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**The environmental health dimension of hybrid- and remote-
working models: An exploratory study**

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Patras, Greece, May 2022

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The environmental health dimension of hybrid- and remote-
working models: An exploratory study

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The completion of this dissertation thesis marks the end of my studies at the MBA Program of the Hellenic Open University. The dissertation’s theme is a result of the combination of my 10-year environmental health academic background at the Medical School of the National and Kapodistrian University of Athens with the field of business administration. For that reason, I would like to dedicate this work to all those who are constantly trying to create more sustainable corporate environmental profiles for the promotion of environmental health and communities’ wellbeing. I would also like to express here my gratitude to Prof. Prodromos Chatzoglou for his crucial support during the thesis preparation.

Abstract

Climate change and poor urban air quality are two environmental health issues that require urgent action. Traffic management interventions are among the proposed solutions. According to the available literature, remote-working arrangements, such in the case of the ongoing pandemic, display an ability to offer a win-win-win situation, between firms, desk-duty employees, and the environment. This dissertation aims at evaluating the environmental health outcomes of remote working. A structured questionnaire, divided into seven sections, i.e., one introductory and six main sections related to environmental health parameters such as energy consumption, water consumption, greenhouse gas emissions and waste production, was prepared and distributed electronically. The final sample consisted of 194 respondents who had remote-working experience. The preliminary data analysis was followed by first and second order factor analysis, correlation analysis and analysis of variance. Afterwards, structural equation modelling was performed in order to evaluate the research model and the hypotheses of the study. According to the results of this dissertation, modern companies/organizations do show an interest in improving their environmental footprint. However, their knowledge on how to reduce certain crucial environmental health parameters such as energy consumption, water consumption and waste production has to be expanded. Moreover, the employees' domestic behavior related to environmental health parameters such as energy consumption and waste management is better than the same behavior during their presence in their workplace. There is also evidence that the environmental profile of a given firm has an impact on the establishment of remote-working arrangements. The dissertation, despite its limitations, provides important insights that should be taken into consideration as regards the identification of the exact environmental health outcomes of remote-working arrangements. The whole subject is an interdisciplinary, complex field with notable environmental dimensions and managerial implications that require further research.

Keywords: Remote working, Hybrid working, Teleworking, Environmental health, Environmental profile, Pollution

Η διάσταση της περιβαλλοντικής υγείας του υβριδικού και του απομακρυσμένου
μοντέλου εργασιακής απασχόλησης: Μία διερευνητική μελέτη

Σωτήριος Μάιπας

Περίληψη

Η κλιματική αλλαγή και η υποβαθμισμένη ποιότητα αέρα στις πόλεις αποτελούν δύο ζητήματα περιβαλλοντικής υγείας που απαιτούν άμεση αντιμετώπιση. Ανάμεσα στις προτεινόμενες λύσεις, συναντούμε τις παρεμβάσεις που αφορούν στη διαχείριση της κυκλοφορίας των οχημάτων. Σύμφωνα με τη διαθέσιμη βιβλιογραφία, η εξ αποστάσεως εργασία, όπως συνέβη λόγω της πανδημίας, μπορεί να προσφέρει σημαντικά οφέλη τόσο για τις επιχειρήσεις και τους υπαλλήλους γραφείου όσο και για το περιβάλλον. Η διπλωματική εργασία στοχεύει στην αξιολόγηση των σχετιζόμενων με την περιβαλλοντική υγεία συνεπειών από την εξ αποστάσεως εργασία. Δημιουργήθηκε δομημένο ερωτηματολόγιο, αποτελούμενο από επτά ενότητες: μία εισαγωγική και έξι σχετιζόμενες με παραμέτρους που αφορούν μεταξύ άλλων στην κατανάλωση ενέργειας και νερού, στις εκπομπές θερμοκηπικών αερίων και στην παραγωγή αποβλήτων. Το ερωτηματολόγιο διαμοιράστηκε ηλεκτρονικά και το δείγμα της μελέτης αποτελούταν από 194 άτομα που είχαν εξ αποστάσεως εργασιακή εμπειρία. Την αρχική στατιστική ανάλυση ακολούθησαν η ανάλυση παραγόντων, συσχέτισης και διακύμανσης. Μέσω μοντέλων δομικών εξισώσεων, αξιολογήθηκε το ερευνητικό μοντέλο και οι υποθέσεις της μελέτης. Διαπιστώθηκε ότι οι σύγχρονες επιχειρήσεις/οργανισμοί επιδεικνύουν ενδιαφέρον για τη βελτίωση του περιβαλλοντικού τους αποτυπώματος. Ωστόσο, η γνώση τους για τον τρόπο βελτίωσης του περιβαλλοντικού τους προφίλ πρέπει να διευρυνθεί. Επιπλέον, διαπιστώθηκε ότι η συμπεριφορά των εργαζομένων στο σπίτι τους, όσον αφορά σε συγκεκριμένες παραμέτρους όπως η κατανάλωση ενέργειας και η διαχείριση αποβλήτων, είναι καλύτερη από την αντίστοιχη συμπεριφορά τους όταν βρίσκονται στον χώρο εργασίας τους. Υπάρχουν, επίσης, ενδείξεις ότι το περιβαλλοντικό προφίλ μίας δεδομένης επιχείρησης επιδρά στην καθιέρωση του καθεστώτος της εξ αποστάσεως εργασίας. Η διπλωματική εργασία, παρά τους περιορισμούς της, παρέχει σημαντικές πληροφορίες που πρέπει να ληφθούν υπόψη στη γενικότερη έρευνα για την ταυτοποίηση των επιπτώσεων των εξ αποστάσεως εργασιακών μοντέλων στο περιβάλλον. Το όλο ζήτημα αποτελεί ένα διεπιστημονικό και σύνθετο πεδίο, με αξιοσημείωτες διαστάσεις, που αφορούν τόσο στην

περιβαλλοντική υγεία όσο και στη διοίκηση των επιχειρήσεων, οι οποίες χρήζουν περισσότερης έρευνας.

Λέξεις – Κλειδιά: Εξ αποστάσεως εργασία, Υβριδικό μοντέλο εργασίας, Περιβαλλοντική Υγεία, Περιβαλλοντικό προφίλ, Ρύπανση

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List of Abbreviations & Acronyms

- ANOVA: Analysis of Variance
- B: Firm’s Environmental Profile (factor)
- Ba: Energy Consumption-W (factor)
- Bb: Water Consumption-W (factor)
- Bc: Energy Efficiency-W (factor)
- Bd: Waste Production-W (factor)
- C: RW Arrangements (factor)
- CFI: Comparative Fit Index
- CMin: Minimum Sample Discrepancy
- COVID-19: Corona Virus Disease 2019
- D: GG Vehicle Emissions (factor)
- DF: Degrees of Freedom
- E: Employees’ Elect. Consumption-W&H (factor)
- Ea: Employees’ Elec. Consumption-W (factor)
- Eb: Employees’ Elec. Consumption-H (factor)
- EC: Energy Consumption
- EEC: Employees’ Electricity consumption
- EF: Environmental Footprint
- EWC: Employees’ Water consumption
- EWP: Employees’ Waste production
- F: Employees’ Water Consumption-W (factor)
- G: Employees’ Waste Separation-W&H (factor)
- Ga: Employees’ Waste Production-W (factor)
- Gb: Employees’ Waste Separation-W (factor)
- Gc: Employees’ Waste Separation-H (factor)
- GFI: Goodness-of-fit
- GG: Greenhouse Gas
- H: Household
- H(number): Hypothesis(number)
- HC: High Confidence
- KMO: Kaiser-Meyer-Olkin

LC: Low Confidence

MC: Medium Confidence

min.: Minutes

NFI: Normed Fit Index

RMR: Root Mean Square Residual

RMSEA: Root Mean Square Error of Approximation

RW: Remote Working

SEM: Structural Equation Modelling

Std.D: Standard Deviation

W&H: Workplace and Household

W: Workplace

WC: Water Consumption

WP: Waste Production

[ANOVA Analysis, Tables 5.22-5.23:

Family status (S: Single, M: Married, CP: Civil partner, D: Divorced, W: Widowed)

Higher completed educational level (S: Secondary level, PS: Post-secondary level, B: Bachelor's degree, M: Master's degree, D: Doctoral degree)

Means of transportation (PC: Private car, PM: Private motorcycle, B: Bicycle, PT: Public transport, C: Combination, F: On foot, O: Other)

Occupational position (M: Manager, A: Administrative personnel, W: Working personnel, O: Other)

Type of company/organization (Pr: Private company, NG: Non-governmental organization, Pu: Public sector, O: Other)

Industry sector: (Ed: Education, Ho: Hospitality, Fi: Financial sector, IT: Information Technology and Communications, He: Health, Me: Media and Entertainment, Tr: Transportation, In: Industrial/Manufacturing sector, Co: Construction, Ot: Other)]

1. Introduction

1.1 Brief description

Environmental health, defined as the public health’s branch that deals with all the different factors of the natural and man-made environment that display the ability to affect human health (McSwane et al., 2015, p. 138; Frumkin, 2016, p. 3), is currently being associated with the ongoing Corona Virus Disease 2019 (COVID-19) pandemic, and the gravity of its overall impact (Maipas et al., 2021a). The ubiquitous presence of the environmental factors that have the ability to affect human health, such as low air quality, carcinogenic chemicals, endocrine disruptors, water-, vector- and food-borne diseases, reveals the urgency for protection against these health hazards. Given the fact that many of the environmental factors that affect health belong to a firm’s macroenvironment, the business sector must acquire relevant mitigation and adaptation strategies.

The huge list of the different professions that are involved in environmental health management, includes, amongst others, doctors, occupational health physicians, physicists, economists, social and political scientists, civil engineers, communication experts, lawyers, psychologists, food and noise inspectors, and zoologists (Fitzpatrick, 2002, p. 2). Given the significant business sector’s impact on the environment, and the need for acquiring green market strategies that, in parallel, create or enhance necessary competitive advantages (Mukonza and Swarts, 2019), business managers should be included in the extended versions of this list.

Environmental health management requires innovative approaches that consider each era’s concept and specific necessities. Taking into account that innovation may be considered as a function of time, location, and explicit (“know-what”), and tacit (“know-how”) knowledge acquisition (Maipas, 2020), environmental health specialists and environmental health-related professionals, during the pandemic period (i.e., 2020-2022), are constantly acquiring experience, knowledge and skills to innovate and effectively manage such situations in favor of both natural environment and sustainable development. Remote-working arrangements, either as a feasible outcome of technological advances or as innovative approaches towards reducing urban traffic and congestions that have a severe impact on human health (Levy et al.,

2010), may be considered as a part of the new era’s mitigation and adaptation strategies against environmental degradation.

Two of the most common examples of environmental health issues that require urgent action are climate change and poor urban air quality. Both have common sources and are being associated with increased morbidity and mortality (Haryanto, 2018; Mika et al., 2018). Many solutions have been proposed, with energy consumption reductions, green infrastructure, food waste reduction, and traffic management interventions being some common examples (Bigazzi and Rouleau, 2017; Hewitt et al., 2020; Man et al., 2020; Bartocci et al., 2021).

During COVID-19 lockdown, the natural and urban environments experienced a significant quality improvement via the reduction of the emissions of urban air pollutants, such as particulate matter and greenhouse gases, the reduction of noise levels, and the reduction of industrial wastes (Arora et al., 2020). As a matter of fact, in some cities, such as California, Madrid, Barcelona, Delhi and Wuhan, the urban air quality improvement was remarkably significant (Mahato et al., 2020; Pan et al., 2020; Baldasano et al., 2021; Ghahremanloo et al., 2021).

Regarding the city of California, it is worth mentioning here that a relevant study estimated thousands of prevented poor air quality-related deaths annually, due to an assumed persistence of the ongoing reduction of air pollution levels. Also, the same study proposed, amongst others, “telecommuting” as a measure against both the pandemic and climate change (Pan et al., 2020).

The concept of “remote-working” and its conservative acceptance appeared as a result of the ’70s oil crisis in the United States (Stretenović et al., 2021). Another crisis, i.e., the ongoing health crisis, has led to its overall acceptance as an antidote to the declining economic activity of the necessary -for health purposes- lockdown. One interesting fact to further highlight is that, indeed, crises, such as the ones that have environmental health content do act as promoters of technological innovation and exaptation (Ardito et al., 2021; Casagrande et al., 2021).

The present dissertation, entitled “The environmental health dimension of hybrid- and remote-working models: An exploratory study”, discloses the mutual relationship between remote-working models and positive environmental health outcomes. The

still ongoing pandemic has generated, amongst others, an interesting literature gap and relevant research opportunities regarding environmental health and remote working. Also, there is a need to provide environmental health insights for modern human resource management strategies, as they have been dictated by lockdown measures.

For the purposes of the study, a relevant structured questionnaire was created. The data analysis included inferential statistics and Structural Equation Modeling analysis. The dissertation aspires to conclude that firms, via remote working arrangements, may contribute to a healthier urban environment, without imperiling their own sustainability, but also while creating considerable competitive advantages in the process.

1.2 Importance of the topic

Currently, it is common sense that the current and future application of remote-working arrangements (i.e., hybrid-working model or fully remote-working model) are gaining more and more supporters (Blanding, 2021). As far as the environmental health dimension of these working models is concerned, there is evidence – and also a need to provide more relevant insights – that remote working may be considered as a key-factor for their overall acceptance, either as an adaptive or as a mitigative measure against environmental health deterioration. Especially in urban areas, where pollution’s impact on human and animal health, and the burden it places on the relevant health sector’s expenses are devastating, their probable positive contribution may be of paramount importance (Pascal et al., 2013; Lanzi et al., 2018).

Remote-working arrangements may reduce urban traffic, energy, and water consumption, and offer opportunities for actions against low urban air quality, climate change and other health threats that impact life quality negatively. Remote-working arrangements that reduce the number of vehicles without endangering firms’ sustainability, may serve as an indirect, but effective, traffic management control measure (Maipas et al., 2021b), in favor of maintaining a higher quality of urban life.

Further, given the necessity for the adoption of green market strategies as a tool for creating, sustaining or improving a firm’s competitive advantage, remote-working

arrangements may serve as competitive advantages sources, that protect both the natural capital and firms’ sustainability, as well as promote the dictates of sustainable development.

1.3 Aims and objectives

This dissertation aims at disclosing the mutual relationship between remote-working models and positive environmental health outcomes by revealing the environmental co-benefits of this emerging trend and by providing necessary insights for modern human resource management. It may also serve as an advisory tool for the firms that seek a solid framework for adapting their remote working arrangements on the premise that EH is being carefully incorporated into the relevant strategies.

The significance of such an intervention, as regards, for instance, the energy demands of firms’ facilities, may also justify the use of the recently proposed -by the writer of this dissertation and his research team- remote-working carbon-saving footprint (Maipas et al., 2021b).

1.4 Structure of the thesis

This dissertation is divided into 7 main chapters, a reference section, and an appendix section. Each one of the following chapters is divided into carefully selected sections that allow readers to obtain detailed insights into the research topic, after their subsequent reading.

Chapter 1 serves as an introductory chapter to the dissertation subject. For the purposes of this chapter, the concept of “environmental health” is defined. Also, here the reader finds a first brief explanation about the association between environmental health and working model arrangements.

The next chapter, entitled “Chapter 2: Systematic Literature Review”, contains the systematic literature review on the dissertation topic, which allowed us to prepare the “Conceptual Framework & Research Hypotheses” in Chapter 3. Then, we proceed to the description of the research methodology and the data collection (Chapter 4).

Chapter 5, which requires the previous collection of the primary data, includes the necessary statistical analysis, whose interpretation and discussion are the subject of the next chapter (Chapter 6). Chapter 6 also contains the managerial implications related to remote-working arrangements for strategically implemented and productive human resource management. Finally, Chapter 7 contains a summary of the present dissertation and its conclusions.

After the main chapters, a reference list and an appendix section are provided. The appendix section contains the questionnaire of the study.

2. Systematic literature review

The following diagram describes the systematic review methodology used in our study. We focused the literature research on articles and reviews in the English language, published between March 11, 2020 [the date of the characterization of COVID-19 as a “pandemic” (WHO, 2020)] and October 30, 2022. The initial sample contained 925 articles.

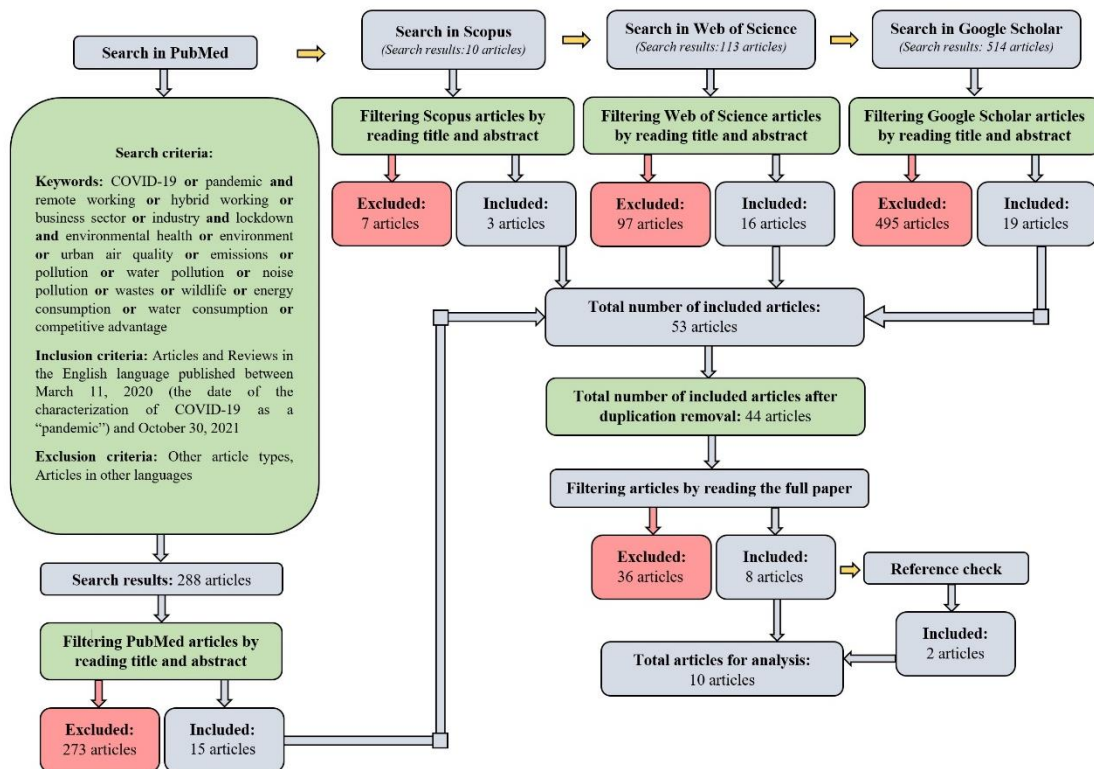


Figure 2.1: The systematic review methodology

The final sample of the systematic review procedure contained 10 articles. The confirmed high quality of the journals (as depicted by their impact factors, see Table I), and the fact that three of them focus on sustainability reveals the importance of this and of the relevant ongoing studies.

