2.4	2.4	48.8
Quality control department	1	0.8	0.8	49.6
Medical service	1	0.8	0.8	50.4
Social service	1	0.8	0.8	51.2
Accounting department	30	24	24	75.2
Payroll	1	0.8	0.8	76
Nursing department	2	1.6	1.6	77.6
Economics Department	4	3.2	3.2	80.8
Pathological clinic	1	0.8	0.8	81.6
Order Office	1	0.8	0.8	82.4
Nursing service	1	0.8	0.8	83.2
Department of receipt of sanitary material	1	0.8	0.8	84
Information technology department	6	4.8	4.8	88.8
Protocol Department	2	1.6	1.6	90.4
Human ressources Department	8	6.4	6.4	96.8
Quality control service	1	0.8	0.8	97.6
Pharmacy	1	0.8	0.8	98.4
Psychiatric clinic	2	1.6	1.6	100
Total	125	100	100	

From the demographic characteristics it is concluded that women participants are the majority compared to men. Although in our survey an attempt was made to send questionnaires to an equal number of men and women, the female responses received were overwhelmingly greater. This fact can be a limitation of our research and may mean that most of the men who did not participate in the survey have never worked remotely. Therefore, it could be assumed that telecommuting in our research serves women more, possibly because of their role as mothers and homecarers. However, further investigation of the matter is suggested to confirm the assumption.

4.1.2. Descriptions for the main research part

Participants were then asked a number of questions (Table 4.3 to Table 4.19) related to employment in greek health care units hospitals during the Covid-19 lockdown and telecommuting. The following tables show the frequencies and percentages, while they include the median and the interquartile range. For variables that were nominal, only frequencies and percentages are given.

Table 4.3. Distribution of responses to the following question (N=125): Have there been management difficulties in your hospital service during the time of COVID-19 that led to the implementation of telework?

	Frequency	Percent	Valid Percent	Cumulative Percent
I absolutely disagree	2	1.6	1.6	1.6
Disagree	3	2.4	2.4	4
I neither agree nor disagree	18	14.4	14.4	18.4
Agree	50	40	40	58.4
Strongly Agree	52	41.6	41.6	100
Total	125	100	100	
Median=4 . Interquartile Range=1				

Table 4.4. Distribution of responses to the following question (N=125): **Before COVID-19 did you work remotely?**

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	109	87.2	87.2	87.2
	Yes	16	12.8	12.8	100.0
	Total	125	100.0	100.0	

Table 4.5. Distribution of responses to the following question (N=125): **Would you like to work remotely?**

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	47	37.6	37.6	37.6
	Yes	78	62.4	62.4	100.0
	Total	125	100.0	100.0	

Table 4.6. Distribution of responses to the following question (N=125): During the time of COVID-19 did you work remotely?

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	44	35.2	35.2	35.2

		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	81	64.8	64.8	100.0
	Total	125	100.0	100.0	

From the comparison of the results of Tables 4.4 -4.5 -4.6 it can be concluded that before the pandemic a small percentage of 12,8% of the workers in the Greek health and welfare units worked remotely (see Table 4.8) while since the Covid-19 pandemic a 64,8% of employees worked remotely (see Table 4.5), while telecommuting seems to be viewed positively by a 62.4% of employees (see Table 4.6).

Table 4.7. Distribution of responses to the following question (N=125): Telecommuting can improve my job satisfaction and commitment to the hospital where I work.

		Frequency	Percent	Valid Percent	Cumulative Percent
	I absolutely disagree	13	10.4	10.4	10.4
	Disagree	14	11.2	11.2	21.6
	I neither agree nor disagree	43	34.4	34.4	56.0
	Agree	32	25.6	25.6	81.6
	Strongly Agree	23	18.4	18.4	100.0
	Total	125	100.0	100.0	
	Median=3.Interquartile Range=4				

Table 4.8. Distribution of responses to the following question (N=125): **Telecommuting can improve my work performance.**

		Frequency	Percent	Valid Percent	Cumulative Percent
	I absolutely disagree	14	11.2	11.2	11.2
	Disagree	22	17.6	17.6	28.8
	I neither agree nor disagree	34	27.2	27.2	56.0
	Agree	29	23.2	23.2	79.2
	Strongly Agree	26	20.8	20.8	100.0
	Total	125	100.0	100.0	
	Median=3.Interquartile Range=2				

Table 4.9. Distribution of responses to the following question (N=125): Telecommuting could reduce stress e.g. due to flexible working hours or reducing the spread of the virus.

