Remote Working Risk Exposure - An Europe Digital Coverage Case Study

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Abstract

This study aims to explore the impact of remote work on the digital skills of individuals in Europe, emphasizing the potential risks associated with not adapting to the rapidly changing work environment. The selection of this topic was driven by the growing relevance of flexible work models for companies, making it a subject of considerable interest for employees, employers, organizations, and researchers alike.

A mixed research methodology was employed for this study. Initially, the relationship between remote work and digital skills levels was explored by analyzing existing literature from recent years. Subsequently, quantitative methods were applied using statistical software programs to analyze secondary data obtained from the Eurostat database. The findings are presented in tables and graphs for better visualization. The findings reveal a statistically significant positive correlation between remote work and a high level of digital skills among employees.

The paper demonstrates originality by offering novel perspectives into the field of digitalization and remote employment. It explores the relationship between remote work as an independent variable and digital skills, a departure from the conventional approach. Our work provides insightful information for future investigations and acts as a starting point for scholars who wish to investigate deeper into this topic. Additionally, our work might be educational and useful to students researching comparable topics for their dissertation or bachelor's theses. Furthermore, the conclusions and suggestions made in this study might be helpful to companies and governmental organizations that are accountable for developing strategies and policies related to digital competence and working from home.

Keywords

Remote working, digital skills level, correlation analysis, European countries, risk exposure

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Introduction

This paper investigates the relationship between remote work and the digital proficiency of employees across 26 European nations during the 2021-2022 timeframe. Our research employs a dual approach, integrating both qualitative and quantitative methods. This includes an extensive literature review, summarizing recent pertinent findings, alongside statistical analysis of secondary data retrieved from the Eurostat database using SPSS software. Digitalization plays a crucial role in enabling remote work, but what impact does working from home have on individuals' digital skills, and what are the risks associated with not adopting remote work practices?

According to the teleworkability index, 36% of jobs in the European Union are considered suitable for remote work (Babapour Chafi, Hultberg and Bozic Yams, 2021), a potential that persists even after the lifting of pandemic restrictions. As per König and Seifert (2022) even in the later stages of their careers, workers are required to confront new technical challenges and enhance their computer skills. The quantity of research on digital skills is expanding, but it has been hampered by the limited availability of reliable data (Männasoo, Pareliussen and Saia, 2023). Fostering creativity and innovation is now more essential than ever (Tønnessen, Dhir and Flåten, 2021) for the survival and expansion of organizations. Employees

and organizations that want to adapt to a remote system of work need to have into consideration the risks exposures related with cybersecurity, data protection and privacy, laws and regulations, communication, technological issues and monitoring performance among others. The period following the pandemic has also shown how systems may recover, even in a short amount of time if businesses, organisations, institutions, and individuals are ready to be adaptable and think in terms of sustainability (Settembre-Blundo et al., 2021).

The paper's structure comprises several sections: literature review providing a synthesis of relevant recent research on the topic; research methodology outlining our objectives, hypotheses, dataset, and statistical methods; followed by results and discussion, where numerical findings are interpreted and contextualized within the framework of management research. Finally, conclusions are drawn based on the accumulated evidence.

1. Review of the scientific literature

Remote employment known also as work from home or telecommuting means that work activities are carried out in the homes of the employees (Budnitz and Tranos, 2022) This type of work is experienced by numerous people from different fields and has been predominantly analyzed during and after the pandemic. Starting with March 2020, there was a major disruption in the landscape of work (Tønnessen, Dhir and Flåten, 2021), where remote work, digitalization and risks converge. This substantial alteration is motivated by the guidance provided by the World Health Organization (WHO) to mitigate the spreading of the virus (Khan et al., 2021) and became a reality for many individuals and organizations (De Barros, Melo and Farias, 2021). Organizations across the globe adapt to flexible home offices in the field where it is possible in order to continue their day to day activity. As the new remote working model takes more space, new risks arise from multiple perspectives. An extraordinary growing number of remote employees starts working in this different environment. Therefore it appears the need of specific regulations in order to control the working environment and protect the stakeholders. Businesses are required to modify their organizational and work frameworks (Saura, Ribeiro-Soriano and Zegarra Saldaña, 2022) as well. Remote working implies using technology and digital skills in order to comply with the responsibility of the job and ensuring communication between the stakeholders. Working from home is not possible without digital alphabetization of the employees and technical knowledge of the companies. The rapid digital transformation attracts academic attention in both macroeconomic and microeconomic domains (Männasoo, Pareliussen and Saia, 2023).