No	Journal	Impact factor	Number of articles
1	Applied Energy	9,746	1
2	Energies	3,004	1
3	Environmental Innovation and Societal Transitions	9,680	1
4	Environmental Research Letters	6,793	1
5	Global Transitions	-	1
6	Journal of Transport Geography	4,986	1
7	Sustainability	3,251	2
8	Sustainable Cities and Societies	7,587	1
9	Sustainable Production and Consumption	5,032	1

Table 2.1: Journals, Impact factors, and Number of articles

Two out of ten articles do not include data from the recent, and historically largest ever, remote-working experience (see Banjo et al., 2020). However, their results are useful, and were included in the current study. The first of these two is a systematic review article whose references cover the period before the characterization of COVID-19 disease as a pandemic, i.e., 1994 – 02/2020 (Hook et al., 2020). The second one also covers a short period before the outbreak of COVID-19 disease, i.e., 2011-2016 (Eldér, 2020).

The following tables provide a description of the systematically reviewed articles.

No	Year	Reference	Industry sector or Employees of Interest	Environmental Health Parameter of Interest	Region of Interest	Country's income group*
1	2020	Edomah and Ndulue, 2020	Residential, commercial and industrial electricity consumers	Electricity consumption	Lagos (Nigeria)	Lower middle income
2		Elldér, 2020	Swedish population (randomized and representative sample)	Number of car daily trips; daily distance covered by car	Sweden	High income
3		Hook et al., 2020	-	Energy and climate impacts	World	All categories
4		Wang and Ozbilen, 2020	Residents of Puget Sound region	Built environment; sustainable travel	Puget Sound region (USA)	High income
5	2021	Abulibdeh, 2021	6 sectors in Doha (2 residential, 1 commercial, 1 industrial, 1 governmental, 1 productive farm)	Electricity consumption; Water consumption	Doha City (Qatar)	High income
6		Deiss et al., 2021	Office workers	Energy consumption	New York (USA)	High income
7		Fabiani et al., 2021	Desk-workers	Greenhouse gas emissions by each desk-worker; houses' and workplaces' energy efficiency	Italy	High income
8		Guerin, 2021	Primary source: a corporate entity in the utility and service's sector which has big office spaces in various areas of Australia	Daily commuting distance; energy use; energy efficiency; depletion of energy sources and scarce metals; global warming potential; photochemical oxidation; human toxicity	Australia	High income
9		Loia and Adinolfi, 2021	Twitter's users	Public's perception of the positive environmental impact of remote working	Twitter	-
10		Noussan and Jarre, 2021	Commuters in Lombardy	Commuting demand (for work or study purposes); energy consumption; greenhouse gas emissions	Lombardy (Italy)	High income

*The World Bank, n.d.

Table 2.2: The systematically reviewed articles (a)

Ref.	Article’s title	Methodology	Environmental Health positive outcome
Edomah and Ndulue, 2020	Energy transition in a lockdown: An analysis of the impact of COVID-19 on changes in electricity demand in Lagos Nigeria	Exploratory research; data collection from feeder locations	HC
Elldér, 2020	Telework and daily travel: New evidence from Sweden	Data collection from the Swedish National Travel Survey; multivariate regression models	HC
Hook et al., 2020	A systematic review of the energy and climate impacts of teleworking	Systematic review	LC
Wang and Ozbilen, 2020	Synergistic and threshold effects of telework and residential location choice on travel time allocation	Empirical study; exploitation of data from the United States Environmental Protection Agency’s Smart Location Database; gradient boosting decision tree model	MC
Abulibdeh, 2021	Spatiotemporal analysis of water-electricity consumption in the context of the COVID-19 pandemic across six socioeconomic sectors in Doha City, Qatar	Data collection from Qatar General Electricity and Water Corporation; calculation of energy and water consumption’s variability over time and space (e.g., use of GIS, hot spot analysis, spatial and regression statistical analysis)	HC
Deiss et al., 2021	Analysis of Energy Consumption in Commercial and Residential Buildings in New York City before and during the COVID-19 Pandemic	Primary data collection from US Energy Information Administration, US Census Bureau, and NYC Open Data; construction of a representative commercial office building model (in Midtown Manhattan)	HC
Fabiani et al., 2021	Sustainable production and consumption in remote working conditions due to COVID-19 lockdown in Italy: An environmental and user acceptance investigation	Life Cycle Assessment based on ISO 14040; questionnaire; statistical analysis (ordinal logistic regression, multinomial logistic regression)	HC
Guerin, 2021	Policies to minimise environmental and rebound effects from telework: A study for Australia	Comparative lifecycle assessment based on ISO 14040, 14041, 14042, 14043, 14048; use of SimaPro (lifecycle assessment software)	HC
Loia and Adinolfi, 2021	Teleworking as an Eco-Innovation for Sustainable Development: Assessing Collective Perceptions during COVID-19	Data collection of Twitter’s users’ opinions; data mining; sentiment analysis	HC
Noussan and Jarre, 2021	Assessing Commuting Energy and Emissions Savings through Remote Working and Carpooling: Lessons from an Italian Region	Bottom-up analysis based on an origin-destination matrix; estimation of travel distances; estimation of vehicle stock; estimation of energy consumption of transportation	HC
*HC = high confidence, **MC = medium conf., ***LC = low conf. (based on authors’ opinions and comments)			

Table 2.3: The systematically reviewed articles (b)

The systematic review by Hook et al. (2020), despite not including the remote-working experience imposed by the pandemic, found a potential for positive environmental health outcomes. Hook et al. (2022) concentrated on energy consumption related to home-based remote working, as a feasible outcome of modern information and communication technologies, and, after collecting an initial sample of 9.461 articles, synthesized the results of 39 empirical articles presenting quantitative analyses. The authors clearly highlighted the need for avoiding “superficial” positive results, since the majority of the reviewed studies had partially ignored certain crucial parameters such as non-work travel, home and office energy consumption, and the difference in the energy efficiency of the different transport modes (Hook et al., 2022). The other study that also did not include data from the recent remote-working experience, i.e., the study of Elldér (2020), by analyzing data from the Swedish National Travel Survey 2011-2016, concluded that full-day remote-working is more environmentally efficient than part-day remote-working, reduces congestion during rush hours, and is associated with higher rates of active travel modes’ use, such as walking and bicycling, generating more positive health outcomes for remote workers.

Edomah and Ndulue (2020), by collecting data from electricity distribution companies feeding Lagos (Nigeria), confirmed significant changes in electricity demand due to lockdown policies. They demonstrated that there is a clear reduction in the commercial and industrial sector’s energy needs due to lockdown that kept people in their houses, forcing them to consume more energy in their residential spaces. However, the business-as-usual scenario generally seems to be more energy demanding than remote-working arrangements (Edomah and Nduleue, 2020), demonstrating that there is room for adopting relevant strategies towards the desired energy transition goals.

Wang’s and Ozbilen’s empirical study (2020), which was based on the 2017 Puget (Washington State, US) Sound Regional -smartphone based- Travel Survey, provided insights about the residential location, built environment characteristics, and sustainable travel. The authors also highlighted the beneficial role of remote-working arrangements when combined with an adequate, healthier and greener built environment (Wang’s and Ozbilen, 2020). Moreover, Fabiani et al. (2021), via studying the life cycle impact of common everyday activities on the Global Warming

Potential under normal and lockdown conditions in Italy, found that remote working displayed a positive environmental health impact when the daily distance between the house of the desk-duty employee and its workplace was larger than 10 km. The larger the distance, the better the environmental performance during the recent lockdown. However, employees whose houses were located within a 10 km – distance from their workplace, produced a negative environmental health outcome, since the contemporary high energy needs of their house’s heating exceeded the relevant reduction in the workplace’s energy need (Fabiani et al., 2021).

Noussan and Jarre (2021), via analyzing the commuting demand in Lombardy (Italy) and its impact, also related the avoidance of longer daily trips with a better environmental performance, and proposed a non-homogenous remote-working arrangement between a given firm’s employees based on the distance-to-be-covered, which in combination with strategical governmental decisions regarding remote-working, could significantly reduce the firms’ environmental impact. The authors, by combining remote-working’s and carpooling’s positive impact (Figure 2.2), also found that remote-working is more effective in emission savings (Noussan and Jarre, 2021).

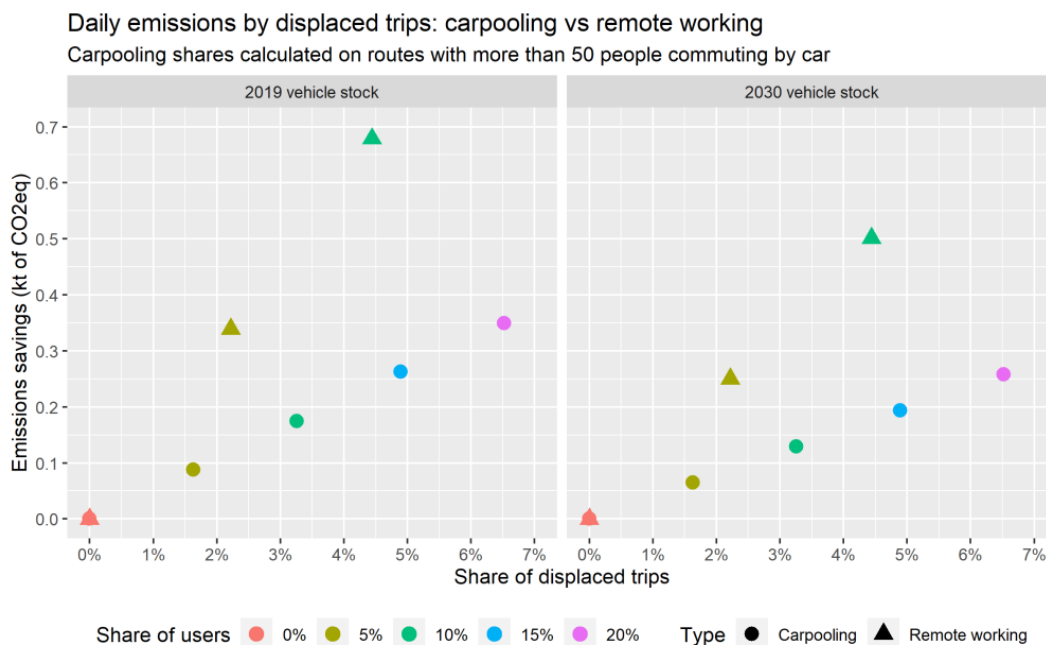


Figure 2.2: Carpooling vs Remote Working. Source: Noussan and Jarre, 2021. License: CC BY 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

Abulibdeh (2021) studied, via focusing on spatial distributions and spatial statistical analysis, the lockdown's impact on energy consumption and on another environmental parameter, i.e., water consumption. The diagrams in Figure 2.3 describe the water and energy consumption in Qatar during the period 2018-2020. The higher residential energy consumption during the summer months was attributed to the wide use of energy-demanding systems that follow a seasonal pattern, such as air conditioners. The confirmed positive relationship between these two parameters may offer opportunities for less water use via energy consumption reduction policies (Abulibdeh, 2021).

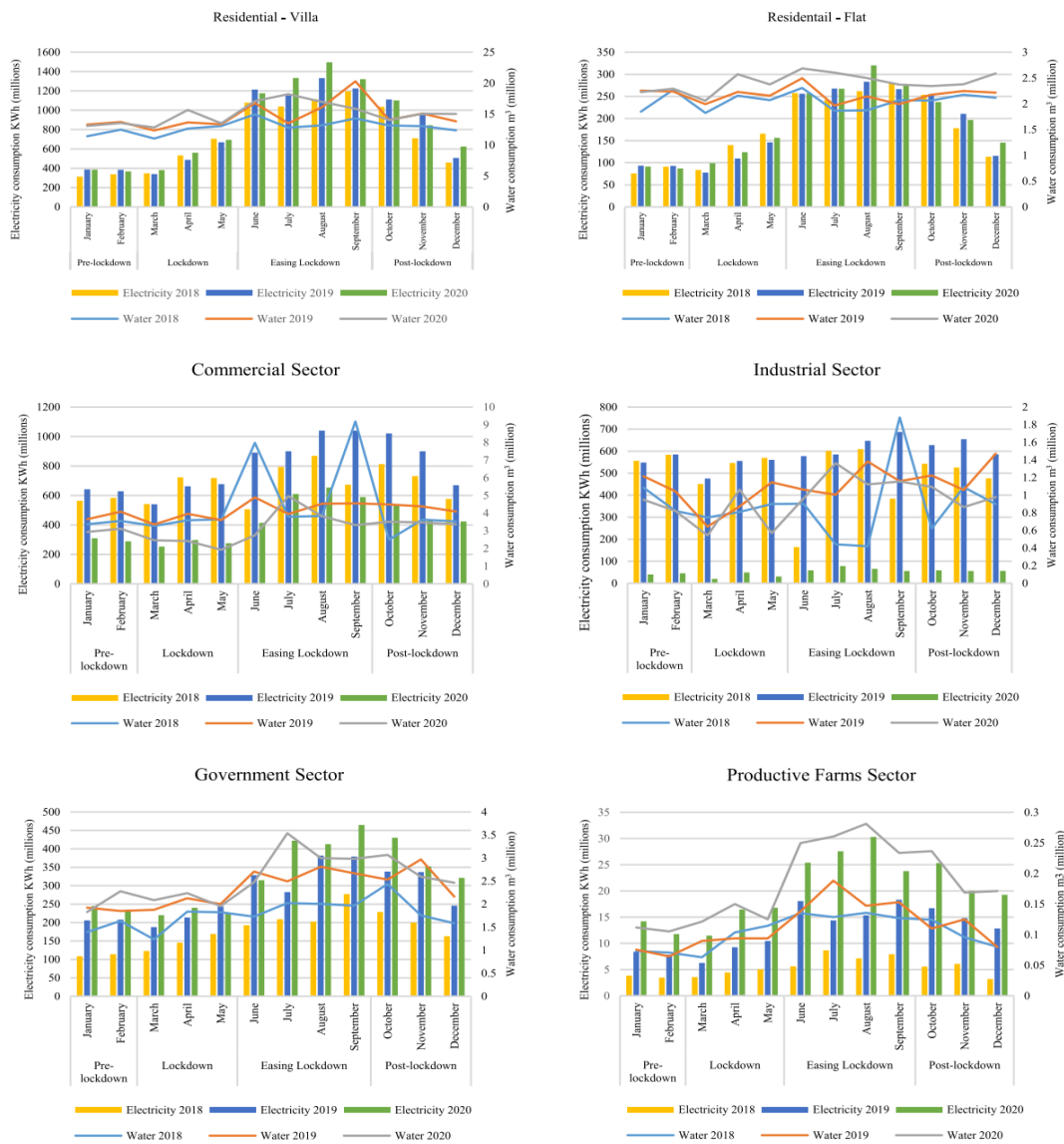


Figure 2.3: Water and electricity consumption in Qatar. Source: Abulibdeh, 2021. License: CC BY 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

Deiss et al. (2021) proved that there is a threshold in office occupancy where the energy burden from commercial and transport energy needs becomes larger than the energy burden from residential energy needs. Indeed, the adoption of a relevant remote- or hybrid- working arrangement may result in lower energy burdens and energy costs, and be also beneficial for employees who can save money from the significant reduction in their own transportation expenses. Moreover, the lower the office occupancy, the greater the distances between employees and, as a result, the lower the probability of the virus spread (Deis et al., 2021).

The following diagrams (Figures 2.4-2.6) display the energy consumption patterns related to a representative office building in New York (model office building created by the authors), a comparison between transportation costs savings and household energy costs, and the previously described threshold (Deiss et al., 2021).