		Frequency	Percent	Valid Percent	Cumulative Percent
	I absolutely disagree	4	3.2	3.2	3.2
	Disagree	5	4.0	4.0	7.2
	I neither agree nor disagree	28	22.4	22.4	29.6
	Agree	45	36.0	36.0	65.6
	Strongly Agree	43	34.4	34.4	100.0
	Total	125	100.0	100.0	
	Median=4.Interquartile Range=2				

Table 4.10. Distribution of responses to the following question (N=125): Telecommuting could reduce burnout e.g. because of the time savings due to not commuting.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I absolutely disagree	4	3.2	3.2	3.2
	Disagree	12	9.6	9.6	12.8
	I neither agree nor disagree	17	13.6	13.6	26.4
	Agree	47	37.6	37.6	64.0
	Strongly Agree	45	36.0	36.0	100.0
	Total	125	100.0	100.0	
	Median=4.Interquartile Range=2				

Table 4.11. Distribution of responses to the following question (N=125): Telecommuting could reduce my days away from work (eg for special leave for parents and vulnerable social groups) because of the flexibility it offers.

		Frequency	Percent	Valid Percent	Cumulative Percent
	I absolutely disagree	6	4.8	4.8	4.8
	Disagree	6	4.8	4.8	9.6
	I neither agree nor disagree	19	15.2	15.2	24.8
	Agree	46	36.8	36.8	61.6
	Strongly Agree	48	38.4	38.4	100.0
	Total	125	100.0	100.0	
	Median=4.Interquartile Range=2				

Table 4.12. Distribution of responses to the following question (N=125): Would you work remotely during a lockdown/quarantine if you were given the option to support the needs of your department?

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	6	4.8	4.8	4.8
	Yes	119	95.2	95.2	100.0
	Total	125	100.0	100.0	

Furthermore, research proposed that teleworking could improve employees' job satisfaction and commitment to an organization and even their job performance (see Tables 4.7-4.8). Teleworking could also reduce work-related burnout and stress, due to reduced commuting or more flexible hours (see Tables 4.9-4.10). Other profits include reduced commuting costs and flexibility to work from anywhere (see Tables 4.10-4.11). In addition, thanks to remote work, the health and welfare units can thus continue without interruption the operation of their administrative services by supporting effectively and dynamically all the other health and welfare services (see Table 4.12).

Table 4.13. Distribution of responses to the following question (N=125): Telecommuting can lead to social and professional isolation from the hospital where I work.

		Frequency	Percent	Valid Percent	Cumulative Percent
	I absolutely disagree	3	2.4	2.4	2.4
	Disagree	16	12.8	12.8	15.2
	I neither agree nor disagree	43	34.4	34.4	49.6
	Agree	33	26.4	26.4	76.0
	Strongly Agree	30	24.0	24.0	100.0
	Total	125	100.0	100.0	
	Median=4.Interquartile Range=1				

Table 4.14. Distribution of responses to the following question (N=125): Telecommuting gives reduced opportunities to share information.

		Frequency	Percent	Valid Percent	Cumulative Percent
	I absolutely disagree	5	4.0	4.0	4.0
	Disagree	17	13.6	13.6	17.6
	I neither agree nor disagree	34	27.2	27.2	44.8
	Agree	46	36.8	36.8	81.6
	Strongly Agree	23	18.4	18.4	100.0
	Total	125	100.0	100.0	
	Median=4.Interquartile Range=1				

Table 4.15. Distribution of responses to the following question (N=125): Telecommuting presents difficulties in separating the boundaries between work and personal time.

		Frequency	Percent	Valid Percent	Cumulative Percent
	I absolutely disagree	4	3.2	3.2	3.2
	Disagree	12	9.6	9.6	12.8
	I neither agree nor disagree	28	22.4	22.4	35.2
	Agree	39	31.2	31.2	66.4
	Strongly Agree	42	33.6	33.6	100.0
	Total	125	100.0	100.0	
	Median=4.Interquartile Range=2				

Table 4.16. Distribution of responses to the following question (N=125): Telecommuting can force telecommuters to work overtime to prove their worth and lead to burnout.