Digitization entails the conversion of analog data into digital format, allowing it to be stored and transmitted using computers (Simion et al., 2023). The rise of digital technologies is significantly influencing the establishment or evolution of companies (Bacca-Acosta et al., 2023) According to Crawford (2021), in the globalized virtual economy, professionals must prioritize the acquisition of advanced intercultural and digital skills. The significance of digital competence in the workplace grows considerably, as it is challenging to find employment where digital skills are not a requirement. Digital technologies is changing the business environment (Hock-Doepgen et al., 2021) and serve as primary catalysts for innovation, growth, and job creation in the global economy (Bartolomé, Garaizar and Larrucea, 2022). The integration of new technologies is not only facilitating the adoption of digital platforms by workers, but has also positively influencing employees eagerness to learn and utilize these technologies (Saura, Ribeiro-Soriano and Zegarra Saldaña, 2022).

Digital competencies involve the skill to comprehend and articulate the transformation of information into knowledge, operations, and services. This must adapt based on the capacity to leverage new technologies and adjust to the market's conditions (Drydakis, 2022). The concept of digital transformation (Rothstein, 2024) entails the reassignment of labor and capital to more efficient purposes, particularly those that generate technological innovation. Other thing to be taken into consideration is that the difference between the European countries can be altered by the unequal distribution of information and communication technology infrastructure by the private companies (Tóth and Nagy, 2023). Männasoo, Pareliussen and Saia (2023) states that there exists a positive relationship between digital skills and employment levels in European states, digitalization increasing the growing number of teleworkers. In their study Saura, Ribeiro-Soriano and Zegarra Saldaña, (2022) identifies that work from home comes with negative impact such as stress, cybersecurity concerns and privacy. The overall performance of the workers can be negatively impacted by the limited feedback caused by usage of digital communications and reduced interpersonal contact (Ilter, Barth-Farkas and Ringeisen, 2023).

The potential of digital transformation lies in promoting growth that is both inclusive and sustainable (Elmassah and Hassanein, 2022), enhancing equilibrium between work and personal life. However, the

uneven distribution of digital capabilities across European regions (Caravella et al., 2023) raises the risk of divergence and polarization. Despite the widespread integration of the digital sphere as a crucial aspect of contemporary society, numerous individuals continue to be excluded or face challenges in utilizing it (Tóth and Nagy, 2023), leading to persistent inequalities. Budnitz and Tranos (2022) explains that the success of remote work relies on the availability of high-speed internet connections. Recognition of the right to digital education has been scarce (Barahona, 2023) and burdened with challenges, training processes should be customized to fit the specific needs of each category (Ogrean and Herciu, 2022). Individuals with less digital literacy are majorly working jobs that cannot be done from home, 17% of the person working in traditional workframe rated their digital skills as excellent or very good, while 40% of the remote employees rated their digital skills as excellent or very good (König and Seifert, 2022). Therefore remote workers already have acquired good level of digital skills. König and Seifert (2022) demonstrates that work from home improve digital skills, especially for the older employees. European Union introduced "2030 Digital Compass: the European way for the Digital Decade" in March 2021 dedicated for the transition to digitalization (Ogrean and Herciu, 2022).