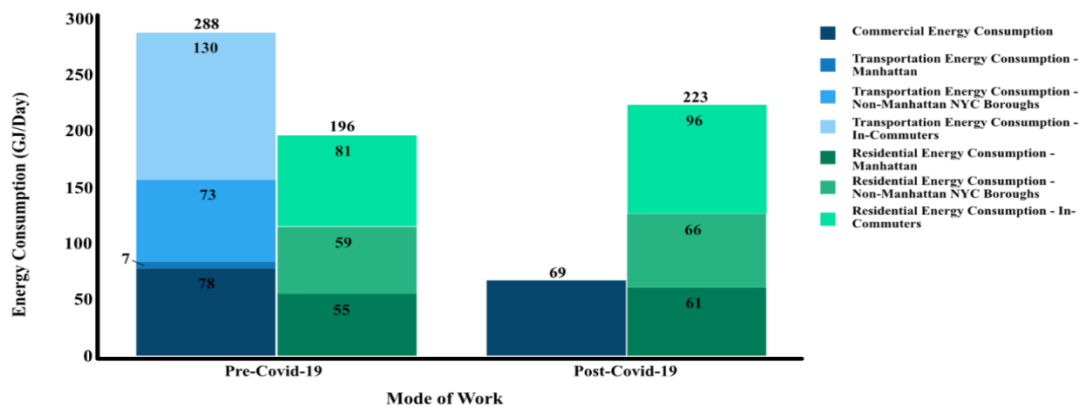


Figure 2.4: Comparison of energy consumption. Source: Deiss et al., 2021. License: CC BY 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

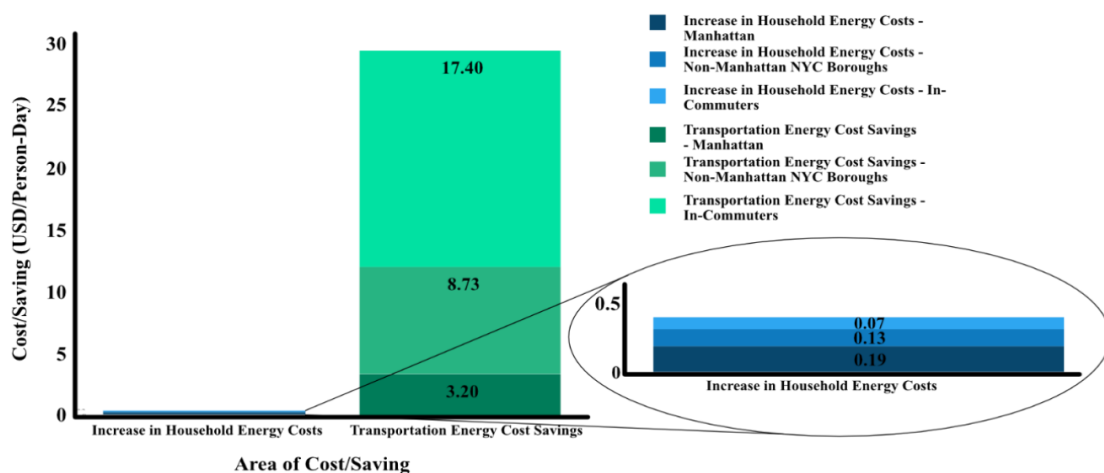


Figure 2.5: Household energy costs vs transportation energy cost savings. Source: Deiss et al., 2021. License: CC BY 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

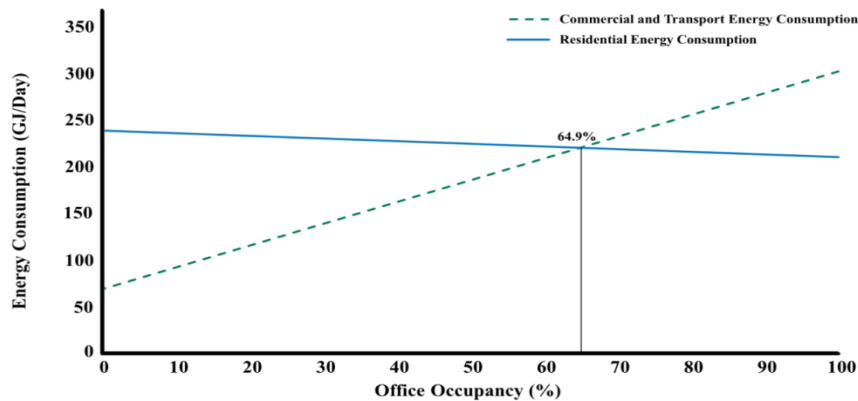


Figure 2.6: Energy consumption vs office occupancy. Source: Deiss et al., 2021. License: CC BY 4.0 (<https://creativecommons.org/licenses/by/4.0/>)

Guerin (2021) published a very interesting research article, based on a comparative lifecycle analysis, that concluded that there is a clear potential for global warming impact benefits associated with teleworking’s comparison to non-teleworking. However, there are some crucial parameters that determine the positive impact of remote-working. These parameters may be summarized in the following table.

Parameter	Parameter’s behavior	Environmental benefit due to remote-working
Commuting distance	Increase	Increase
Firm’s buildings’ efficiency	Increase	Decrease
Home office’s dependence on greener energy sources	Increase	Increase
Hot-desking (i.e., the use of the same desks by more than one worker at different times which reduces the need for space)	Increase	Increase

Source: Guerin, 2021

Table 2.4: Remote-working’s “rule of thumb”

The paramount importance of the distance is evident once again in this research article that uses data from Australia. As a matter of fact, Guerin (2021), as mentioned previously, argues that the workers who have to travel the longest distances for arriving at their workplace should be prioritized for remote-working arrangements. However, that may “allow” some employees to move far from their workplace, in order to become remote workers; a decision that has the potential to alter land use and urbanization patterns (Guerin, 2021).

Of note is the fact that the big data analysis performed by Loia et al. (2021) concluded that there was no public perception of the positive environmental health impact of remote working, as it was revealed by the relevant “tweets” (Twitter messages). Given the known relationship between environmental concern and behavior (Fu et al., 2020), this may require more attention when associating remote-working arrangements with the adoption of environmentally friendly behavior, better environmental performance, and sustainable practices.

2.1 Strengths and Opportunities of Remote-Working Models

The systematic literature review demonstrated that remote working arrangements display the ability to offer a win-win-win situation, between firms, desk-duty employees, and the environment. The fact that there are employees who want to work remotely for specific reasons, such as due to the need for providing care to children or elderly people (Noussan and Jarre, 2021), and also the fact that remote working arrangements can reduce not only a given firm’s operating cost, but also the employees’ transportation expenses (Deiss et al., 2021), are two strengths of paramount importance towards the wider acceptance of remote working arrangements.

Since the proposed wider acceptance of remote working is already becoming a new reality, and given the “recency” of the scientific evidence, the confirmed strengths of these models may also be opportunities for acquiring future “strengths” and positive outcomes. The following table provides an overview of these opportunities.

Reduction of the firm’s environmental footprint	Fabiani et al., 2021
Improvement of the employees’ lifestyle	
Combination of remote-working arrangements with land-use policies and improvements in the built environment that also promote a healthier and greener lifestyle	Wang and Ozbillen, 2020
Clear potential to adopt energy-saving strategies and newer, environmentally friendlier energy consumption patterns	Edomah and Ndulue, 2020
Combination of remote-working with improvements in home’s office energy efficiency (e.g., use of natural light) or with the use of renewable energy sources	Guerin, 2021
Probable water-saving potential (since there is a confirmed positive relationship between energy and water consumption, given the energy-saving potential of remote-working, there may be also a water-saving potential)	Abulibdeh, 2021

Table 2.5: Opportunities of remote working models in relation to Environmental Health

2.2 Knowledge gaps

At Table 2.6, we summarize the major limitations of the systematically reviewed studies which may be considered as knowledge gaps that need to be covered by scientific research.

Reference	Article’s title	Study’s major limitations
Edomah and Ndulue, 2020	Energy transition in a lockdown: An analysis of the impact of COVID-19 on changes in electricity demand in Lagos Nigeria	Study’s reproducibility (each country adopted a different lockdown policy)
Elldér, 2020	Telework and daily travel: New evidence from Sweden	Rebound effects are not being studied in depth; the nature of the study could not include whole household level impact (e.g., travel data for other family members that do not work/telework); indirect-multidimensional effects of some study’s variables
Hook et al., 2020	A systematic review of the energy and climate impacts of teleworking	The fact that the majority of the reviewed articles provided a partial coverage of the real energy-saving outcome, ignoring some important parameters such as non-work travel, office and home energy consumption
Wang and Ozbilen, 2020	Synergistic and threshold effects of telework and residential location choice on travel time allocation	Study’s results may not be considered as a “general rule”, given each region’s special characteristics
Abulibdeh, 2021	Spatiotemporal analysis of water-electricity consumption in the context of the COVID-19 pandemic across six socioeconomic sectors in Doha City, Qatar	Elimination of certain parameters that affect electricity and water consumption, such as consumers’ behavioral patterns. The majority of the systematically reviewed studies were from the US, where there is a clear preference for the use of private cars instead of public transport. That could generate a probable over-estimation of the positive environmental health impact.
Deiss et al., 2021	Analysis of Energy Consumption in Commercial and Residential Buildings in New York City before and during the COVID-19 Pandemic	None (however, authors mention the lack of post-COVID-19 energy consumption data)
Fabiani et al., 2021	Sustainable production and consumption in remote working conditions due to COVID-19 lockdown in Italy: An environmental and user acceptance investigation	No advanced sampling and data collection methods; undetermined impact of the confounding variables, and of the seasonal impact on energy consumption (e.g., summer vs winter season)
Guerin, 2021	Policies to minimise environmental and rebound effects from telework: A study for Australia	None
Loia and Adinolfi, 2021	Teleworking as an Eco-Innovation for Sustainable Development: Assessing Collective Perceptions during COVID-19	Short duration of the study (6 months); analysis based only on Twitter, lack of demographic data; probably incomplete list of analysis’s keywords
Noussan and Jarre, 2021	Assessing Commuting Energy and Emissions Savings through Remote Working and Carpooling: Lessons from an Italian Region	Estimations based only on remote working and carpooling (negligence of a probable shift from car use to use of environmentally friendlier means of transport); difficulties in estimating the vehicle stock renewal’s indices; uncertainties in distance estimations; uncertainties in estimating future values

Table 2.6: Limitations of the systematically reviewed articles

The complexity of the issue justifies the existence and the magnitude of knowledge gaps. The majority of them have to do with the rebound effects of remote-working. Obviously, without energy efficient residential spaces, and without personal behavioral change towards a more environmentally sound behavior (e.g., extensive use of private vehicles for non-work purposes), such interventions may lead to lower or zero energy savings or to higher energy consumptions.

Given the uncertainties, the exact energy saving which could be quantitatively determined, for instance, via the calculation of a remote-working carbon-saving footprint (Maipas et al., 2021), is very difficult to be precisely determined, since it is based on a large variety of parameters. The list of the most significant parameters includes amongst others the energy efficiency of a given firm’s buildings, the space of its offices, the energy efficiency of employees’ houses, the percentage of the renewable energy use, the different behavioral patterns between the employees (e.g., some consume consciously less energy while others do not), the built environment’s characteristics, the public transport and electrical vehicles use etc.

Moreover, the ongoing and future research studies, as this dissertation thesis, should provide insights regarding amongst others: a) the water consumption pattern due to remote working arrangements, b) the firms’ waste production pattern due to remote working arrangements, c) the impact of the firms’ existing environmental profile on the establishment of remote working arrangements, d) the firms’ perception about the environmental efficiency of remote working arrangements, and e) the possibility for firms to gain a competitive advantage via a better environmental profile due to remote working arrangements.

3. Conceptual Framework & Research Hypotheses

According to the EU Renovation Wave Strategy (EC, 2020) which aims at climate neutrality and recovery, the COVID-19 pandemic has boosted the necessity to deeply renovate our buildings towards environmental sustainability and high energy efficiency. Based on that, and on the obligatory energy upgrading of our buildings by 2030, according to the Energy Performance Building Directive (EC, 2021), as well as on the EU’s ecodesign requirements (EC, n.d.), and on efforts such as the establishment of subsidies for the replacement of household energy-intensive appliances (Kathimerini Cyprus, 2021), one could “ignore” the probable differences in the energy class between households and office buildings, since these differences are going to be either eliminated or substantially reduced during the next years. However, this dissertation did include some relevant questions regarding the differences in energy efficiency since this parameter is still important.

Obviously, the impact on environmental health is a highly complex outcome, determined by factors such as vehicle emissions, electricity and water consumption, and waste production. Indeed, all the relevant research studies address one or more of these four parameters. This cannot surprise us since these are amongst the main environmental determinants of health and well-being.

Moreover, by looking at the 17 Sustainable Development Goals in the following figure, one could easily understand that these certain factors are also important determinants for the overall achievement of sustainability, since they are either directly or indirectly related to each one of the 17 goals.

SUSTAINABLE DEVELOPMENT GOALS



Figure 3.1: Sustainable Development Goals (Source: United Nations, n.d.)

Furthermore, as the Pan American Health Organization (PAHO, n.d.), which serves as the World Health Organization’s Regional Office for the Americas, describes, there are five certain sustainable goals that closely address the so-called “environmental determinants” of health, contributing either directly or indirectly to the achievement of Good Health and Well-being (Goal No. 3). These five goals are the following:

- a) Clean Water and Sanitation (Goal No. 6)
- b) Affordable and Clean Energy (Goal No. 7)
- c) Sustainable Cities and Communities (Goal No. 11)
- d) Climate Action (Goal No. 13)
- e) Sustainable Production and Consumption (Goal No. 12)

These five key areas are closely and directly related to all the variables selected for our study: a) **Firm’s environmental profile**, b) **Remote working arrangements**, c) **Greenhouse gas vehicle emissions**, d) **Electricity consumption per employee**, e) **Water consumption per employee**, and f) **Waste production per employee**.

Although we address the necessary parameters, there were some factors that we were not able to incorporate into our study, such as the collection of numerical data from the electricity and water providers regarding the relevant consumptions before, during

and after the recent lockdown, as well as the collection of numerical data regarding commuters' fuel consumption. The incorporation of these data was not feasible due to the difficulty of measuring and collecting them, and also due to the time constraints a master's dissertation has in regards to its completion. Moreover, there are also some other interesting parameters that are similarly difficult to be determined, such as the reduction in urban noise pollution levels, and the wildlife's "bounce back" due to the adoption of policies that reduce urban traffic as became obvious during the recent lockdowns (Arora et al., 2020; Garrido-Cumbrera et al., 2021).

The previously mentioned factors-variables are all determined by both governmental and personal decisions. Further, we strongly believe that the parameter of vehicle greenhouse gas emissions, and the patterns of electricity and water consumption, as well as of waste production, may be controlled by carefully and strategically selected working arrangements, especially in the case of office desk employees, such as the respondents to our questionnaire.

As regards the results of the study, we expect to find a positive environmental health impact from the establishment of remote working arrangements, which may improve the existing environmental profile of a given firm, which is a product of the aggregate of daily and non-daily firm's operations (see, for instance, Tsalis et al., 2020).

We base our expectation on the following hypotheses:

Hypothesis 1 (H1): The environmental profile of a given firm has an impact on the establishment of remote working arrangements

Remote working arrangements, as has been demonstrated by the systematic literature review of the previous chapter, do display a potential for positive environmental health outcomes. The adoption of eco-innovation and policies that boost the environmental profile and behavior of a given firm depends, amongst others, on the technological frontiers and on the environmental awareness of the managers (González and León, 2001; González-Benito and González-Benito, 2008; Machnik-Słomka and Kłosok-Bazan, 2017). Remote working may serve as an eco-innovative alternative to traditional working arrangements, as Loia and Adinolfi (2021) describe

by taking into consideration the “definition” of environmental innovation provided by Oltra and Jean (2009).

Oltra and Jean (2009) include the modified processes that benefit the environment into the definition of “environmental innovation”. As regards remote working, it is a modified version of traditional working patterns that benefits environmental health. Its adoption as a strategy to improve the environmental footprint of a given firm, as well as the adoption of every environmentally friendly policy, may depend on the already existing environmental profile of the firm.

Hypothesis 2 (H2): Remote working arrangements reduce greenhouse gas vehicle emissions per desk-duty employee-commuter (reduction of circulating cars)

Remote working arrangements impact on the demand for commuting, and, as a result, on the number of circulating cars; a fact that displays a clear potential for a reduction in greenhouse gas emissions (Fabiani et al., 2021; Guerin, 2021; Noussan and Jarre, 2021). Indeed, the recent lockdown, combined with the forced establishment of remote working, did significantly improve urban air quality in many large cities around the world, since vehicle emissions are a crucial determinant for urban air quality and its health implications (Maipas et al., 2021). Of note, Giovanis (2018), via studying teleworking’s impact on traffic and air quality in Switzerland over the period 2002-2013, demonstrated that teleworking reduces traffic on average by 2.7%, and air pollution by 2.6-4.1%. Giovanis (2018) highlights, amongst others, the key factor of the reduction in the number of people driving alone; a parameter that reduces fuel demand/consumption, traffic, congestions, and air pollution (Giovanis, 2018).

Hypothesis 3 (H3): Remote working arrangements reduce electricity consumption per desk-duty employee

Overall, by taking into consideration both entrepreneurial and residential energy demand, there is evidence that remote working arrangements are associated with a less energy demanding business model compared to the business-as-usual model (Edomah and Ndulue, 2020). Moreover, an interesting report prepared by Access Economics (2010) for the Australian government reveals that there is a clear potential for energy savings via a reduction in electricity demand/need per worker when comparing remote working to traditional office working. Indeed, remote working does offer an opportunity for achieving lower electricity consumption patterns, as the systematic review of the previous chapter has revealed.

Hypothesis 4 (H4): Remote working arrangements reduce water consumption per desk-duty employee

As we have already mentioned in the previous chapter, remote working arrangements may display a water-saving potential; closely linked to the energy-saving potential (Abulibdeh et al., 2021). Moreover, as Moglia et al. mention (2021) the increases in residential water consumption during the recent lockdown may have been offset by the water consumption decrease in the commercial sector. Despite the complexity of the issue, we may assume that there is a potential for a reduction in water consumption, since remote workers consume zero water from their offices' facilities while working remotely, as Otaki et al. (2020) assume for the residents when they are away from their homes.

Hypothesis 5 (H5): Remote working arrangements reduce waste production per desk-duty employee

Waste production patterns, as regards, for instance, the volume and the spatial distribution of the produced waste is a complex outcome of governmental decisions (e.g. regarding mobility, economic activities, and human presence in certain areas), firm's policies and employees' behavior (Edjabou et al., 2015; Sarmiento et al., 2022).

Especially in the case of desk-duty employees, where we have a large variety of produced waste (e.g., paper, plastic materials, food waste, and electronic waste), there is a strong need to avoid unnecessary waste production, to recycle and re-use some waste types, such as organic waste that could serve as fertilizers (Edjabou et al., 2015; Coker et al., 2016). Employees’ behavior towards the reduction of the generated waste is a crucial sustainability parameter that it could be the result of a relevant joint firm’s sustainability effort (see, for instance, Vieira de Almeida, 2015) and/or the result of the replacement of traditional, paper-demanding processes with digitalized alternatives that require much less paper, as it is being accomplished when people working remotely (McCaney, 2011; Open Access Government, 2021).

The following diagram gives an illustrative overview of the previously mentioned hypotheses, and depicts the conceptual framework of our study.

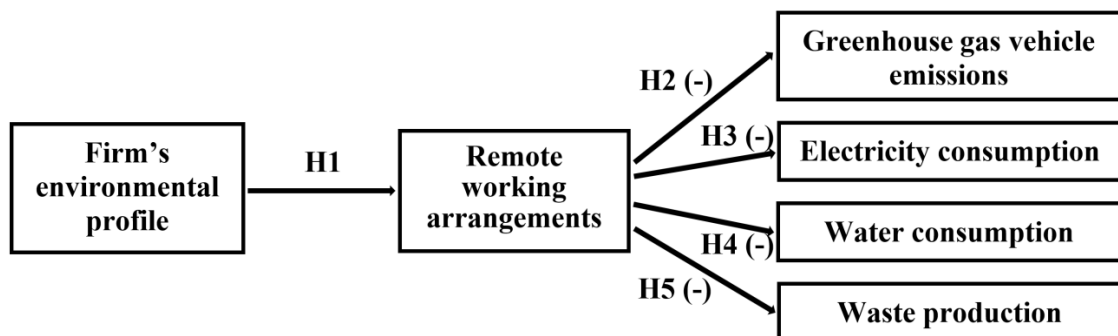


Figure 3.2: The conceptual framework of the study

4. Research methodology

A structured questionnaire was prepared based on the five research hypotheses as they have already been described in the previous chapter. The questions were selected after carefully reviewing the relevant literature and critically scrutinizing other researches' questionnaires, that were addressing the same factors-variables. Furthermore, a few more questions were prepared, in order to cover our theme more spherically. The questionnaire was initially prepared in English since HOU's MBA program is also offered in English. Afterwards, since the respondents are mainly citizens who speak Greek as their mother tongue, we translated the questions into Greek. Then, the Greek questionnaire was inserted into a Google Form, in order to be electronically distributed to desk-duty employees who have remote-working experience, mainly as a result of the recent COVID-19 restrictions.