		Frequency	Percent	Valid Percent	Cumulative Percent
	I absolutely disagree	10	8.0	8.0	8.0
	Disagree	20	16.0	16.0	24.0
	I neither agree nor disagree	31	24.8	24.8	48.8
	Agree	34	27.2	27.2	76.0
	Strongly Agree	30	24.0	24.0	100.0
	Total	125	100.0	100.0	
	Median=4.Interquartile Range=1				

Table 4.17. Distribution of responses to the following question (N=125): The operation of technologies and virtual meetings is not always an easy task.

		Frequency	Percent	Valid Percent	Cumulative Percent
	I absolutely disagree	4	3.2	3.2	3.2
	Disagree	12	9.6	9.6	12.8
	I neither agree nor disagree	35	28.0	28.0	40.8
	Agree	48	38.4	38.4	79.2
	Strongly Agree	26	20.8	20.8	100.0
	Total	125	100.0	100.0	
	Median=4.Interquartile Range=1				

Table 4.18. Distribution of responses to the following question (N=125): As a telecommuter, do you have an office or co-working space in your home?

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	51	40.8	40.8	40.8
	Yes	74	59.2	59.2	100.0
	Total	125	100.0	100.0	

Table 4.19. Distribution of responses to the following question (N=125): As a telecommuter, did you receive the required technology support from your hospital?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	96	76.8	76.8	76.8
	Yes	29	23.2	23.2	100.0
	Total	125	100.0	100.0	

However, telecommuting is confirmed by our case study to have disadvantages, such as social and professional isolation, reduced opportunities for information sharing, and difficulties in separating work and personal time (see Tables 4.13-4.15). The lack of physical separation between these two worlds can create problems, such as family responsibilities extending into work and professional obligations encroaching on family time. This can cause telecommuters to work overtime to prove themselves, leading to burnout. The ability to be constantly connected to work through a variety of technologies (e.g. Zoom, Slack) can also make workers feel like they cannot unplug at the end of the day (see Tables 4.16-4.17).

It is also noteworthy that many employees (40.8%, see Table 4.18) do not have a suitable space for teleworking, while the vast majority (76.18%, see Table 4.19) lack technological support during the performance of their work duties.

4.2. Results of Inductive Statistics

In the second part of the analysis of the results obtained from the present research, the relationships between the examined variables were studied.

4.2.1. Relationship between main research part questions and age

Because the dependent variables were ordinal and age had two levels, we used the Mann–Whitney test to examine possible differences in their responses by age.

We find only one statistically significant relationship, which concerns responses to the question "Have there been management difficulties in your hospital service during the time of COVID-19 that led to the implementation of telework" and age (U = 776.5. p = 0.003). Looking at the mean ranks, we conclude that participants who were 41 years of age or older expressed a higher degree of agreement with the proposition that there were 'management difficulties in their hospital service during the time of COVID-19 that led to the implementation of telework' than those who were under 41 years. Therefore, participants who were 41 years of age or older appear to have struggled more than participants who were under 41 years of age (Table 4.20).

Table 4.20: Differences in responses by age.