A key barrier in virtual work is the ongoing need for employees to adjust to technical issues and the potential complications with new technologies. Companies must handle these difficulties strategically (Saura, Ribeiro-Soriano and Zegarra Saldaña, 2022) in order to build a successful and long-lasting remote work strategy. The influence of digital technologies on job quality can be either beneficial or detrimental (Berg et al., 2023), depending on their utilization. According to Vissenberg et al., (2023) digital skills and knowledge are not enough in ensuring the risks of remote working system. Risk management plays a crucial role for the success of the organization, the necessity of such a strategy has been pointed out by the pandemic. Risk management is critical in times of volatility because it ensures that organizations work responsibly while also being adaptable and durable. Management of risks should be incorporated in the organizational environment of all organizations, no matter the size or nature of business (Prioteasa and Ciocoiu, 2017). Aside from day-to-day risk management, emergency circumstances such as COVID-19 represent significant disruptions in the global economic, social, environmental, and geopolitical order.

2. Research methodology

This section of the paper outlines the methodological approach employed, including the objectives and hypotheses, as well as the data collection and preparation processes to ensure reliability and relevance for stakeholders. The tools utilized encompassed SPSS for statistical analysis, Microsoft Excel for data processing and graphs, Microsoft Word for working on text, tables.

2.1. Objectives and hypothesis

The aim of the study is to explore the influence of remote work on digital skills in Europe during the years 2021 and 2022. The main objectives associated with the aim of the study include: identifying datasets for both variables, examining the connection between remote work and individuals proficiency in digital skills, emphasizing the significance of remote work for enhancing digital literacy while acknowledging associated risks. According to these three objectives there were formulated 3 hypotheses:

- Hypothesis 1

(H0): There is a significant difference in the availability and quality of datasets for remote work and individuals' proficiency in digital skills.

(H1): There is no significant difference in the availability and quality of datasets for remote work and individuals' proficiency in digital skills.

- Hypothesis 2:

(H0): There is no significant relationship between remote work and individuals' proficiency in digital skills.

(H1): There is a significant positive relationship between remote work and individuals' proficiency in digital skills.

- Hypothesis 3:

(H0): The risks associated with remote work do not outweigh the benefits in terms of enhancing digital literacy.

(H1): The risks associated with remote work outweigh the benefits in terms of enhancing digital literacy.

These hypotheses provide a framework for testing the relationships and significance between remote work and digital skills proficiency while considering both positive and negative aspects. The main hypothesis of the paper suggests that there exists a statistically significant positive correlation between the variables of employees working from home and individuals possessing above basic overall digital skills in Europe.

2.2. Data sets

The data was gathered from the Eurostat database in 2024, compiling percentages for various variables across European countries for the years 2021 and 2022. Employees working from home are defined as those either fully remote or engaged in hybrid work arrangements with at least four days of remote work per month. Above basic overall digital skills indicate proficiency in digital literacy, possessing strong digital capabilities, and being an independent user. After processing the dataset, incomplete indicators were removed, including countries lacking percentages for both variables in both years.

Table no. 1 presents this data specifically for employees engaged in remote work and individuals possessing above basic overall digital skills across 26 European countries.

Table no. 1. Data set for employees working from home and Individuals with above basic overall digital skills in Europe

	independent variable	dependent variable
Country	**The percentage of employees working from home**	**Individuals with above basic overall digital skills**
Austria	16.2%	32.0%
Belgium	16.0%	28.3%
Croatia	7.3%	25.0%
Cyprus	5.3%	25.0%
Czechia	7.3%	35.5%
Denmark	12.7%	39.4%
Estonia	15.4%	34.8%
Finland	15.2%	53.6%
France	16.7%	30.6%
Germany	14.9%	19.8%
Greece	10.4%	20.0%
Hungary	6.2%	28.1%
Ireland	14.6%	38.5%
Italy	5.1%	22.2%
Latvia	5.5%	16.6%
Lithuania	9.1%	25.9%
Luxembourg	19.2%	27.9%
Malta	21.5%	37.0%
Netherlands	17.9%	54.5%
Norway	12.7%	50.7%
Poland	6.8%	20.1%
Portugal	14.6%	29.9%
Romania	4.0%	9.0%
Slovenia	8.0%	18.9%
Spain	8.5%	38.7%
Sweden	12.2%	36.5%

Source: Eurostat

2.3. Statistical analysis

The initial phase of the analysis focused on verifying the quality of the data to ensure its cleanliness and readiness for descriptive statistical analysis. First, measures such as mean, median, and standard deviation

were computed for each variable. Next, the distribution underwent scrutiny through Shapiro-Wilk and Kolmogorov-Smirnov tests to assess its normality, subsequently, non-parametric tests were conducted. The correlation analysis aimed to ascertain statistically significant relationships between variables.