4.1 Questionnaire design & structure

The structured questionnaire of the study consisted of seven main sections, and one introductory section. The introductory section was providing information regarding the “who, what, and why” of our study, and was thanking all the participants who voluntarily and anonymously answered the questions. It also provided the contact details of the MBA student, and information regarding participants' access to the results of the study.

The seven main sections/parts were the following:

- Section A: This part, entitled “**Demographic data and occupational position**”, collected data regarding respondents' demographic information and occupational position.
- Section B: This part, entitled “**Firm's environmental profile**”, consisted of energy-, water-, and waste-related questions, aiming at providing an overview of the current environmental profile of a given firm.
- Section C: This part, entitled “**Remote working arrangements**” asked the respondents to describe their remote working day.

- Section D: This part, entitled “**Greenhouse gas vehicle emissions**”, collected data regarding the commuters’ carbon footprint.
- Section E: This part, entitled “**Electricity consumption per employee**”, asked respondents to provide information regarding their electricity demand/consumption while being either at their workplace or at their home office.
- Section F: This part, entitled “**Water consumption per employee**”, asked respondents to provide information about how their water demand/consumption changes while being at their workplace.
- Section G: This part, entitled “**Waste production per employee**”, provided information about employees’ waste production patterns (e.g., paper, kitchen-waste, e-waste etc.), and tries to identify relevant differences between remote and non-remote working arrangements.

Both the English and Greek versions of the full questionnaire, as well as their introductory texts, are available in the Appendix.

The following table describes each one of the main parts of the questionnaire.

Part	Factor/Variable	Number of questions	Measuring scale	Sources <i>(after necessary modifications, adjustments, and additions)</i>
A	Demographic data and occupational position	16	-	National Research Council Canada, 2018; de Pádua Pinheiro Pieron, 2020; Statistics Canada, n.d.
B	Firm’s environmental profile	25	5-point Likert scale	Vassileva et al., 2012; Fiorillo, 2013
C	Remote working arrangements	4	5-point Likert scale	Corpuz, 2011
D	Greenhouse gas vehicle emissions	6	5-point Likert scale	Sobrino and Arce, 2021
E	Electricity consumption per employee	8	5-point Likert scale	Vassileva et al., 2012
F	Water consumption per employee	3	5-point Likert scale	Otaki et al., 2020
G	Waste production per employee	11	5-point Likert scale	Procházková, 2019 (waste categories); Zhang et al., 2019
Total number of questions:		73		

Table 4.1: Questionnaire structure and sources

4.2 Data collection

The participants were recruited mainly via snowball sampling, which is a common technique based on the respondents will to forward the questionnaire to more participants (see, for instance, Chambers et al., 2020). Due to the large number of the student’s personal and professional contacts, we were able to reach a large initial number of respondents, who voluntarily helped us by forwarding the questionnaire to their own personal and professional contacts and asking them to do the same. Given the multitude of ways that the questionnaire was distributed (email, Viber groups, Facebook, etc.), we are not able to know the total number of people who were invited to respond to the questionnaire.

In particular, the questions -in Greek- were inserted into a Google Form. Google Form is very helpful since it is compatible with all the devices, and gives us the results in a well-structured table. Afterwards, the link to the questionnaire was sent to the student’s contacts via email, Viber and Facebook (either as a post or as a Messenger message). The majority of the contacts voluntarily agreed to distribute the questionnaire further. The primary contact list included the student’s friends, relatives, colleagues and acquaintances. Moreover, the questionnaire was sent to student’s fellow students via email. Finally, the student tried to approach a few private entities in Athens and Thessaloniki. Some of those with which he does maintain relationships help us with the further distribution of the questionnaire.

The questionnaire was available from February 18 to March 18, 2022. In total, 207 people participated in the survey.

5. Data analysis

5.1 Introduction

Initially, 207 answers were collected through the electronically distributed questionnaire. Out of 207, 13 had to be excluded since 10 people had no remote working experience, and 3 people had exclusively only remote working experience. The questions that served as “screening questions” were the A.7, i.e. “Distance (in km) between home and workplace”, and the C.1, i.e. “I have been working at home on some days as part of my company’s/organization’s remote working arrangements”. The remaining 194 answered questionnaires were fully completed.

5.2 Sample characteristics

The following paragraphs describe the information gathered through the first part of the questionnaire (demographic data and general questions about the participants and their companies/organizations). All the results described below were calculated using the IBM SPSS statistical software, Ver. 26.

The majority (75% or 146 out of 194) of the respondents were women, while the mean and the median age of the respondents were 41,26 years (Std.D.: 9,235) and 41 years respectively (Figure 5.1).

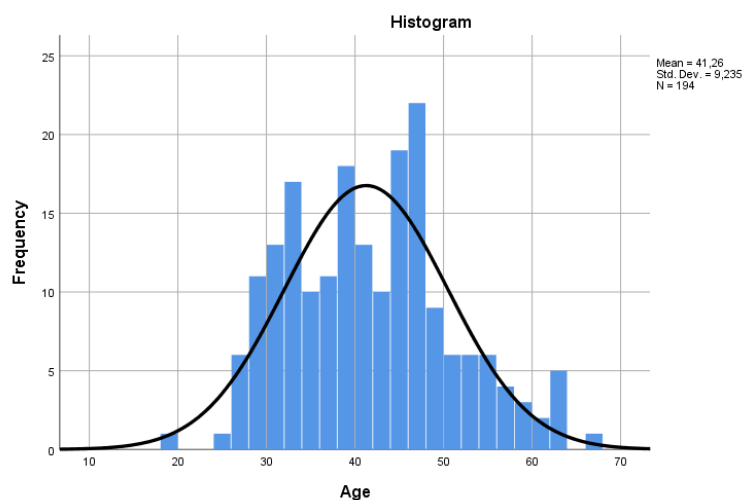


Figure 5.1: Age

Further, 52,1% of the respondents were married, while 40,2% were single. Interestingly, the respondents are rather well educated since the majority of them (51,5%) has a master’s degree or even holds a doctoral degree (6,7%) (Table 5.1).

	Frequency	Percent	Cumulative Percent
Secondary level	13	6,7	6,7
Post-secondary level	8	4,1	10,8
Bachelor’s degree	60	30,9	41,8
Master's degree	100	51,5	93,3
Doctoral degree	13	6,7	100,0
Total	194	100,0	

Table 5.1: Higher completed educational level

Their families, living in the same house, include 2,57 members (Std.D: 1,208), with the number of minors being 0,71 (Std.D: 0,954).

As far as the residential area of the participants is concerned, the majority of them are living and working in the region of Attica. It is worth mentioning that the questionnaire was also answered by 11 Greeks living and working abroad (10 in Denmark, 1 in England).

Further, it is worth noticing that the mean distance between respondents’ home and workplace is about 12 km (Std.D: 18,077), while the median distance is about 7 km. The smaller distance is 0 km (people living very close to their work, 3 answers), and the largest distance is 148 km (1 answer). Both distances were accepted since in the countryside of Greece many people live and work on different floors of the same building. Moreover, in Attica, there are many people who live in Athens and work, for instance, in Boeotia.

The mean average time spent travelling from home to workplace is 29,21 min. (Std.D: 21,874), and the median 25 min., with the shortest trip lasting only 1 min, while the largest 120 min. It is important that in order to cover the distance between home and their workplace, they are using various means of transportation, mainly their private cars (52,1%), public transportation (24.2%), or even on foot (14,4%). Motorcycles, bicycles and other means are used by less than 10% of the participants.

The vast majority of the participants are full time employees (94,3%), mainly working as administrative personnel (42,8%) (Table 5.2), in the public (46,9%) or the private sector (41,2%) (Table 5.3) in firms of all sizes (Table 5.4).

	Frequency	Percent
Manager	26	13,4
Administrative personnel	83	42,8
Working personnel	55	28,4
Other	30	15,5
Total	194	100,0

Table 5.2: Occupational position

	Frequency	Percent
Private company	80	41,2
Non-governmental organization	12	6,2
Public sector company	91	46,9
Other	11	5,7
Total	194	100,0

Table 5.3: Type of company/organization

	Frequency	Percent
<10 employees	28	14,4
10-50	70	36,1
51-250	35	18,0
251-500	20	10,3
>500	41	21,1
Total	194	100,0

Table 5.4: Size of company/organization

The next table (Table 5.5) provides an overview of the industry sectors.

	Frequency	Percent
Education	55	28,4
Hospitality	4	2,1
Financial sector	13	6,7
Info.Techn. & Communications	21	10,8
Health	16	8,2
Media and Entertainment	1	,5
Transportation	2	1,0
Manufacturing	4	2,1
Construction	5	2,6
Other	73	37,6
Total	194	100,0

Table 5.5: Industry sector

5.3 Firms’ environmental profile

The second part of the questionnaire consisted of 5 sub-sections: energy consumption (EC), water consumption (WC), energy efficiency (EE), waste production (WP), and one section/question related to employees’ environmental footprint.

The first subsection refers to the energy consumption (EC) which includes 8 questions. The results of the descriptive analysis are presented in Table 5.6.

It is observed that the mean score of all eight items is above the mean point 3 (neither disagree nor agree), that is on the positive side of the scale. The items with the highest mean score are EC7 and EC6 (3,59 and 3,56 respectively), suggesting that organizations show an interest in improving their electricity consumption habits, although they are already using low energy lamps wherever it is possible. On the other hand, the item with the lowest mean score is EC2 (3,15) revealing that these organizations do not have a good knowledge on how to keep low their overall energy consumption.

	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8
Mean	3,19	3,15	3,44	3,48	3,45	3,56	3,59	3,24
Median	3	3	3,5	4	3	4	4	3
Mode	3	3	3	4	3	4	4	3
Standard deviation	1,347	1,214	1,242	1,239	1,2	1,267	1,172	1,354

Table 5.6: Energy consumption

- EC1: Interest in energy-related questions
- EC2: Knowledge on how to keep low energy consumption
- EC3: Desire to increase knowledge on keeping low energy consumption
- EC4: Knowledge of own electricity consumption
- EC5: Will to increase knowledge on electricity consumption
- EC6: Use of low energy lamps where possible
- EC7: Interest in improving electricity consumption habits
- EC8: Efforts to limit hot water consumption

The next subsection (i.e., water consumption) included seven questions. As we can see in the following table (Table 5.7), the mean score of all the items is above the mean point, i.e., on the positive side of the scale. The item with the highest mean score (3,51) is the WC4, suggesting that organizations do know their water consumption. However, the two items with the lowest score [i.e., WC2 (3,17) and WC7 (3,18)] indicate that these organizations do not try enough to limit water

consumption, and do not have a good knowledge on how to keep low their water consumption.

	WC1	WC2	WC3	WC4	WC5	WC6	WC7
Mean	3,30	3,17	3,27	3,51	3,27	3,32	3,18
Median	3	3	3	4	3	3	3
Mode	3	3	3	3	3	3	3
Standard deviation	1,244	1,237	1,213	1,218	1,156	1,196	1,189

Table 5.7: Water consumption

- WC1: Interest in water-related questions
- WC2: Knowledge on how to keep low water consumption
- WC3: Desire to increase its knowledge on keeping low water consumption
- WC4: Knowledge of own water consumption
- WC5: Will to increase knowledge on water consumption
- WC6: Interest in improving water consumption habits
- WC7: Efforts to limit water consumption

The third subsection (i.e., energy efficiency) included two questions (Table 5.8). The mean scores of both items are below the mean point (i.e., neither disagree nor agree). That reveals that the companies/organizations whose employees participated in our survey have important gaps in energy efficiency that should be addressed.

	EE1	EE2
Mean	2,92	2,98
Median	3	3
Mode	3	1
Standard deviation	1,321	1,452

Table 5.8: Energy efficiency

- EE1: Use of energy efficient heating systems
- EE2: Insulation level provided by external doors' and windows' frames

The next subsection (i.e., waste production) included seven questions (Table 5.9). It is observed that the mean score of all the seven items is above the mean point. The item with the highest mean score (3,54) is the WP7, suggesting that companies/organizations show a notable interest in separating waste collection by placing materials in the relevant recycling bins. However, the two items with the lowest score (3,21) are WP2 and WP4, suggesting that companies/organizations try to limit their waste production, and also increase their knowledge on producing less waste.

	WP1	WP2	WP3	WP4	WP5	WP6	WP7
Mean	3,42	3,21	3,32	3,21	3,27	3,24	3,54
Median	3	3	3	3	3	3	4
Mode	5	3	3	3	3	3	5
Standard deviation	1,338	1,222	1,222	1,271	1,226	1,215	1,389

Table 5.9: Waste production

- WP1: Interest in waste-related questions
- WP2: Efforts to limit waste production
- WP3: Knowledge on how to produce less waste
- WP4: Desire to increase knowledge on producing less waste
- WP5: Knowledge of own waste production
- WP6: Will to increase knowledge on waste production
- WP7: Waste separation by placing materials in assigned recycling bins

The next subsection included one question regarding company’s/organization interest in helping employees improve their environmental footprint (Table 5.10). Since the mean score is above the mean point, there is a slight relevant interest.

	EF
Mean	3,33
Median	3
Mode	5
Standard deviation	1,360

Table 5.10: Employees’ environmental footprint

EF: Interested in helping employees improve their environmental footprint

5.4 Remote-working arrangements

This part included four questions. As we can see in the following table (Table 5.11), the respondents did have a significant remote working experience (since RW1 has a mean score very close to 5). Moreover, remote working is not an impediment to the accomplishment of the normal job tasks, as it can be deduced from the low scores of RW2 and RW3 (and from the high RW4’s score).

	RW1	RW2	RW3	RW4
Mean	4,7	1,63	2,38	3,86
Median	5	1	2	4
Mode	5	1	1	5
Standard deviation	0,638	1,089	1,45	1,392

Table 5.11: Remote-working arrangements

RW1: Level of agreement with the statement: “I have been working at home on some days as part of my company’s/organization’s remote working arrangements”

RW2: Level of agreement with the statement: “My remote working day is a day on which I do not usually work”

RW3: Level of agreement with the statement: “My remote working day is a day on which I accomplish some of my job tasks”

RW4: Level of agreement with the statement: “My remote working day is a normal working day at another workplace”

5.5 Greenhouse gas vehicle emissions

This part included six questions as regards greenhouse gas (GG) vehicle emissions (Table 5.12). The results here are consistent with what participants have mentioned in the demographic questions about the means of transportation they use. The results confirmed that they mainly use their car (GG1). The next option with the highest score -which however is below the mean point- is the public transport (GG3). Moreover, as it was expected, they often encounter traffic congestion (GG6).

	GG1	GG2	GG3	GG4	GG5	GG6
Mean	3,31	1,28	2,3	1,17	1,84	3,19
Median	4	1	1	1	1	4
Mode	5	1	1	1	1	4
Standard deviation	1,693	0,85	1,642	0,657	1,419	1,338

Table 5.12: Greenhouse gas vehicle emissions

GG1: Frequency of traveling to the workplace by car (either private car or taxi)

GG2: Frequency of traveling to the workplace by motorcycle

GG3: Frequency of traveling to the workplace by public transport

GG4: Frequency of traveling to the workplace by bicycle

GG5: Frequency of traveling to the workplace on foot

GG6: Frequency of encountering congestion

5.6 Electricity consumption per employee

This part of the questionnaire included eight questions as regards employees’ electricity consumption (EEC). The results (Table 5.13) indicate that the participants do make significant efforts to reduce their energy consumption (at their home, and at their workplace too), since all the relevant scores are well above 3 (mean point). However, as expected, these efforts are much greater at home than at their workplace. For instance, EEC1 (i.e., the effort to reduce energy consumption while being at their workplace) has a mean score of 3,90 which is much lower than the mean score of EEC5 (i.e., the effort to reduce energy consumption while being at home). Moreover, the same occurs with the standby use (EEC3 vs EEC7). It is also worth mentioning that the respondents, while being at home, display a significant energy-saving

behavior as regards the switching off the lights in unoccupied rooms (EEC6 has a mean score of 4,71), and the use of natural light (EEC8 has a mean score of 4,62).

	EEC1	EEC2	EEC3	EEC4	EEC5	EEC6	EEC7	EEC8
Mean	3,90	4,33	3,73	4,06	4,54	4,71	4,15	4,62
Median	4	5	4	4	5	5	4	5
Mode	4	5	4*	5	5	5	5	5
Standard deviation	0,974	0,902	1,161	1,054	0,603	0,510	0,948	0,566

**Smallest value (multiple modes exist)*

Table 5.13: Electricity consumption per employee

- EEC1: Efforts to reduce energy consumption while being at the office
- EEC2: Switching off the lights in unoccupied rooms while being at the office
- EEC3: Efforts to avoid the standby use while being at the office
- EEC4: Efforts to use only the natural light when possible while being at the office
- EEC5: Efforts to reduce energy consumption while being at home
- EEC6: Switching off the lights in unoccupied rooms while being at home
- EEC7: Efforts to avoid the standby use while being at home
- EEC8: Efforts to use only the natural light when possible while being at home

5.7 Water consumption per employee

The next part of the questionnaire included three questions as regards employees’ water consumption (EWC). The low mean score of EWC1 (2,4) indicates that the employees’ water usage pattern does not significantly change while being at their workplace (Table 5.14). This is in accordance with the high mean score of EWC3 (4,25) which provides a picture of the level of the satisfaction of the water usage while being at the office.

	EWC1	EWC2	EWC3
Mean	2,4	3,7	4,25
Median	2	4	4
Mode	1	4	5
Standard deviation	1,281	1,167	0,829

Table 5.14: Water consumption per employee

- EWC1: Difference in water usage pattern between home and workplace
- EWC2: Determination of water usage based on own preferences (while being at the office)
- EWC3: Satisfaction with water usage while being at the office

5.8 Waste production per employee

The final part of the questionnaire included eight questions as regards employees’ waste production (EWP) at their workplace (Table 5.15), and three questions related to EWP at their home (Table 5.16).