Questions	Age	N	Mean Rank	Sum of Ranks
1) Have there been management difficulties in your hospital service during the time of COVID-19 that led to the implementation of telework?	<41 years old	24	44.85	1076.50
	41 years and older	101	67.31	6798.50
	U=776.5 P=0.003			
2) Telecommuting can improve my job satisfaction and commitment to the hospital where I work.	<41 years old	24	67.65	1623.50
	41 years and older	101	61.90	6251.50
	U=1100.5 P=0.47			
3) Telecommuting can improve my work performance.	<41 years old	24	69.92	1678.00
	41 years and older	101	61.36	6197.00
	U=1046.0 P=0.286			
4) Telecommuting could reduce stress e.g. due to flexible working hours or reducing the spread of the virus.	<41 years old	24	69.48	1667.50
	41 years and older	101	61.46	6207.50
	U=1056.5 P=0.305			
5) Telecommuting could reduce burnout e.g. because of the time savings due to not commuting.	<41 years old	24	69.52	1668.50
	41 years and older	101	61.45	6206.50
	U=1055.5 P=0.300			
6) Telecommuting could reduce my days away from work because of the flexibility it offers.	<41 years old	24	58.04	1393.00
	41 years and older	101	64.18	6482.00
	U=1093.0 P=0.429			
7) Telecommuting can lead to social and professional isolation from the hospital where I work.	<41 years old	24	63.40	1521.50
	41 years and older	101	62.91	6353.50
	U=1202.5 P=0.951			
8)Telecommutinggives reduced opportunities to share information.	<41 years old	24	60.08	1442.00
	41 years and older	101	63.69	6433.00
	U=1142.0 P=0.648			
9) Telecommuting presents difficulties in separating the boundaries between work and personal time.	<41 years old	24	61.31	1471.50
	41 years and older	101	63.40	6403.50
	U=1171.5 P=0.791			
10) Telecommuting can force telecommuters to work overtime to prove their worth and lead to burnout.	<41 years old	24	53.46	1283.00
	41 years and older	101	65.27	6592.00
	U=983.0 P=0.140			
11) The operation of technologies and virtual meetings is not always an easy task	<41 years old	24	59.75	1434.00
	41 years and older	101	63.77	6441.00
	U=1134.0 P=0.609			

In the Table 4.21 anx^2 independence test was applied, because we had a series of nominal variables (Yes/No answers) and an ordinal one (age). From the results that follow, no statistically significant relationship is found.

Table 4.21: Anx^2 independence test to a series of nominal variables (Yes/No answers) & an ordinal one (age).

Variables	Categories	Age		x^2 (1)	p
		<41 years old	41+ years old		
		n (%)	n (%)		
1) Before COVID-19. did you work remotely?	No	19	90	1.72	0.190
		79.2%	89.1%		
	Yes	5	11		
		20.8%	10.9%		
2) Would you like to work remotely?	No	7	40	0.90	0.343
		29.2%	39.6%		
	Yes	17	61		
		70.8%	60.4%		
3) During the time of COVID-19. did you work remotely?	No	8	36	0.045	0.831
		33.3%	35.6%		
	Yes	16	65		
		66.7%	64.4%		
4) As a telecommuter. do you have an office or co-working space in your home?	No	10	41	0.009	0.923
		41.7%	40.6%		
	Yes	14	60		
		58.3%	59.4%		
5) As a telecommuter. did you receive the required technology support from your hospital?	No	21	75	1.909	0.167
		87.5%	74.3%		
	Yes	3	26		
		12.5%	25.7%		

4.2.2. Relationship between main research part questions and educational level

Because the dependent variables were ordinal and educational level was categorized into three levels (Secondary education, Higher education, Master's/PhD holder), the Kruskal-Wallis test was used to examine possible differences in their responses according to their educational level.

Only one statistically significant relationship was found, which concerns responses to the question "Were there any management difficulties in your hospital service during the COVID-19 era that led to the implementation of telework?" and educational level (x^2(2) = 7.796, p = 0.020).

Also, in the Table-4.22, the mean rank per age category is presented, as well as the corresponding values of x^2(2) and p.

Table 4.22. The mean rank per age category & the corresponding values of $x^2(2)$ & p.