As regards the first set of questions (Table 5.15), the highest mean score (EWP1) confirmed the expected result that companies/organizations do produce large amounts of paper waste. Moreover, the mean scores of EWP7 (3,57) and EWP8 (3,56) indicate that there is a tendency to separate recyclable waste and dangerous waste from other waste. However, this is not true in the case of food waste (EWP6 has a mean score of 2,87). The low value of EWP5 reveals that companies/organizations whose respondents participated in the survey do not produce large amounts of electronic waste (EWP4 has a mean score of 2,18) and other types of waste (EWP5 has a mean score of 2,31).

	EWP1	EWP2	EWP3	EWP4	EWP5	EWP6	EWP7	EWP8
Mean	3,69	2,76	2,80	2,18	2,31	2,87	3,57	3,56
Median	4	3	3	2	2	3	4	4
Mode	4	2	2	1	2	1	5	5
Standard deviation	1,067	1,131	1,206	1,069	0,949	1,538	1,432	1,603

Table 5.15: Waste production per employee (workplace)

- EWP1: Frequency of producing paper waste at the workplace
- EWP2: Frequency of producing plastic waste at the workplace
- EWP3: Frequency of producing kitchen waste (such as food waste) at the workplace
- EWP4: Frequency of producing electronic waste at the workplace
- EWP5: Frequency of producing other types of waste at the workplace
- EWP6: Frequency of separating food waste from other waste at the workplace
- EWP7: Frequency of separating recyclable waste from other waste at the workplace
- EWP8: Frequency of separating dangerous waste from other waste at the workplace

The mean scores of the three items related to respondents’ behavior while being at home (Table 5.16) are above the mean point, suggesting that the respondents do display an environmentally friendly behavior as regards the management of their domestic waste. However, despite the fact that they separate recyclable waste - EWP10 has a mean score of 4,09- and dangerous waste -EWP11 has a mean value of 3,98- from other waste, there is a clear need for better performance in the management of food waste (EWP9 has a mean score of 3,61).

	EWP9	EWP10	EWP11
Mean	3,61	4,09	3,98
Median	4	5	5
Mode	5	5	5
Standard deviation	1,461	1,296	1,377

Table 5.16: Waste production per employee (household)

- EWP9: Frequency of separating food waste from other waste at home

EWP10: Frequency of separating recyclable waste from other waste at home

EWP11: Frequency of separating dangerous waste from other waste at home

It should be highlighted that the respondents display a significantly environmentally friendlier behavior as regards their waste management while being at their home. For instance, the item EWP6, i.e., the separation of food waste from other waste at the workplace, has a mean score of 2,87 which is much lower than the mean score of EWP9 (3,61), i.e., the separation of food waste from other waste at home. The same occurs with the separation of recyclable waste from other waste (EWP7 vs EWP10: 3,57 vs 4,09), and with the separation of dangerous waste from other waste (EWP8 vs EWP11: 3,56 vs 3,98).

5.9 Factor analysis

Factor analysis, which was performed with the help of the SPSS statistical software, was used in order to evaluate the reliability and also the validity of the measured items (see Anderson and Gerbing, 1988). A description of the appropriate techniques/indexes used are presented in Table 5.17.

Statistical tool	Description	Selected references
First order factor analysis	It is used to reduce the questionnaire items to a smaller group of items	Buys and Miller, 2012, p. 109
Second order factor analysis	It is used to identify probable constructs of higher order	Buys and Miller, 2012, p. 109
Kaiser-Meyer-Olkin (KMO) value	It is used, as a goodness-of-fit measurement, to assess sampling adequacy. It should be > 0,5.	Nandagopal et al., 2008, p. 164; Buys and Miller, 2012, p. 109; Dhillon et al., 2014; Hargreaves and Mani, 2015
Total Variance Explained (TVE)	It is used as a measure of the extent to which a certain factor interprets the variance of its items. Generally, it should be greater than 60.	Nandagopal et al., 2008, p. 164
Factor Loadings	These values are used to determine which variables belong to which factor (i.e., each variable may be assumed as a component of the factor with which it has the highest “loading”). Factor loadings greater than 0,6 are considered as acceptable values.	Nandagopal et al., 2008, p. 164; Chatzoglou et al., 2018
Cronbach’s alpha coefficient	It is used to measure the internal consistency / correlation between the study’s items. It should ideally be $\geq 0,7$. However, values > 0.60 are also considered as acceptable/good.	Chatzoglou et al., 2018; Tavakol and Dennick, 2011; Buys and Miller, 2012, p. 109
Correlation analysis	It is used to identify possible -either positive (+) or negative(-)-relationships between the various pairs of variables. For this type of analysis, Spearman’s correlation coefficient will be used (± 1 : strong correlation, 0: no correlation), accompanied by its p-value at a certain alpha level.	Nandagopal et al., 2008, p. 164; Darginavičienė and Navickienė, 2015
Analysis of	It is used to assess the probable impact of Part A’s items (e.g.,	Lee, 2008

Variance (ANOVA)	demographic data) on the study’s factors.	
Structural Equation Modelling (SEM)	It is used to define all the relationships between dependent and independent variables. The goodness-of-fit indices that is used are the following: a) Minimum Sample Discrepancy / Degrees of Freedom (CMin/DF, acceptable value <5), b) Goodness-of-Fit Index (GFI, acceptable value >0,9), c) Comparative Fit Index (CFI, acceptable value >0,9), d) Normed Fit Index (NFI, acceptable value >0,9), e) Root Mean Square Residual (RMR, unacceptable values >0,08), and f) Root Mean Square Error of Approximation (RMSEA, unacceptable values >0,08). Moreover, SEM analysis, via IBM SPSS Amos, also gives two important values: a) path coefficient [-1 (strong negative correlation) to 1 (strong positive correlation)], and b) a value at the top right corner of each rectangular -in our case- box, which indicates the percentage of the variance of the certain factor (the one in the box) that is explained by other factors/elements which affect the factor in the box.	Arbuckle, 2007, p. 95; Chatzoglou et al., 2018; Yakubu and Dasuki, 2018; Madan, 2020

Table 5.17: Statistical tools

The first and second order factor analysis gave the following results (for a detailed view of the items, the reader could consult the questionnaire in the Appendix section) (Table 5.18):

Factors	Items [excluded]	KMO	TVE	Factor Loadings	Cronbach a	Mean	Std. Dev.
Ba (Energy Consumption-W)	1-8	,916	65.082	,659 - ,901	,923	3,39	1,013
Bb (Water Consumption-W)	9-15	,904	78.158	,755 - ,921	,953	3,29	1,066
Bc (Energy Efficiency-W)	16-17	,500	77.523	,880 - ,880	,708	2,95	1,221
Bd (Waste Production-W)	18-24	,920	78.793	,712 - ,929	,952	3,32	1,120
C (RW Arrangements)	2-4 [1]	,647	57.529	,736 - ,771	,621	2,05	,996
D (GG Vehicle Emissions)	1, 3 [2,4-6]	,500	79.242	,890 - ,890	,738	2,49	1,485
Ea (Employees’ Elec. Consumption-W)	1-4	,772	60.569	,743 - ,808	,779	4,01	,797
Eb (Employees’ Elec. Consumption-H)	5-8	,783	61.363	,725 - ,815	,753	4,50	,514
F (Employees’ Water Consumption-W)	2-3 [1]	,500	64.908	,806 - ,806	,639	3,98	,810
Ga (Employees’ Waste Production-W)	1-5	,645	52.190	,566 - ,737	,653	2,75	,704
Gb (Employees’ Waste Separation-W)	6-8	,646	69.986	,760 - ,898	,780	3,33	1,272
Gc (Employees’ Waste Separation-H)	9-11	,659	70.411	,770 - ,893	,788	3,89	1,156

Table 5.18: First Order Factor Analysis

The results are quite satisfactory since the scores for all indexes and for all subfactors and factors are within the acceptable ranges. More specifically:

- a) From the 56 questions originally used, only 6 were excluded from the construction of the subfactors / factors.

b) The factors are adequate and valid since:

- In all cases KMO is $> 0,600$. Bc, D, and F have $KMO = 0,500$ because they are formed by only two variables.
- All the TVE values are greater than 60, with the exception of C and Ga (>50).
- Factor loadings are either very good ($>0,7$, in 10 cases) or good ($>0,6$, in 1 case). Only in one case (Ga) it is -marginally- lower than 0,6.

c) The factors are reliable:

- Cronbach a values for eight subfactors/factors are very good ($>0,7$), while three are good ($>0,6$)

A similar factor analysis was also performed (Table 5.19) in order to construct the factors related to B, E and G. The results are also satisfactory, suggesting that these factors are also valid and reliable.

Factors	Items	KMO	TVE	Factor Loadings	Cronbach a	Mean	Std. Dev.
B (Firm’s Environmental Profile)	Ba-Bd, B25	,849	71.931	,643 - ,920	,890	3,25	,969
E (Employees’ Elect. Consumption-W&H)	Ea, Eb	,500	77.934	,883 - ,883	,675	4,25	,582
G (Employees’ Waste Separation-W&H)	Gb, Gc	,500	78.017	883 - ,883	,716	3,61	1,073

Table 5.19: Second Order Factor Analysis

An overview of the results of the descriptive analysis concerning the above constructed subfactors and factors are presented in Table 5.20.

Factor	Mean	Median	Mode	Std. Deviation
Ba (Energy Consumption-W)	3,3885	3,38	3	1,013
Bb (Water Consumption-W)	3,2879	3,14	3	1,066
Bc (Energy Efficiency-W)	2,951	3,00	3	1,221
Bd (Waste Production-W)	3,3152	3,29	5	1,120
C (RW Arrangements)	2,0533	2,00	1	0,996
D (GG Vehicle Emissions)	2,4948	2,5	1	1,485
Ea (Employees’ Elec. Consumption-W)	4,0052	4,00	4	0,797
Eb (Employees’ Elec. Consumption-H)	4,5039	4,50	5	0,514
F (Employees’ Water Consumption-W)	3,9768	4,00	4	0,810
Ga (Employees’ Waste Production-W)	2,7495	2,60	3	0,704
Gb (Employees’ Waste Separation-W)	3,3299	3,33	5	1,272
Gc (Employees’ Waste Separation-H)	3,8935	4,17	5	1,156
B (Firm’s Environmental Profile)	3,2545	3,26	5	0,969
E (Employees’ Elect. Consumption-W&H)	4,2545	4,38	5	0,582

G (Employees’ Waste Separation-W&H)	3,6117	3,67	5	1,073
<i>*Smallest value (multiple modes exist)</i>				

Table 5.20: Factor analysis (factors and subfactors)

5.10 Correlation analysis

As already described in Table 5.17, for the correlation analysis, which only examines the correlation between pairs of variables, we will use Spearman’s r , and Sig. (2-tailed) value. As it becomes obvious from the following table (Table 5.21), with the exception of Employees’ waste production-W, Employees’ water consumption-W, and GG Vehicle Emissions, there are correlations -either weak or strong- between all the other variables.

Exceptionally strong are the positive correlation between Water Consumption-W and Energy Consumption-W ($r_s=0,838$), and the correlation between Firm’s Environmental Profile and: a) Energy Consumption-W ($r_s=0,886$), b) Water Consumption-W ($r_s=0,879$), and c) Waste Production-W ($r_s=0,876$).

The correlations between Waste Production-W and a) Energy Consumption-W ($r_s=0,727$), and b) Water Consumption-W ($r_s=0,744$) are relatively strong. The same occurs with the correlation between the Firm’s Environmental Profile and Energy Efficiency-W ($r_s= 0,682$), and with the correlation between employees’ electricity consumption at home and their electricity consumption at the workplace ($r_s=0,619$). Employees’ Waste Separation-H is also correlated with Employees’ Waste Separation-W ($r_s=0,535$). There is also a worth-mentioning correlation, e.g., the one between the Energy Efficiency-W and Energy Consumption-W ($r_s=0,527$).

		Energy Consumption-W	Water Consumption-W	Energy Efficiency-W	Waste Production-W	Employees' Elec. Consumption-W	Employees' Elec. Consumption-H	Employees' Waste Production-W	Employees' Waste Separation-W	Employees' Waste Separation-H	Firm's Environmental Profile	RW Arrangements	GG Vehicle Emissions	Employees' Elec. Consumption-W&H	Employees' Water Consumption-W
Energy Consumption-W	Spearman's r	1,000													
	Sig. (2-tailed)	.													
Water Consumption-W	Spearman's r	,838**	1,000												
	Sig. (2-tailed)	,000	.												
Energy Efficiency-W	Spearman's r	,527**	,477**	1,000											
	Sig. (2-tailed)	,000	,000	.											
Waste Production-W	Spearman's r	,727**	,744**	,485**	1,000										
	Sig. (2-tailed)	,000	,000	,000	.										
Employees' Elec. Consumption-W	Spearman's r	,330**	,321**	,172*	,256**	1,000									
	Sig. (2-tailed)	,000	,000	,017	,000	.									
Employees' Elec. Consumption-H	Spearman's r	,192**	,209**			,619**	1,000								
	Sig. (2-tailed)	,007	,003			,000	.								
Employees' Waste Production-W	Spearman's r							1,000							
	Sig. (2-tailed)							.							
Employees' Waste Separation-W	Spearman's r	,436**	,433**	,371**	,556**	,280**	,213**		1,000						
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,003		.						
Employees' Waste Separation-H	Spearman's r	,282**	,247**	,181*	,269**	,257**	,367**		,535**	1,000					
	Sig. (2-tailed)	,000	,001	,012	,000	,000	,000		,000	.					
Firm's Environmental Profile	Spearman's r	,886**	,879**	,682**	,876**	,348**	,190**		,557**	,305**	1,000				
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,008		,000	,000	.				
RW Arrangements	Spearman's r	-,161*	-,156*	-,170*							-,169*	1,000			
	Sig. (2-tailed)	,025	,030	,018							,018	.			
GG Vehicle Emissions	Spearman's r												1,000		
	Sig. (2-tailed)												.		
Employees' Elec. Consumption-W&H	Spearman's r	,311**	,305**	,173*	,240**	,948**	,822**		,298**	,322**	,323**			1,000	
	Sig. (2-tailed)	,000	,000	,016	,001	,000	,000		,000	,000	,000			.	
Employees' Water Consumption-W	Spearman's r						,172*								,170*
	Sig. (2-tailed)						,017								,018
Employees' Waste Separation-W&H	Spearman's r	,428**	,397**	,341**	,490**	,318**	,327**		,899**	,837**	,511**			,361**	
	Sig. (2-tailed)	,000	,000	,000	,000	,000	,000		,000	,000	,000			,000	

*Correlation is significant at the 0,05 level, **Correlation is significant at the 0.01 level

Table 5.21: Correlation analysis

5.11 ANOVA analysis

ANOVA analysis was used to examine whether the mean score of the subfactors and factors significantly differ based on the demographic characteristics of the participants.

The following tables (Tables 5.22, 5.23) display the results of the ANOVA analysis.

	Ba	Bb	Bc	Bd	Ea	Eb	Ga	Gb	Gc
Gender									
Age									
Family status	S (3,17) M (3,56) CP (2,82) D (3,70) W (5,00)								
Higher completed educational level		S (3,79) PS (3,79) B (3,45) M (3,06) D (3,48)		S (3,71) PS (3,95) B (3,43) M (3,08) D (3,80)			S (2,32) PS (2,80) B (2,77) M (2,70) D (3,40)		
Distance (km)									
Average time spent (min.)									
Means of transportation									
Household members	0 (2,50) 1 (3,05) 2 (3,30) 3 (3,79) 4 (3,50) 5 (3,46) 6 (3,56)			0 (2,48) 1 (2,86) 2 (3,33) 3 (3,70) 4 (3,36) 5 (3,69) 6 (2,86)					
Minors in the household	0 (3,26) 1 (3,64) 2 (3,36) 4 (4,67)								
Occupational status						F (4,01) P (4,04) C (3,83) O (3,50)			
Occupational position									
Type of company / organization	Pr (3,86) NG (3,54) Pu (2,99) O (3,27)	Pr (3,62) NG (3,57) Pu (2,95) O (3,35)	Pr (3,41) NG (3,58) Pu (2,44) O (3,14)	Pr (3,59) NG (3,48) Pu (3,09) O (3,00)					
Size of company / organization	<10 (3,64) -50 (3,07) -250 (3,53) -500 (3,44) >500 (3,62)			<10 (3,30) -50 (3,00) -250 (3,43) -500 (3,59) >500 (3,63)					
Industry sector	Ed (3,58) Ho (3,63) Fi (3,59) IT (3,68) He (3,16) Me (4,63) Tr (4,38) In (3,97) Co (4,13) Ot (3,04)			Ed (3,30) Ho (3,00) Fi (3,26) IT (3,54) He (3,96) Me (5,00) Tr (3,29) In (4,39) Co (3,86) Ot (3,03)	Ed (4,29) Ho (4,63) Fi (3,92) IT (3,81) He (3,53) Me (5,00) Tr (4,38) In (4,31) Co (4,00) Ot (3,89)				

Table 5.22: ANOVA analysis (a)

	B	C	D	E	F	G
Gender						
Age			19-30 (3,22) 31-35 (2,67) 36-40 (2,50) 41-45 (1,99) 46-50 (2,24) 51-55 (2,96)			
Family status			S (2,96) M (2,13) CP (2,57) D (2,43) W (2,50)			
Higher completed educational level					S (4,12) PS (4,63) B (4,06) M (3,91) D (3,58)	
Distance (km)			0-5 (2,35) -10 (2,76) -15 (3,08) -20 (1,60) -30 (2,00) -40 (1,90) >40 (2,29)			
Average time spent (min.)			1-5 (2,35) 6-10 (1,84) 11-15 (1,83) 16-20 (2,22) 21-30 (2,59) 31-60 (2,98) >60 (3,72)			
Means of transportation			PC (1,26) PM (2,81) B (2,83) PT (4,60) C (3,67) F (3,04) O (2,50)			
Household members	0 (2,40) 1 (2,90) 2 (3,19) 3 (3,61) 4 (3,36) 5 (3,54) 6 (3,15)					
Minors in the household						
Occupational status						
Occupational position			M (1,60) A (2,71) W (2,91) O (1,92)			
Type of company / organization	Pr (3,60) NG (3,60) Pu (2,91) O (3,21)		Pr (2,58) NG (3,46) Pu (2,24) O (2,95)			
Size of company / organization			<10 (2,05) -50 (2,21) -250 (2,93) -500 (3,23) >500 (2,55)			
Industry sector				Ed (4,45) Ho (4,78) Fi (4,06) IT (4,11) He (3,96) Me (5,00) Tr (4,44) In (4,34) Co (4,33)		

Table 5.23: ANOVA analysis (b)

The results reveal that out of the fourteen demographic characteristics, eight (gender, age, family status, distance between home and workplace, mean of transportation, minors in the household, occupation status and occupational position) do not seem to affect the mean score of the nine subfactors examined. On the other hand:

- Type of company/organization affects 6 factors [i.e., Ba (Energy Consumption-W), Bb (Water Consumption-W), Bc (Energy Efficiency-W), Bd (Waste Production-W), B (Firm’s Environmental Profile), D (GG Vehicle Emissions)]
- Industry sector affects 4 factors [i.e., Ba (Energy Consumption-W), Bd (Waste Production-W), Ea (Employees’ Elec. Consumption-W), E (Employees’ Elect. Consumption-W&H)]
- Higher completed educational level affects 4 factors [i.e., Bb (Water Consumption-W), Bd (Waste Production-W), Ga (Employees’ Waste Production-W), F (Employees’ Water Consumption-W)]
- “Household members” affects 3 factors [i.e., Ba (Energy Consumption-W), Bd (Waste Production-W), B (Firm’s Environmental Profile)], and
- Size of company affects 3 factors [i.e., Ba (Energy Consumption-W), Bd (Waste Production-W), D (GG Vehicle Emissions)]

A different interpretation of these findings is that from the nine subfactors and six factors examined, Ba (energy Consumption - W) and Bd (Waste Production - W) are affected by five of the fourteen demographic characteristics, while D (GG Vehicle Emissions) is affected by eight of these characteristics. All other subfactors and factors are affected by only one or even none of the demographic characteristics.

5.12 Structural analysis

This section includes the SEM analysis, based on the indicators already described in Table 5.17. The first steps of the analysis revealed that “Greenhouse gas vehicle emissions”, “Employees’ water consumption” and “Employees’ waste production” do not affect and are not being affected by other factors. Therefore, these factors were not included in the next steps of the analysis.

The following diagram (Figure 5.2) displays a comprehensive graphical representation of the research model, which incorporates the subfactors and the demographic characteristics that ANOVA analysis revealed that affect the mean scores of the subfactors.

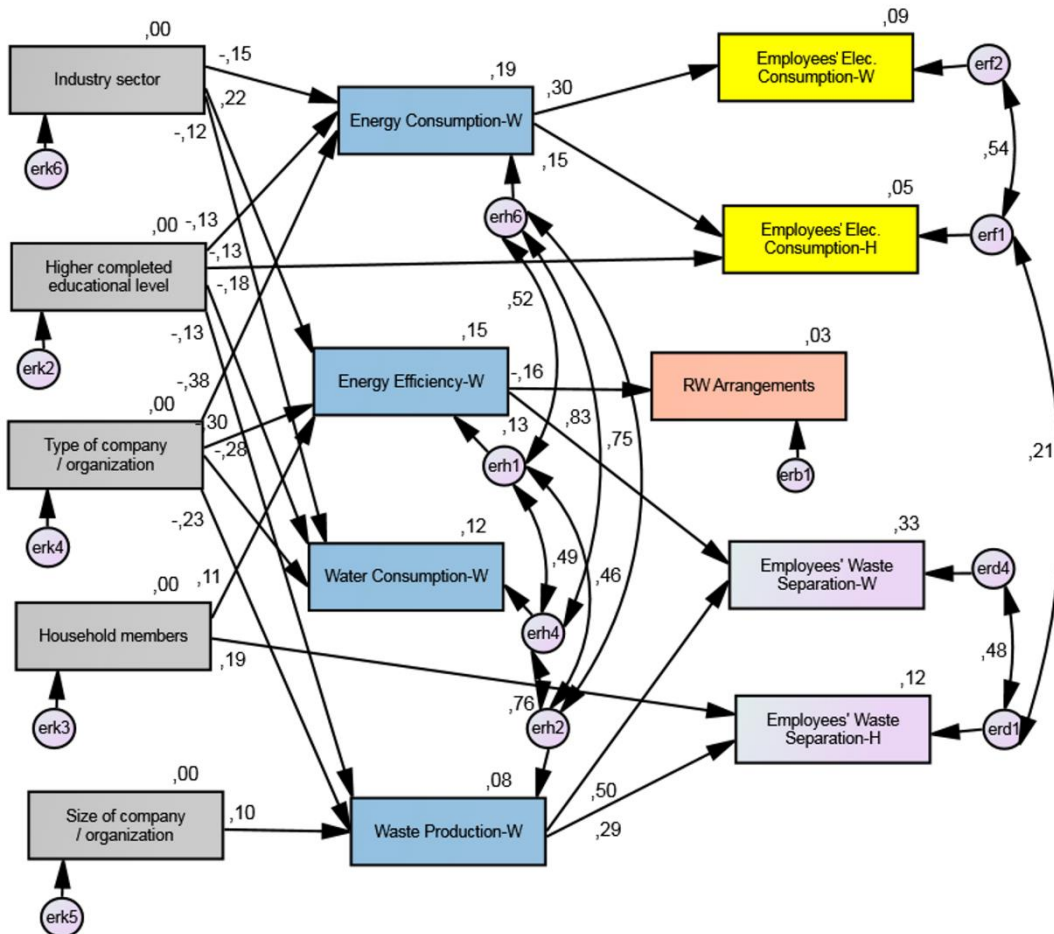


Figure 5.2: Comprehensive SEM model

The values of the fit measures, already described in Table 5.17, are the following (Table 5.24):

	CMin/DF	GFI	CFI	NFI	RMR	RMSEA
<i>Accepted Scores</i>	< 5,000	> ,900	> ,900	> ,900	< ,070	< ,070
Scores	1,063	,954	,995	,930	,066	,018

Table 5.24: Fit indices (a)

Therefore, for this comprehensive version (cmv) of the SEM diagram, we have:

cmv.a) All the model-fit indexes have accepted values, confirming the validity of the model

cmv.b) The four subfactors of the factor “Firm’s environmental profile” [i.e, Energy

consumption (at work), energy efficiency (at work), water consumption (at work), and waste production (at work)] are being affected by demographic characteristics

cmv.c) The previously mentioned subfactors are interconnected, creating -as expected by the factor analysis- a “superfactor”

cmv.d) The factor “Employees’ waste separation (at work)” and “Employees’ waste separation (at home)” also form a “superfactor”

cmv.e) Higher completed educational level poses a direct effect on employees’ domestic electricity consumption

cmv.f) The number of the household members poses a direct effect on employees’ waste separation at home

cmv.g) The factor “Remote working arrangements” is being directly affected only by the factor “Energy efficiency at work”

cmv.h) Remote working arrangements do not affect any factor

cmv.i) Given the small values at the top right corners of the rectangular boxes-factors, the explanatory power of the whole model is limited, meaning that there are more factors affecting the dependent factors, which are not included in this study.

cmv.j) However, the factor “Energy efficiency (at work)” and “Waste production (at work)” account for 33% of the variance of the “Employees’ waste separation (at work)”. Moreover, the path coefficient between “Waste production (at work)” and “Employees’ waste separation (at work)” (0,50) is also very satisfying. Therefore, a significant correlation was identified.

cmv.k) “Employees’ electricity consumption (at work)” and “Employees’ electricity consumption (at home)” are interconnected

Moreover, a concise SEM model could also be created based, amongst others, on the “superfactors” mentioned at cmv.b and cmv.c. This model is presented below (Figure 5.3):

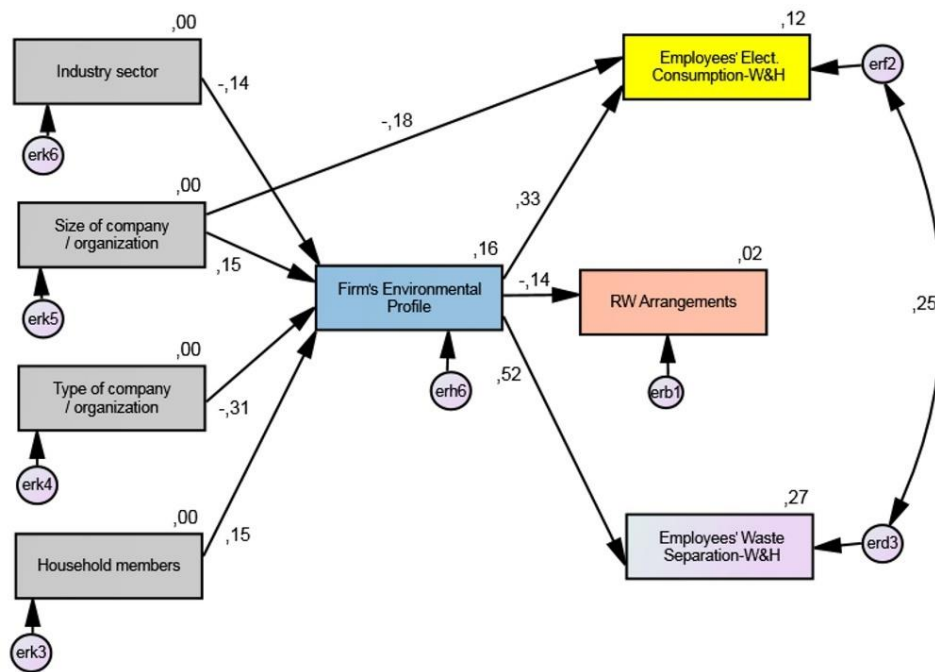


Figure 5.3: Concise SEM model

The values of the fit measures, described in Table 5.17, are the following (Table 5.25):

	CMin/DF	GFI	CFI	NFI	RMR	RMSEA
<i>Accepted Scores</i>	< 5,000	> ,900	> ,900	> ,900	< ,070	< ,070
Scores	,865	,980	1,000	,893	,086	,000

Table 5.25: Fit indices (b)

Therefore, for this concise version (cnv) of the SEM diagram, we have:

cnv.a) Except for the NFI and RMR which had marginally undesired values, all the other model-fit indexes have accepted values, confirming a good model fit

cnv.b) All the four demographic parameters included in the model do affect “Firm’s environmental profile”

cnv.c) The size of company/organization directly affects (negative correlation) “Employees’ electricity consumption (W&H)”

cnv.d) The firm’s environmental profile affects employees’ electricity consumption (W&H), remote-working arrangements, and employees’ waste separation (W&H)

cnv.e) There is a notable correlation between “Firm’s environmental profile” and “Employees’ waste separation (W&H)” (path coefficient = 0.52), and "Employees’ Electricity Consumption - W&H" (path coefficient=0,33).

cnv.f) The factors “Employees’ electricity consumption (W&H)” and “Employees’ waste separation (W&H)” are interconnected

cnv.g) As in the comprehensive model, the explanatory power of the whole model is limited, especially for “Remote-working arrangements” (“Firm’s environmental profile accounts only for 2% of the variance of “Remote-working arrangements”)

As regards the hypotheses, the results of the two models give the following results:

	Hypothesis	cnv model		cnv model		
		Path Coeff.	Result	Path Coeff.	Result	
1	The environmental profile of a given firm has an impact on the establishment of remote working arrangements	Energy consumption - W	-	Accepted	-0,14	Accepted
		Energy efficiency-W	- 0,16			
		Water consumption-W	-			
		Waste production-W	-			
2	Remote working arrangements reduce greenhouse gas vehicle emissions per desk-duty employee-commuter (reduction of circulating cars)	-	Rejected	-	Rejected	
3	Remote working arrangements reduce electricity consumption per desk-duty employee	-	Rejected	-	Rejected	
4	Remote working arrangements reduce water consumption per desk-duty employee	-	Rejected	-	Rejected	
5	Remote working arrangements reduce waste production per desk-duty employee	-	Rejected	-	Rejected	

Table 5.26: Hypotheses testing results

As it becomes obvious from the previous table (Table 5.26), only one hypothesis is accepted. However, given the complexity of the issue and including the relatively small and also negative path coefficient, we cannot be very confident about this correlation and its characteristics. However, some worth-mentioning correlations were identified:

- a) “Firm’s environmental profile” and “Employees’ waste separation (W&H)”, with a path coefficient of 0,52 (cnv model)
- b) “Type of company/organization” and “Energy consumption (W)”, with a path coefficient of -0,38 (cmv model)
- c) “Firm’s environmental profile” and “Employees’ electricity consumption (W&H)”, with a path coefficient of 0,33 (cnv model)
- d) “Type of company/organization” and “Firm’s environmental profile”, with a path coefficient of -0,31 (cnv model)
- e) “Type of company/organization” and “Energy efficiency (W)”, with a path coefficient of -0,3 (cmv model)

These correlations should be considered important findings of the study. They confirm that the type of a company/organization is a determining factor for their overall environmental footprint. Moreover, they confirm that the environmental profile of a given company/organization is correlated with its employees’ environmental behavior. Waste separation seems an easy method to acquire a better environmental profile, but there is room and a clear need for more interventions as regards the achievement of better environmental health outcomes.

6. Discussion and Interpretation of the results

6.1 Discussion

It is already known that environmental performance is a significant component of a firm's reputation (Miles and Covin, 2000). There is also evidence that the improvement of environmental performance may generate positive financial outcomes (Ambec and Lanoie, 2008). However, given the complexity of the issue, this positive relationship cannot be considered as an indisputable outcome (see Junquera and Barba-Sánchez, 2018). Indeed, Junquera and Barba-Sánchez (2018), via performing structural analysis, demonstrated that, in the case of wineries, the environmental proactivity has the potential to create cost-based and differentiation-based competitive advantages. However, the authors could not demonstrate a direct impact of the so-called “environmental proactivity” on financial performance (Junquera and Barba-Sánchez, 2018). This may be in accord with the conclusion of Orsato (2009, p.3) who has found that being green “pays”, but not always.

Bloom et al. (2015) demonstrated that, in the case of call-center employees, remote working did increase their performance. Another interesting article, prepared by Hardy et al. (2021), tried to shed light on the “paradox”, as they characterized it, of the increased productivity during COVID-19 quarantine and remote-working arrangements. They attributed this outcome to the increase in the productivity of extroverted people, as a result of social distancing measures (Hardy et al., 2021).

Undoubtedly, the whole topic is extremely complex. This complexity may explain the fact that the current master thesis did not confirm the reduction in greenhouse vehicle emissions due to remote working arrangements (Hypothesis 2), the reduction in electricity and water consumption per desk-duty employee (Hypotheses 3 and 4), and the reduction in waste production per desk-duty employee (Hypothesis 5). This could be attributed to various factors including the industry sector of the employees, and to certain demographical characteristics that displayed a non-expected large variety, such as household and workplace location. If the study was focused only on certain big cities of Greece that face outdoor air pollution problems (e.g, Athens and Thessaloniki), our results regarding pollution could have been in accord with the expected from the literature (see, for instance, Pata, 2020).

However, recent research studies have confirmed the contribution of remote-working arrangements to the improvement of urban air quality (Ju et al., 2021; Gupta et al., 2022; Roshan et al., 2022). It is worth mentioning that Roshan et al. (2022) recently demonstrated that mobility restrictions have been associated with significant reductions in the “heat island effect”. Therefore, the author of this thesis strongly believes that the proposed “remote-working carbon-saving footprint” should be widely accepted as an environmental indicator of the reduction in greenhouse gas vehicle emissions (Maipas et al., 2021b), which have been demonstrated by other researchers who have included quantitative data, but not in this thesis. The fact that our study does not include quantitative data as regards electricity and water consumption and/or waste production is one of its main limitations.

This study also revealed some important interconnections, such as the interconnection between “Employees’ waste separation (at home)” and “Employees’ waste separation (at work)”. This is very interesting, since a previous study noticed that recycling at home and recycling at work are unrelated (Heidrich and Harvey, 2018). As regards the energy-related correlations, one could say that they were expected, given the importance of energy management in modern firms (see, for instance, Schulze et al., 2016). As regards the impact of the educational level on the domestic electricity consumption, a negative path coefficient was found. This also cannot surprise us because a higher educational level may mean higher income and a more energy-intensive lifestyle (see, for instance, Romero-Jordán and del Río, 2022).

The correlation between a firm’s environmental profile and environmental health parameters, such as energy/water consumption at the workplace, and waste production at the workplace reveal the impact of a given firm’s environmental policy on crucial sustainability indicators. Moreover, the strong correlation between water consumption and energy consumption is in accordance with the relevant finding of Abulibdeh (2021) (see page 24).

This dissertation found amongst others that waste production at the workplace is correlated with energy/water consumption. It also showed that employees’ electricity consumption at home and their electricity consumption at the workplace, as well as employees’ waste separation at home and waste separation at the workplace, are correlated. The acquisition of such everyday habits obviously serves as a mitigating factor

against environmental degradation, and should be present in both homes and workplaces. These correlations reveal once again the overall positive impact of having sustainable behaviors, neither as an obligation (for instance, in a workplace) nor only as a domestic “rule”, but as a way of both living and working. As Wang et al. (2019) demonstrated the “personal norm” is a determinant as regards the energy conservation intention in one’s workplace.

The correlation between energy efficiency at the workplace and energy consumption at the workplace is also not surprising. These two parameters do maintain a multidimensional and interesting relationship that, despite probable rebound effects, e.g., the probable increase in fuels’ demand/use as a result of their increased efficiency (Greening et al., 2000), has the potential to offer sustainable outcomes (Costa-Campi et al., 2015; Liu et al., 2016; Nepal et al., 2021). However, energy efficiency alone is not enough (see Gu et al., 2013).

Furthermore, vehicle emissions are affected by the size and type of the companies. This is not surprising since many large companies’ location is far away from employees’ residential areas. Obviously, if the desk-duty employees of such firms offer their services remotely on a more stable basis, the emissions will be reduced, and they will have an opportunity to save enough money since fuel prices are currently (2022) rising.

Since the Hypothesis 1 (i.e., The environmental profile of a given firm has an impact on the establishment of remote working arrangements) was accepted, this might be an indicator of a probable incorporation of remote-working arrangements into the firm’s green strategies. This, under certain circumstances, may generate significantly positive environmental health outcomes in the long run.