Questions	Education level	N	Mean Rank
1) Were there any management difficulties in your hospital service during the COVID-19 era that led to the implementation of telework?	**Secondary education**	**24**	**64.08**
	Higher education	**54**	**54.05**
	Master's/PhD holder	**47**	**72.73**
	$x^2(2) = 7.796$ p = 0.020		
2) Telecommuting can improve my job satisfaction and commitment to the hospital where I work.	Secondary education	24	49.31
	Higher education	54	64.21
	Master's/PhD holder	47	68.60
	$x^2(2) = 4.934$ p = 0.085		
3) Telecommuting can improve my work performance.	Secondary education	24	52.06
	Higher education	54	64.16
	Master's/PhD holder	47	67.26
	$x^2(2) = 3.038$ p = 0.219		
4) Telecommuting could reduce stress e.g. due to flexible working hours or reducing the spread of the virus.	Secondary education	24	60.10
	Higher education	54	60.28
	Master's/PhD holder	47	67.61
	$x^2(2) = 1.351$ p = 0.509		
5) Telecommuting could reduce burnout e.g. because of the time savings due to not commuting.	Secondary education	24	56.27
	Higher education	54	63.56
	Master's/PhD holder	47	65.79
	$x^2(2) = 1.248$ p = 0.536		
6) Telecommuting could reduce my days away from work (e.g. for special leave for parents and vulnerable social groups) because of the flexibility it offers.	Secondary education	24	57.44
	Higher education	54	57.64
	Master's/PhD holder	47	72.00
	$x^2(2) = 5.224$ p = 0.073		
7) Telecommuting can lead to social and professional isolation from the hospital where I work.	Secondary education	24	67.92
	Higher education	54	65.36
	Master's/PhD holder	47	57.78
	$x^2(2) = 1.782$ p = 0.410		
8) Telecommutinggives reduced opportunities to share information.	Secondary education	24	70.31
	Higher education	54	62.61
	Master's/PhD holder	47	59.71
	$x^2(2) = 1.488$ p = 0.475		
9) Telecommuting presents difficulties in separating the boundaries between work and personal time.	Secondary education	24	61.54
	Higher education	54	65.47
	Master's/PhD holder	47	60.90
	$x^2(2) = 0.487$ p = 0.784		
	Secondary education	24	60.38
	Higher education	54	61.76

10) Telecommuting can force telecommuters to work overtime to prove their worth and lead to burnout.	Master's/PhD holder	47	65.77
	$x^2(2) = 0.490$ p = 0.783		
11) The operation of technologies and virtual meetings is not always an easy task.	Secondary education	24	64.19
	Higher education	54	66.73
	Master's/PhD holder	47	58.11
	$x^2(2) = 1.597$ p = 0.450		

To see between which categories of educational level there are differences on the variable "Were there managerial difficulties in your service of your hospital during the time of COVID-19 that led to the implementation of telework", we perform paired Mann-Whitney tests. From the results that follow, we conclude that the participants who were holders of a master's/doctorate degree showed a higher degree of agreement with the proposition in question, compared to those who had Higher education (U=882.5 p=0.004). Therefore, participants who held a master's/doctoral degree seem to have had more difficulty than participants who had a Higher education.

Also, in the Table 4.23 the mean rank per education level category is presented.as well as the corresponding values of U and p.

Table 4.23. The mean rank per education level category & the corresponding values of U & p.

	Education level	Mean Rank	U	P
Have there been management difficulties in your hospital service …?	Secondary education	43.54		
	Higher education	37.70		
			551.000	0.264
	Secondary education	33.04		
	Master's/PhD holder	37.51		
			493.000	0.341
	Higher education	**43.84**		
	Master's/PhD holder	**59.22**		
			882.500	**0.004**

Finally, because there were a number of nominal variables (yes/no responses) and one ordinal (educational level), an x^2 independence test was applied (see Table 4.24). From the results that follow, two statistically significant relationships are identified.

- A statistically significant relationship is found between educational level and the variable "Would you like to work remotely?" (x^2 (2) =8.46. p=0.015). In particular, the majority of participants who held a master's degree/doctorate (72.3%) wished to work remotely, as did the majority of participants who were graduates of higher education (64.8%). However, the majority of participants who were secondary school graduates did not wish to work remotely (62.5%).
- A statistically significant relationship is found between educational level and the variable "As teleworkers, did you receive the required technological support from your hospital?" (x^2 (2) =10.01. p=0.007). In particular, the majority of participants who held a Master's/PhD (72.3%) stated that they had an office or friendly workspace at home. as did the majority of participants who were graduates of higher education (59.3%). However, the majority of participants who

were secondary school graduates stated that they did not have an office or a friendly workspace at home (66.7%).

Table 4.24. An x^2 independence test, on nominal variables (yes/no responses) &an ordinal (educational level).

			Education level			
			Secondary education	Higher education	Master's/PhD holder	
1)Before COVID-19. did you work remotely?	No	Count	20	49	40	109
		% within Education level	83.3%	90.7%	85.1%	87.2%
	Yes	Count	4	5	7	16
		% within Education level	16.7%	9.3%	14.9%	12.8%
x^2 (2) =1.113, **p**=0.573						
2)Would you like to work remotely?	No	Count	15	19	13	47
		% within Education level	**62.5%**	35.2%	27.7%	37.6%
	Yes	Count	9	35	34	78
		% within Education level	37.5%	**64.8%**	**72.3%**	62.4%
x^2 (2) =8.46, **p**=0.015)						
3)During the time of COVID-19. did you work remotely?	No	Count	12	21	11	44
		% within Education level	50.0%	38.9%	23.4%	35.2%
	Yes	Count	12	33	36	81
		% within Education level	50.0%	61.1%	76.6%	64.8%
x^2 (2) =5.494.**p**=0.064						
4)As a telecommuter. do you have an office or co-working space in your home?	No	Count	16	22	13	51
		% within Education level	**66.7%**	40.7%	27.7%	40.8%
	Yes	Count	8	32	34	74
		% within Education level	33.3%	**59.3%**	**72.3%**	59.2%
x^2 (2) =10.01, **p**=0.007						
5)As a telecommuter. did you receive the required technology support from your hospital?	No	Count	22	39	35	96
		% within Education level	91.7%	72.2%	74.5%	76.8%
	Yes	Count	2	15	12	29
		% within Education level	8.3%	27.8%	25.5%	23.2%

x^2 **(2)** =3.756, **p**=0.153

5. Discussion

The effects of telecommuting have been widely discussed in the last decade and especially since the emergence of covid-19, during which many people were forced to telecommute due to lockdowns. This issue has been discussed both in the relevant literature and in official government documents at an international level. Although the effects are rarely seen in isolation, they have been divided into different categories based on the changes they cause. The adoption of telecommuting measures has been shown to have economic, equity and environmental benefits for organizations, workers and local governments. Furthermore, the effects can be at a personal, organizational or societal level and by extension affect the achievement of the SDGs. Moreover, the importance and benefits of telework organization have been widely recognized by organizations, governments and academics around the world 10510641.

First, it was observed that employees' socio-demographic characteristics can potentially influence the perception of the difficulties that led to the adoption of teleworking during the crisis period as it happened with greek health care administrators during covid-19 (Hypothesis 1, confirmed), since participants who were 41 years of age or older seem to have struggled more than participants who were under 41 years of age.   Also, the educational level of employees affects their intention to telework and is related to their positive or negative attitude to work from home (Hypothesis 2, confirmed). In particular, the majority of participants with a master's/Ph.D. desired to work remotely, as did the majority of higher education graduates, in contrast to secondary education graduates. Those findings are supported by previous studies, such as those of Moens et.al.44, Beňo 7 and Gajendran & Harrison 14.

Furthermore, the educational level (and possibly the income of the employees since in Greek greek health care units the employees are paid according to their educational level) affects the existence of the necessary equipment and space at home, as well as the required technological support for the implementation of telework (Hypothesis 3, confirmed). More specifically, the majority of university graduate participants (of all levels) stated that they had an office or friendly work space at home but also received the required technological support from the hospital, in contrast to the participants who were secondary school graduates. Those findings are supported by previous studies, such as those of Cuerdo-Vilcheset.al.12and Campbell & Gavett 97. Finally, it should be underlined that from Hypotheses 2 and 3 it may be concluded that the possibility for the adoption of telework is linked to the educational level and economic status of the employee, which creates social inequalities in access to telework. This element was previously mentioned in a research by Martins & Sobral 42.

In addition, supporting the findings of   Boell et.al. 102 and Cuerdo-Vilcheset.al.12, the research outcomes suggest that telecommuting could improve the job satisfaction and commitment 38869 of employees in an organization and even their work performance. These positives could be offset by the negatives associated with organizational stress in order to predict acceptance of sustainable development through telework (Hypothesis 4, confirmed). At the same time, the assumption on the part of telecommuters, as emerged from the survey, that telecommuting could reduce burnout and stress, due to reduced commuting or more flexible hours, may contribute to the same goal 222684.

Moreover, supporting the findings of Green et.al. 17] and Lebopo et.al. [38 the research outcomes suggest that the impact of telecommuting during the COVID-19 crisis is perceived in various aspects (social, economic, environmental) of hospital workers' lives and careers (Hypothesis 5, confirmed). This is also related to the fact that the impact of telecommuting may be even higher since the adoption of telecommuting can reduce commuting costs (for all parties, e.g. individuals, organisations and the environment), increasing the flexibility to work from anywhere, as it emerged from our case study 22402073.