Urban air pollution is one of the most important known health risk factors. Given the notable environmental degradation of the urban settlements and the relationship between environmental degradation and the ongoing pandemic (Maipas et al., 2021a), and taking into account the fact that urban areas may favor person-to-person viruses transmission (see Wang et al., 2022), all the relevant mitigative strategies against the environmental deterioration should be simultaneously considered important steps against the outbreak and the development of future pandemics. Office buildings, which do occupy very large areas in the urban settlements, and require/consume large amounts of energy (Mantesi et

al., 2022), could be crucial elements of such mitigative strategies. In particular, given the successful outcome of the pandemic’s remote-working “experiment” (Mantesi et al., 2022), remote-working is going to become an intrinsic part of future working arrangements. The author of this dissertation strongly believes that remote-working arrangements are able to evolve into determinants of success in the business sector’s mitigative policies against climate change and poor air quality.

6.2 Managerial implications

As far as the managerial implications are concerned, this study made an attempt to identify possible relationships between the environmental profile of a given firm and the establishment of remote-working arrangements which may be considered as managerial decisions. The acceptance of Hypothesis 1 confirms that there is a relationship which, however, needs further research.

Since higher educational level affects crucial environmental health factors (e.g., energy consumption at work, water consumption at work, and waste production at work), managers may either consider hiring already highly educated candidates for a job vacancy or motivate their subordinates to improve their educational level. Moreover, relevant educational activities within a given firm e.g., in-person seminars or e-learning initiatives regarding electricity and/or water consumption and waste separation habits also might help. However, such lifelong learning non-formal educational initiatives need evaluation and/or confirmation by relevant studies.

According to the available literature, there is evidence that remote-working arrangements display the potential to produce positive environmental health outcomes. Our study did not confirm a clear relationship between remote-working arrangements and firm’s environmental profile, possibly due to the complexity of the real-life business environments and to the many factors involved. However, modern managers should try to achieve improvements in the employees’ habits as regards the protection of the environment, and the saving of energy, which not only may have the potential to serve as a booster towards the improvement of the firm’s environmental profile, but also to contribute to the real-life global problems, as dictated by corporate sustainability. It is common sense that the improvement of the environmental awareness within a firm and among the employees may favor the environmental profile of a given firm.

It should also be mentioned here that Junquera et al. (2018) found that environmental proactivity has a significantly positive impact on managers’ perception of performance, but this is only a perception and is not able to guarantee substantive financial outcomes. However, given the increase in productivity related to remote-working arrangements (Bloom et al., 2015; Hardy et al., 2021) and their well-known associations with environmental health parameters, there may be a possibility to create a context conducive for a win-win-win situation between environment, desk-duty employees, and firms. The urgent need for proper energy management, which is one of the most important facets of this reality, may reveal the necessity of the establishment of energy manager positions (Schulze et al., 2016).

Modern managers, who are forced to make decisions under a fragile environmental reality as a result of, for instance, urban air pollution and climate change, cannot be indifferent to this possibility. They should be aware of modern environmental sustainability issues, and constantly increase the environmental performance of their firm. The lack of such awareness is an obstacle, such as in the case of many firms of the Industry 4.0 -i.e., the industry that depends on a modern “ecosystem” of smart technological interconnections between its components- which are not fully aware of the real potential of applying environmental sustainability strategies (Brozzi et al., 2020).

Moreover, the constant improvement in energy efficiency via adopting “green” innovations should be an intrinsic part of a modern company’s/organization’s strategy. As Costa-Campi et al. (2015) describe, energy efficiency and environmental efficiency should be considered complementary goals. However, despite the well-known positive impact of the relevant energy-efficient equipment in the reduction of anthropogenic greenhouse gas emissions (Nepal et al., 2021), the effort towards sustainability in a given firm must not be limited to the acquisition of energy-efficient new devices. On the contrary, the necessity of such devices should be reduced via the architectural designing of efficient buildings that require fewer manmade energy inputs (Gu et al., 2013).

Given the results of this dissertation’s research, managers should contribute to the expansion of both “know-why” and “know-what” related to their company’s/organization’s energy/water consumption. They should also address all the relevant energy/water efficiency issues, including the sustainable designing of offices and the use of natural light where possible, and help their employees reduce their

environmental footprint. Since the current study demonstrated that employees behave more sustainably while being at home, managers should help/motivate them to behave the same while being at work.

The cultivation of such habits could foster a sustainable culture within a company/organization. This modern culture should also be in accord with the new strategy of the so-called “ESG” (Environment, Society, Governance). It is worth mentioning that these strategies, such as the one adopted and clearly described by the Industrial and Commercial Bank of China (2021), do include many environmental health parameters - addressed in this dissertation- such as the proper management of employees’ food waste, paper saving (e.g. paperless meetings), and energy-saving options. Hopefully, modern managers may be able to incorporate remote working into the ESG context, in order to produce positive environmental health outcomes.

6.3 Limitations of the study

The current study was performed for the purposes of a postgraduate thesis, meaning that there was a strict time limit as regards the completion of the study that did not allow us to:

- a) search more deeply for further insights and data
- b) acquire quantitative data as regards electricity and water consumption via communicating with electricity and water providers
- c) concentrate only on an educational level since it would be difficult to acquire the necessary number of answers in a timely context
- d) concentrate only on an occupational position (for the same reason as before)
- e) concentrate only on a type of company (for the same reason as before)
- f) concentrate only on a size of company (for the same reason as before)
- g) concentrate only on an industry sector (for the same reason as before)
- h) increase the number of participants (despite the fact that the 194 respondents formed a quite large sample)

Moreover, a large part of the correspondents works in the educational sector (28,4%) and in the health sector (8,2%) which traditionally offer mainly in-person services, and it was -

in the most cases- forced to provide remote services due to the pandemic in a “semi-organized” manner, under difficult circumstances, and maybe without their willingness. This fact may have increased the subjectivity of their responses, leading to underestimations or overestimations of the remote-working environmental health impacts.

Moreover, the current study did not take psychological dimensions into account (e.g. extroversion vs introversion), and other factors such as the age of the company, and its research and development activities regarding the various dimensions of environmental health (see, for instance, Endrikat et al., 2014; Junquera et al., 2018; Hardy et al., 2021).

Another important limitation of the study is the fact that it does not include indoor air quality -either qualitative or quantitative- data. Indoor air quality is an important environmental health parameter, affected by our presence and activities inside a certain building (Settimo et al., 2020; Sarnosky et al., 2021; Zhang et al., 2022), which in turn are related amongst others to working arrangements. For instance, Zhang et al. (2022) demonstrated that, during the lockdown period in China, the final outcome of the “combination” between increased household air pollution and decreased outdoor air pollution, was an increase in premature deaths. It is also worth mentioning here that energy efficiency is usually negatively associated with indoor air pollution, since the reduction in energy use for heating and/or cooling may be the result of interior spaces that “trap” pollutants from indoor sources (Persily and Emmerich, 2011).

6.4 Need for further research

This study’s limitations generate knowledge gaps that should be covered by future research. Since the explanatory power of the model is not strong enough, there are more factors affecting the dependent factors of the study. Further research should be undertaken in order to identify these factors, and incorporate them into new SEM analyses.

The studies that will follow may not only focus on a certain sector but, also, on a certain geographical region, enabling the researchers to acquire, analyze, and display data from electricity and water providers, in order to perform safer and more accurate comparisons between working-as-usual and remote-working. Moreover, since urban pollution is a crucial environmental health problem, further research could also focus on individual urban areas, especially on those who face significant air pollution problems. The pros and

the cons of remote-working as regards urban environmental pollution should emerge as results of more case studies. Given the global acceptance of remote-working arrangements, their environmental health dimensions should be identified and described clearly, since environmental health is a crucial sustainability issue closely related to the quality of life.

Finally, more studies are needed as regards remote-working arrangements and indoor air quality. These studies also need quantitative data which could be easily acquired via indoor air quality monitoring systems.

7. Summary & Conclusions

7.1 Brief summary

Climate change and poor air quality, as already mentioned, are two significant environmental health issues that require urgent action. The recent lockdown has revealed a potential for improvements in the quality of the environment via, for instance, limiting the number of circulating cars. Initially, in order to assess this potential, a systematic literature review was conducted.

Then, the results of the systematic literature review were used for the construction of the research model of the study, and of the set of the research hypotheses. Afterwards, a structured questionnaire was prepared, which was based mainly on previous studies' questionnaires. The questionnaire, which was divided into seven sections (i.e., one introductory section, and six main sections related to environmental health parameters), consisted of 73 questions. The final sample consisted of 194 respondents who had remote-working experience. After the data collection, a statistical analysis took place by using IBM SPSS and IBM SPSS Amos.

The preliminary data analysis was followed by first and second order factor analysis, correlation analysis and analysis of variance. Afterwards, structural equation modelling was performed in order to evaluate the research model and the hypotheses. Then, the results were discussed, and were accompanied by the limitations of the study. Finally, the managerial implications and the need for further research were highlighted.

7.2 Conclusions

Modern companies/organizations do show an interest in improving their environmental footprint. However, their knowledge on how to reduce certain crucial environmental health parameters such as energy consumption, water consumption and waste production has to be expanded.

Moreover, the employees' domestic behavior related to environmental health parameters such as energy consumption and waste management is better than the same behavior during their presence in their workplace. Furthermore, their educational level should be considered as determinant of the environmental health outcomes related to their presence

in their office. The fact that their relevant behavior is associated with the environmental profile of their company/organization is another significant parameter that should be examined carefully.

There is evidence that the environmental profile of a given firm has an impact on the establishment of remote-working arrangements. Given the complexity of the issue and the limitations of the study, the current study does not confirm a correlation between remote-working arrangements and positive environmental health outcomes. However, this dissertation should be considered as a part of an ongoing study.

The dissertation provides important insights that should be taken into consideration as regards the identification of the exact environmental health outcomes of remote working. The whole subject is an interdisciplinary field with notable environmental dimensions and managerial implications that require further research.

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Appendix A: Questionnaire (in English)

The environmental health dimension of hybrid- and remote-working models: An exploratory study

Dear Sir/Madam,

The questionnaire you are invited to answer is a part of the research for the preparation of my postgraduate dissertation at the Postgraduate Program “Master in Business Administration (MBA)” of the Hellenic Open University (Greece).

The aim of this research is to study the impact of remote working models on the environment. This questionnaire is the research tool for collecting the data that will be used to draw general conclusions in the context of the ongoing study.

- The questionnaire is **anonymous**.
- The information you provide is **confidential**.
- The results will only be presented in the form of statistics.
- The questionnaire must be completed only by employees having remote working experience.
- **Please, fill out ALL fields.**
- The results of the research will be included in the full text of the postgraduate dissertation, which will be accessible through the Hellenic Open University Repository (apothesis.eap.gr).
- For any question about this questionnaire, please, send an e-mail to sotgmaip@gmail.com.

Thank you very much for your time and your valuable contribution

Sincerely,
Dr. Sotirios Maipas

Part A. General questions about the participant
(Please, write down the number of your choice in the right column)

A.1 Gender (Options: 1. Male, 2. Female, 3. Other)	.....
A.2 Age:	.....
A.3 Family status (Options: 1. Single, 2. Married, 3. Civil partner, 3. Divorced, 4. Widowed)	.....
A.4 Higher completed educational level (Options: 1. Secondary level, 2. Post-secondary level (e.g., Institute of Vocational Training), 3. Bachelor’s degree, 4. Master’s degree, 5. Doctoral degree, 6. Other)	.....
A.5 Residential location: Municipality: Area:	
A.6 Workplace location: Municipality: Area:	
A.7 Distance (in km) between home and workplace:	.....
A.8 Average time spent travelling from home to workplace:	.....
A.9 Means of transportation to the workplace (Options: 1. Private car, 2. Private motorcycle, 3. Bicycle, 4. Public transport, 5. Taxi, 6. Any combination of the options 1-5, 7. On foot, 8. Other)	.....
A.10 How many people live in your household including yourself?	.....
A.11 How many minors (<18 years) live in your household?	.....
A.12 What is your occupational status? (Options: 1. Full-time, 2. Part-time, 3. Casual, 4. Other)	.....
A.13 What is your occupational position? (Options: 1. Manager, 2. Administrative personnel, 3. Working personnel, 4. Other)	.....
A.14 What is the type of your company/organization? (Options: 1. Private company, 2. Non-governmental organization, 3. Public sector company, 4. Other)	.....
A.15 What is the size of your company/organization in terms of the number of employees? (Options: 1. <10 employees, 2. 10-50, 3. 51-250, 4. 251-500, 5. >500)	.....
A.16 What is the industry sector of your company/organization? (Options: 1. Education, 2. Hospitality, 3. Financial sector, 4. Information Technology and Communications, 5. Health, 6. Media and Entertainment, 7. Transportation, 8. Industrial/Manufacturing sector, 9. Construction 10. Other)	.....

Part B: Firm’s environmental profile

Please, indicate on a scale from 1 to 5 how much you agree or disagree with the following statements: (1: Strongly disagree, 2: Disagree, 3: Neither disagree nor agree, 4: Agree, 5: Strongly agree)		1	2	3	4	5
B.1	My company/organization is interested in energy-related questions					
B.2	My company/organization knows how to keep low energy consumption					
B.3	My company/organization wants to increase its knowledge on keeping low energy consumption					
B.4	My company/organization knows its own electricity consumption					
B.5	My company/organization wants to increase its knowledge on its own electricity consumption					
B.6	My company/organization uses low energy lamps where possible					
B.7	My company/organization is interested in improving its electricity consumption habits					
B.8	My company/organization tries to limit hot water consumption					
B.9	My company/organization is interested in water-related questions					
B.10	My company/organization knows how to keep low water consumption					
B.11	My company/organization wants to increase its knowledge on keeping low water consumption					
B.12	My company/organization knows its own water consumption					
B.13	My company/organization wants to increase its knowledge on its own water consumption					
B.14	My company/organization is interested in improving its water consumption habits					
B.15	My company/organization tries to limit water consumption					
B.16	My company/organization uses energy efficient heating systems					
B.17	My company’s/organization’s external doors’ and windows’ frames offer adequate insulation					
B.18	My company/organization is interested in waste-related questions					
B.19	My company/organization tries to limit waste production					
B.20	My company/organization knows how to produce less waste					
B.21	My company/organization wants to increase its knowledge on producing less waste					
B.22	My company/organization knows its own waste production					
B.23	My company/organization wants to increase its knowledge on its own waste production					
B.24	My company/organization separates waste collection by placing materials in assigned recycling bins					
B.25	My company/organization is interested in helping me improve my environmental footprint					

Part C: Remote working arrangements

Please, indicate on a scale from 1 to 5 how much you agree or disagree with the following statements: (1: Strongly disagree, 2: Disagree, 3: Neither disagree nor agree, 4: Agree, 5: Strongly agree)		1	2	3	4	5
C.1	I have been working at home on some days as part of my company’s/organization’s remote working arrangements					
C.2	My remote working day is a day on which I do not usually work					
C.3	My remote working day is a day on which I accomplish some of my job tasks					
C.4	My remote working day is a normal working day at another workplace					

Part D: Greenhouse gas vehicle emissions

Please, answer the following questions on a scale from 1 to 5: (1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always)		1	2	3	4	5
D.1	How often do you travel to your workplace by car (either private car or taxi)?					
D.2	How often do you travel to your workplace by motorcycle?					
D.3	How often do you travel to your workplace by public transport?					
D.4	How often do you travel to your workplace by bicycle?					
D.5	How often do you travel to your workplace on foot?					
D.6	How often do you encounter congestion?					

Part E: Electricity consumption per employee

Please, indicate on a scale from 1 to 5 how much you agree or disagree with the following statements: (1: Strongly disagree, 2: Disagree, 3: Neither disagree nor agree, 4: Agree, 5: Strongly agree)		1	2	3	4	5
E.1	I try to reduce my energy consumption while being at the office					
E.2	I switch off the lights in unoccupied rooms while being at the office					
E.3	I try to avoid the standby use while being at the office					
E.4	I try to use only the natural light when possible while being at the office					
E.5	I try to reduce my energy consumption while being at my home					
E.6	I switch off the lights in unoccupied rooms while being at my home					
E.7	I try to avoid the standby use while being at my home					
E.8	I try to use only the natural light when possible while being at my home					

Part F: Water consumption per employee

Please, indicate on a scale from 1 to 5 how much you agree or disagree with the following statements: (1: Strongly disagree, 2: Disagree, 3: Neither disagree nor agree, 4: Agree, 5: Strongly agree)		1	2	3	4	5
F.1	My water usage pattern changes while being at the office					
F.2	While being at the office, I determine my water usage based on my own preferences					
F.3	I am satisfied with my water usage while being at the office					

Part G: Waste production per employee

Please, answer the following questions on a scale from 1 to 5: (1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always)		1	2	3	4	5
G.1	At your workplace in your company/organization, how often do you produce paper waste?					
G.2	At your workplace in your company/organization, how often do you produce plastic waste?					
G.3	At your workplace in your company/organization, how often do you produce kitchen waste (such as food waste)?					
G.4	At your workplace in your company/organization, how often do you produce electronic waste?					
G.5	At your workplace in your company/organization, how often do you produce other types of waste?					
G.6	At your workplace in your company/organization, how often do you separate food waste from other waste?					
G.7	At your workplace in your company/organization, how often do you separate recyclable waste from other waste?					
G.8	At your workplace in your company/organization, how often do you separate dangerous waste from other waste?					
G.9	At your home, how often do you separate food waste from other waste?					
G.10	At your home, how often do you separate recyclable waste from other waste?					
G.11	At your home, how often do you separate dangerous waste from other waste?					

Thank you very much for your time!

Appendix B: Questionnaire in Greek (Ερωτηματολόγιο)

Η διάσταση της περιβαλλοντικής υγείας του υβριδικού και του απομακρυσμένου μοντέλου εργασιακής απασχόλησης: Μία διερευνητική μελέτη

Αγαπητέ/ή κύριε/κυρία,

Το ερωτηματολόγιο που καλείστε να απαντήσετε αποτελεί μέρος της έρευνας για την προετοιμασία της μεταπτυχιακής διατριβής μου στο Πρόγραμμα Μεταπτυχιακών Σπουδών “Master in Business Administration (MBA)” του Ελληνικού Ανοικτού Πανεπιστημίου.

Σκοπός της έρευνας είναι να μελετήσει την επίδραση των εξ αποστάσεως εργασιακών μοντέλων στο περιβάλλον. Το ερωτηματολόγιο αυτό αποτελεί το ερευνητικό μέσο συλλογής των δεδομένων που θα αξιοποιηθούν για τη διεξαγωγή γενικών συμπερασμάτων στο πλαίσιο της υπό εξέλιξη μελέτης.