It could also be implicitly concluded that higher acceptance of telecommuting (and by extension the sustainable development it entails) can be achieved when there are higher levels of positive economic and social impact. Finally, it is confirmed that employees' intention to telework in times of

crisis to support the needs of the hospital's administrative departments is not influenced by socio-demographic factors (Hypothesis 6, confirmed), since the vast majority (95.2%) of the participants stated that they would work from distance during a lockdown/quarantine if given the option in order to support the needs of their department. Those findings are supported by previous studies, such as those of Moglia et.al. 45 and Karia & Asaari 35.

From the above it follows that there is an interconnection between the variables, as well as the multiple effects of telework on sustainable development in the teleworkable sectors of greek health care units.

5.1. Recommendations for future research

The present study only focused on one area, which can be characterized as a weakness, as the results cannot be compared to other regions or countries. However, this could be an opportunity for future research to be extended to other areas to provide an opportunity to compare and contrast both locally and internationally. This could lead to the inclusion of other variables, such as the association of telework with volunteering and teleworkers' intention to contribute to society and the achievement of the SDGs. In other words, the analysis can be further developed to expand the areas of focus and broaden our understanding of how the SDGs intersect with volunteering, which results from telecommuting. Therefore, the aim is to confirm telecommuting as an option for sustainable behavior, since it can be transformed into a community-friendly form of work for more workers. In each case the aim is to improve human well-being and enhance human and environmental health.

Then, it would be recommended to further research the topic in order to investigate the extent to which contemporary leaders possess the characteristics of digital leadership 4.0 linked to telework and digital transformation, as well as to future sustainability and the SDGs. This research could make a significant contribution to humanity's future crises.

Finally, a mixed research design approach that adds qualitative aspects in the form of interviews with both teleworkers and managers, as well as policy makers with could provide additional data on the research topic and in particular on promoting sustainable behaviors and acceptance of sustainable development through teleworking.

6. Conclusions

Telework has many aspects and ramifications, for this reason it is important to study this topic, in the service of the interest and general well-being of employees, organizations and the community. Research findings suggest that telecommuting has a greater impact on labor market, economic and social benefits. Thus, its impact is multiple and affects many aspects of society and the SDGs.

More specifically, the adoption of telecommuting requires complex and dynamic changes in technical and behavioral aspects. Few studies attempt to understand the organizational behavioral side of the successful transition to telework or some hybrid form of work. Thus, this study proposes a theoretical framework that addresses the requirements for successfully transitioning to a sustainable effectiveness with telecommuters, as well as telework leadership from an organizational perspective. In addition, the use of this framework could lead to the achievement of sustainable development.

Telecommuting has received tremendous attention from researchers and the public because of its potential for widespread benefits at the individual, organizational, and societal levels. However, there are potential downsides as well. This article provides a critical synthesis of the telework literature. An interdisciplinary, integrated understanding of both the advantages and disadvantages of telework can be used to more effectively shape and inform organizational practices and public policy.

In addition, an important positive aspect of telework that emerged from the present literature review appears to create opportunities for potential linkages between telework and other additional SDG areas, based on the fact that telework appears to be a community-friendly form of work. Therefore the giving and volunteering displayed by many teleworkers, as mentioned by Kamerade & Burchell 34, act as a counterweight to the position that it leads to social distancing and can lead to

sustainable behaviors. For this reason, this research strongly suggests that leaders facilitate telecommuters to adopt green practices and volunteerism that can consequently contribute to the SDGs.

Based on the results of this study, we can also say that implementing a telecommuting program is a good way to create a climate that promotes greater employee satisfaction. This type of work facilitates meeting the basic psychological needs of employees and, consequently, providing arrangements that will promote greater job satisfaction. This conclusion provides evidence for organizations wishing to develop effective strategies for attracting and retaining staff. In other words, this result tends to support the idea that it is possible to create management practices that will counteract the supposed harmful effects, risks and social inequalities of telework.

In summary, to meet the challenges arising from unprecedented times, leaders should redesign their policies, while states should focus on safeguarding workers' rights and freedoms. The value of the most important factor (i.e. the employee) must therefore be assessed for the successful adoption of telework for the benefit of all parties involved (employees, organizations, society) and for the achievement of the social, environmental and organizational sustainability.

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