- Το ερωτηματολόγιο είναι **ανώνυμο**.
- Οι πληροφορίες που παρέχετε **είναι εμπιστευτικές**.
- Τα αποτελέσματα θα παρουσιαστούν μόνο με τη μορφή στατιστικών στοιχείων.
- Το ερωτηματολόγιο πρέπει να συμπληρωθεί μόνο από εργαζόμενους με εμπειρία εξ αποστάσεως εργασίας.
- **Παρακαλώ, συμπληρώστε ΟΛΑ τα πεδία**.
- Τα αποτελέσματα της έρευνας θα συμπεριληφθούν στο πλήρες κείμενο της μεταπτυχιακής διατριβής, η οποία θα είναι προσβάσιμη μέσω του αποθετηρίου των διπλωματικών εργασιών του Ελληνικού Ανοικτού Πανεπιστημίου (apothesis.eap.gr).
- Για οποιαδήποτε ερώτηση σχετικά με αυτό το ερωτηματολόγιο, παρακαλώ, στείλτε e-mail στο sotgmaip@gmail.com.

Σας ευχαριστώ θερμά για τον χρόνο σας και την πολύτιμη συνεισφορά σας

Με εκτίμηση,
Δρ. Σωτήριος Μάιπας

Μέρος Α: Γενικές ερωτήσεις σχετικά με τον συμμετέχοντα
(Καταγράψτε τον αριθμό της επιλογής σας στη δεξιά στήλη)

A.1 Φύλο (Επιλογές: 1. Άνδρας, 2. Γυναίκα, 3. Άλλο)	.....
A.2 Ηλικία:	.....
A.3 Οικογενειακή Κατάσταση (Επιλογές: 1. Ελεύθερος/η, 2. Παντρεμένος/η, 3. Σύμφωνα Συμβίωσης, 3. Διαζευγμένος/η,	.....
A.4 Υψηλότερο ολοκληρωμένο επίπεδο εκπαίδευσης (Επιλογές: 1. Δευτεροβάθμια εκπαίδευση, 2. Μετα-δευτεροβάθμια εκπαίδευση (π.χ. ΙΕΚ), 3. ΑΕΙ/ΤΕΙ, 4. Μεταπτυχιακές Σπουδές, 5. Διδακτορικό, 6. Άλλο)	.....
A.5 Τόπος Διαμονής: Δήμος: Περιοχή:	
A.6 Τόπος Εργασίας: Δήμος: Περιοχή:	
A.7 Χιλιομετρική Απόσταση μεταξύ Κατοικίας και Τόπου Εργασίας:	.....
A.8 Μέσος Χρόνος Κάλυψης της Απόστασης μεταξύ Κατοικίας και Τόπου Εργασίας:	.....
A.9 Μέσο Μετάβασης στον Τόπο Εργασίας (Επιλογές: 1. Ιδιωτικό Ι.Χ., 2. Ιδιωτική Μηχανή, 3. Ποδήλατο, 4. Δημόσιο Μέσο Μαζικής Μεταφοράς, 5. Ταξί, 6. Οποιοσδήποτε συνδυασμός των 1-5, 7. Με τα πόδια, 8. Άλλο)	.....
A.10 Πόσοι άνθρωποι ζουν στην Κατοικία σας συμπεριλαμβανόμενου του εαυτού σας;	.....
A.11 Πόσοι ανήλικοι (<18 ετών) ζουν στην Κατοικία σας;	.....
A.12 Ποια είναι η σχέση εργασίας σας με την επιχείρηση/οργανισμό στην οποία εργάζεστε; (Επιλογές: 1. Πλήρους Απασχόλησης, 2. Μερικής Απασχόλησης, 3. Περιστασιακά, 4. Άλλο)	.....
A.13 Ποια είναι η θέση σας στην επιχείρηση / οργανισμό στην οποία εργάζεστε; (Επιλογές: 1. Διευθυντικό Στέλεχος, 2. Διοικητικό Προσωπικό, 3. Εργατικό Προσωπικό, 4. Άλλο)	.....
A.14 Ποιο το είδος της επιχείρησης / οργανισμού στην οποία εργάζεστε; (Επιλογές: 1. Ιδιωτική Επιχείρηση, 2. Μη Κυβερνητικός Οργανισμός, 3. Δημόσιο, 4. Άλλο)	.....
A.15 Ποιο είναι το μέγεθος της επιχείρησης / οργανισμού στον οποίο εργάζεστε; (Επιλογές: 1. <10 Εργαζόμενοι, 2. 10-50. 3. 51-250, 4. 251-500. 5. >500)	.....
A.16 Ποιος είναι ο κλάδος στον οποίο δραστηριοποιείται η επιχείρηση / οργανισμός στην οποία εργάζεστε; (Επιλογές: 1. Εκπαίδευση, 2. Φιλοξενία (π.χ. τουριστικά καταλύματα, εστίαση), 3. Χρηματοοικονομικός, 4. Πληροφορική και Τηλεπικοινωνίες, 5. Υγεία, 6. Μέσα ενημέρωσης και ψυχαγωγίας, 7. Μεταφορές, 8. Βιομηχανικός / Βιοτεχνικός κλάδος, 9. Κατασκευαστικός κλάδος, 10. Άλλος)	.....

Μέρος Β: Το περιβαλλοντικό προφίλ της επιχείρησης / οργανισμού στην οποία εργάζομαι

Παρακαλούμε, προσδιορίστε με μία κλίμακα από 1 έως 5 πόσο συμφωνείτε ή διαφωνείτε με τα παρακάτω: (1: Διαφωνώ απόλυτα, 2: Διαφωνώ, 3: Ούτε διαφωνώ ούτε συμφωνώ, 4: Συμφωνώ, 5: Συμφωνώ απόλυτα)		1	2	3	4	5
B.1	Η επιχείρηση / οργανισμός στην οποία εργάζομαι ενδιαφέρεται για ζητήματα που αφορούν στην ενέργεια					
B.2	Η επιχείρηση / οργανισμός στην οποία εργάζομαι γνωρίζει πώς να διατηρεί χαμηλή την κατανάλωση ενέργειας					
B.3	Η επιχείρηση / οργανισμός στην οποία εργάζομαι επιθυμεί να αυξήσει τις γνώσεις της σχετικά με τη διατήρηση χαμηλής κατανάλωσης ενέργειας					
B.4	Η επιχείρηση / οργανισμός στην οποία εργάζομαι γνωρίζει τη δική της κατανάλωση ενέργειας					
B.5	Η επιχείρηση / οργανισμός στην οποία εργάζομαι επιθυμεί να αυξήσει τις γνώσεις της σχετικά με τη δική της κατανάλωση ενέργειας					
B.6	Η επιχείρηση / οργανισμός στην οποία εργάζομαι χρησιμοποιεί λαμπτήρες χαμηλής ενεργειακής κατανάλωσης όπου αυτό είναι εφικτό					
B.7	Η επιχείρηση / οργανισμός στην οποία εργάζομαι ενδιαφέρεται να βελτιώσει τις συνήθειές της που αφορούν στην κατανάλωση ενέργειας					
B.8	Η επιχείρηση / οργανισμός στην οποία εργάζομαι προσπαθεί να περιορίσει την κατανάλωση ζεστού νερού					
B.9	Η επιχείρηση / οργανισμός στην οποία εργάζομαι ενδιαφέρεται για ζητήματα που αφορούν στο νερό					
B.10	Η επιχείρηση / οργανισμός στην οποία εργάζομαι γνωρίζει πώς να διατηρεί χαμηλή την κατανάλωση νερού					
B.11	Η επιχείρηση / οργανισμός στην οποία εργάζομαι επιθυμεί να αυξήσει τις γνώσεις της σχετικά με τη διατήρηση χαμηλής κατανάλωσης νερού					
B.12	Η επιχείρηση / οργανισμός στην οποία εργάζομαι γνωρίζει τη δική της κατανάλωση νερού					
B.13	Η επιχείρηση / οργανισμός στην οποία εργάζομαι επιθυμεί να αυξήσει τις γνώσεις της σχετικά με τη δική της κατανάλωση νερού					
B.14	Η επιχείρηση / οργανισμός στην οποία εργάζομαι ενδιαφέρεται να βελτιώσει τις συνήθειές της που αφορούν στην κατανάλωση νερού					
B.15	Η επιχείρηση / οργανισμός στην οποία εργάζομαι προσπαθεί να περιορίσει την κατανάλωση νερού					
B.16	Η επιχείρηση / οργανισμός στην οποία εργάζομαι χρησιμοποιεί συστήματα θέρμανσης που είναι αποδοτικά ως προς την κατανάλωση ενέργειας					

B.17	Τα κουφώματα των εξωτερικών θυρών και των παραθύρων της επιχείρησης / οργανισμού στην οποία εργαζομαι προσφέρουν κατάλληλη μόνωση					
B.18	Η επιχείρηση / οργανισμός στην οποία εργαζομαι ενδιαφέρεται για ζητήματα που αφορούν στα απόβλητα					
B.19	Η επιχείρηση / οργανισμός στην οποία εργαζομαι προσπαθεί να περιορίσει την παραγωγή αποβλήτων					
B.20	Η επιχείρηση / οργανισμός στην οποία εργαζομαι γνωρίζει πώς να παράγει λιγότερα απόβλητα					
B.21	Η επιχείρηση / οργανισμός στην οποία εργαζομαι επιθυμεί να αυξήσει τις γνώσεις της σχετικά με την παραγωγή λιγότερων αποβλήτων					
B.22	Η επιχείρηση / οργανισμός στην οποία εργαζομαι γνωρίζει τη δική της παραγωγή αποβλήτων					
B.23	Η επιχείρηση / οργανισμός στην οποία εργαζομαι επιθυμεί να αυξήσει τις γνώσεις της σχετικά με τη δική της παραγωγή αποβλήτων					
B.24	Η επιχείρηση / οργανισμός στην οποία εργαζομαι διαχωρίζει τα απόβλητα κατά τη συλλογή τους, τοποθετώντας τα ανακυκλώσιμα υλικά σε σημασμένους κάδους					
B.25	Η επιχείρηση / οργανισμός στην οποία εργαζομαι ενδιαφέρεται να με βοηθήσει να βελτιώσω το περιβαλλοντικό μου αποτύπωμα					

Μέρος Γ: Εξ αποστάσεως παροχή εργασίας

Παρακαλούμε, προσδιορίστε με μία κλίμακα από 1 έως 5 πόσο συμφωνείτε ή διαφωνείτε με τα παρακάτω: (1: Διαφωνώ απόλυτα, 2: Διαφωνώ, 3: Ούτε διαφωνώ ούτε συμφωνώ, 4: Συμφωνώ, 5: Συμφωνώ απόλυτα)		1	2	3	4	5
Γ.1	Έχω εργαστεί από το σπίτι κάποιες ημέρες στο πλαίσιο εξ αποστάσεως παροχής εργασίας					
Γ.2	Η δική μου ημέρα εξ αποστάσεως εργασίας είναι μία ημέρα κατά την οποία συνήθως δεν εργαζομαι					
Γ.3	Η δική μου ημέρα εξ αποστάσεως εργασίας είναι μία ημέρα κατά την οποία εκτελώ μερικά από τα εργασιακά μου καθήκοντα					
Γ.4	Η δική μου ημέρα εξ αποστάσεως εργασίας είναι μία φυσιολογική ημέρα εργασίας σε έναν χώρο εργασίας διαφορετικό από αυτόν της επιχείρησης / οργανισμού στην οποία εργαζομαι					

Μέρος Δ: Εκπομπές θερμοκηπικών αερίων από τα οχήματα

Παρακαλούμε, απαντήστε στις επόμενες ερωτήσεις με μία κλίμακα από το 1 έως το 5: (1: Ποτέ, 2: Σπάνια, 3: Μερικές φορές, 4: Συχνά, 5: Πάντα)		1	2	3	4	5
Δ.1	Πόσο συχνά πηγαίνετε στην εργασία με αυτοκίνητο (είτε ιδιωτικής χρήσης είτε ταξί);					
Δ.2	Πόσο συχνά πηγαίνετε στην εργασία σας με μοτοσυκλέτα (μηχανή / μηχανάκι);					

Δ.3	Πόσο συχνά πηγαίνετε στην εργασία σας με τη δημόσια συγκοινωνία;					
Δ.4	Πόσο συχνά πηγαίνετε στην εργασία σας με ποδήλατο;					
Δ.5	Πόσο συχνά πηγαίνετε στην εργασία σας με τα πόδια;					
Δ.6	Πόσο συχνά συναντάτε κυκλοφοριακή συμφόρηση;					

Μέρος Ε: Κατανάλωση ενέργειας ανά υπάλληλο

Παρακαλούμε, προσδιορίστε με μία κλίμακα από 1 έως 5 πόσο συμφωνείτε ή διαφωνείτε με τα παρακάτω: (1: Διαφωνώ απόλυτα, 2: Διαφωνώ, 3: Ούτε διαφωνώ ούτε συμφωνώ, 4: Συμφωνώ, 5: Συμφωνώ απόλυτα)		1	2	3	4	5
E.1	Προσπαθώ να μειώσω τη δική μου κατανάλωση ενέργειας όσο βρίσκομαι στο γραφείο μου στην επιχείρηση / οργανισμό στην οποία εργάζομαι					
E.2	Σβήνω τα φώτα των δωματίων που δεν χρησιμοποιούνται όσο βρίσκομαι στο γραφείο μου στην επιχείρηση / οργανισμό στην οποία εργάζομαι)					
E.3	Προσπαθώ να περιορίζω τη λειτουργία “standby” (αναμονή) των ηλεκτρικών συσκευών όσο βρίσκομαι στο γραφείο μου στην επιχείρηση / οργανισμό στην οποία εργάζομαι					
E.4	Προσπαθώ να αξιοποιώ μόνο το φυσικό φως, όπου αυτό είναι εφικτό, όσο βρίσκομαι στο γραφείο μου στην επιχείρηση / οργανισμό στην οποία εργάζομαι					
E.5	Προσπαθώ να μειώσω τη δική μου κατανάλωση ενέργειας όσο βρίσκομαι στο σπίτι μου					
E.6	Σβήνω τα φώτα των δωματίων που δεν χρησιμοποιούνται όσο βρίσκομαι στο σπίτι μου					
E.7	Προσπαθώ να περιορίζω τη λειτουργία “standby” (αναμονή) των ηλεκτρικών συσκευών όσο βρίσκομαι στο σπίτι μου					
E.8	Προσπαθώ να αξιοποιώ μόνο το φυσικό φως, όπου αυτό είναι εφικτό, όσο βρίσκομαι στο σπίτι μου					

Μέρος ΣΤ: Κατανάλωση νερού ανά υπάλληλο

Παρακαλούμε, προσδιορίστε με μία κλίμακα από 1 έως 5 πόσο συμφωνείτε ή διαφωνείτε με τα παρακάτω: (1: Διαφωνώ απόλυτα, 2: Διαφωνώ, 3: Ούτε διαφωνώ ούτε συμφωνώ, 4: Συμφωνώ, 5: Συμφωνώ απόλυτα)		1	2	3	4	5
ΣΤ.1	Το «μοτίβο» της δικής μου κατανάλωσης νερού αλλάζει όσο βρίσκομαι στην επιχείρηση / οργανισμό στην οποία εργάζομαι					
ΣΤ.2	Όσο βρίσκομαι στην επιχείρηση / οργανισμό στην οποία εργάζομαι, καθορίζω τη δική μου κατανάλωση νερού βάσει των δικών μου προτιμήσεων					
ΣΤ.3	Είμαι ικανοποιημένος από την κατανάλωση νερού που πραγματοποιώ όσο βρίσκομαι στην επιχείρηση / οργανισμό στην οποία εργάζομαι					

Μέρος Ζ: Παραγωγή αποβλήτων ανά υπάλληλο

Παρακαλούμε, απαντήστε στις επόμενες ερωτήσεις με μία κλίμακα από το 1 έως το 5: (1: Ποτέ, 2: Σπάνια, 3: Μερικές φορές, 4: Συχνά, 5: Πάντα)		1	2	3	4	5
Z.1	Στον χώρο εργασίας σας στην επιχείρηση / οργανισμό στην οποία εργάζεστε, πόσο συχνά παράγετε απόβλητα χαρτιού;					
Z.2	Στον χώρο εργασίας σας στην επιχείρηση / οργανισμό στην οποία εργάζεστε, πόσο συχνά παράγετε πλαστικά απόβλητα;					
Z.3	Στον χώρο εργασίας σας στην επιχείρηση / οργανισμό στην οποία εργάζεστε, πόσο συχνά παράγετε απόβλητα κουζίνας (όπως απόβλητα τροφίμων);					
Z.4	Στον χώρο εργασίας σας στην επιχείρηση / οργανισμό στην οποία εργάζεστε, πόσο συχνά παράγετε ηλεκτρονικά απόβλητα;					
Z.5	Στον χώρο εργασίας σας στην επιχείρηση / οργανισμό στην οποία εργάζεστε, πόσο συχνά παράγετε απόβλητα άλλου τύπου;					
Z.6	Στον χώρο εργασίας σας στην επιχείρηση / οργανισμό στην οποία εργάζεστε, πόσο συχνά διαχωρίζετε τα απόβλητα τροφίμων από τα άλλα απόβλητα;					
Z.7	Στον χώρο εργασίας σας στην επιχείρηση / οργανισμό στην οποία εργάζεστε, πόσο συχνά διαχωρίζετε τα ανακυκλώσιμα απόβλητα από τα άλλα απόβλητα;					
Z.8	Στον χώρο εργασίας σας στην επιχείρηση / οργανισμό στην οποία εργάζεστε, πόσο συχνά διαχωρίζετε τα επικίνδυνα απόβλητα από τα άλλα απόβλητα;					
Z.9	Στο σπίτι σας, πόσο συχνά διαχωρίζετε τα απόβλητα τροφίμων από τα άλλα απόβλητα;					
Z.10	Στο σπίτι σας, πόσο συχνά διαχωρίζετε τα ανακυκλώσιμα απόβλητα από τα άλλα απόβλητα;					
Z.11	Στο σπίτι σας, πόσο συχνά διαχωρίζετε τα επικίνδυνα απόβλητα από τα άλλα απόβλητα;					

Σας ευχαριστώ πολύ για τον χρόνο σας!

Author's Statement:

I hereby declare that, in accordance with article 8 of Law 1599/1986 and article 2.4.6 par. 3 of Law 1256/1982, this thesis/dissertation is solely a product of personal work and does not infringe any intellectual property rights of third parties and is not the product of a partial or total plagiarism, and the sources used are strictly limited to the bibliographic references.