The mean serves as the primary measure of central tendency, obtained by summing up all observations and dividing them by their count. Meanwhile, the median denotes the middle observation within a dataset and can be computed by arranging the observations in ascending or descending order. Standard deviation indicates the degree of dispersion of values from the mean. The Shapiro-Wilk test assesses the normality of data distribution, boasting significant statistical power and reliability, particularly with small sample sizes. Correlation analysis highlights the relationship between variables within a statistical population. Pearson's correlation coefficient quantifies the strength and direction of the linear relationship between two standardized variables, ranging from -1 to 1. A positive value denotes a direct correlation, while a negative value signifies an indirect correlation between the two variables (Stefan et al., 2021).

The study upheld strict ethical standards by refraining from collecting primary information directly from individuals and ensuring that issues related to permission and confidentiality were properly addressed. To avoid any potential violations of intellectual property rights, the research relied on secondary data sourced from publicly available resources.

3. Results and discussion

The table no. 2 illustrates the descriptive statistics for employees working from home and individuals with above basic overall digital skills in Europe during the period of 2021-2022, highlighting measures of central tendency.

Table no. 2. Descriptive statistics

indicator	employees working from home	individuals with above basic overall digital skills
Mean	11.665%	30.705%
Median	12.450%	29.095%
Standard deviation	4.9691%	11.2215%
Skewness	0.119	0.496
Standard error of skewness	0.456	0.456
Kurtosis	-1.142	0.153
Standard error of kurtosis	0.887	0.887
Kolmogorov-Smirnov p	0.164	0.200
Shapiro-Wilk p	0.192	0.389
Minimum	4%	9%
Maximum	21.5%	54.5%

The statistical analysis outlined significant findings regarding employees working from home and individuals with above basic overall digital skills in Europe for the years 2021-2022. The median percentage of employees working from home was 12.450%, with a slightly lower mean of 11.665% and a standard deviation of 4.9691%. This is despite a wide range of results, ranging from a minimum of 4% in Romania to a maximum of 21.5% in Malta. On the other hand, the median percentage of individuals with above basic overall digital skills was 29.095%, with a slightly higher mean of 30.705% and a standard deviation of 11.2215%. Again, there was a wide range of results, with a minimum of 9% in Romania and a maximum of 54.5% in the Netherlands. Normality tests, including Kolmogorov-Smirnov and Shapiro-Wilk, indicated that the p-value was greater than 0.05 for both variables, suggesting a normal distribution of the data.

Below is the non-parametric correlation table for employees working from home and individuals with above basic overall digital skills in Europe for the years 2021-2022.

Table no. 3. Statistical correlation between the variables

		employees working from home	individuals with above basic overall digital skills
employees working from home	Pearson Correlation	1	0.544
	Sig.(2-tailed)		0.004
	N	26	26
individuals with above basic overall digital skills	Pearson Correlation	0.544	1
	Sig.(2-tailed)	0.004	
	N	26	26

The nonparametric correlation analysis reveals a statistically significant relationship between the variables, with a correlation coefficient of 0.544 observed between employees working from home and individuals with above basic overall digital skills (H1). This coefficient indicates a strong correlation, suggesting that as the percentage of employees working from home increases, the level of digital skills among individuals in that country tends to be higher. The significance value (p-value) of 0.004, smaller than the standard threshold of 0.05, indicates a low probability that this correlation is due to random fluctuation. Consequently, the correlation between the two variables is significant at the 0.01 level, implying a statistically meaningful relationship between them.

The figure no. 1 visually represents the correlation between the two variables for all 26 countries in Europe for the years 2021 and 2022.

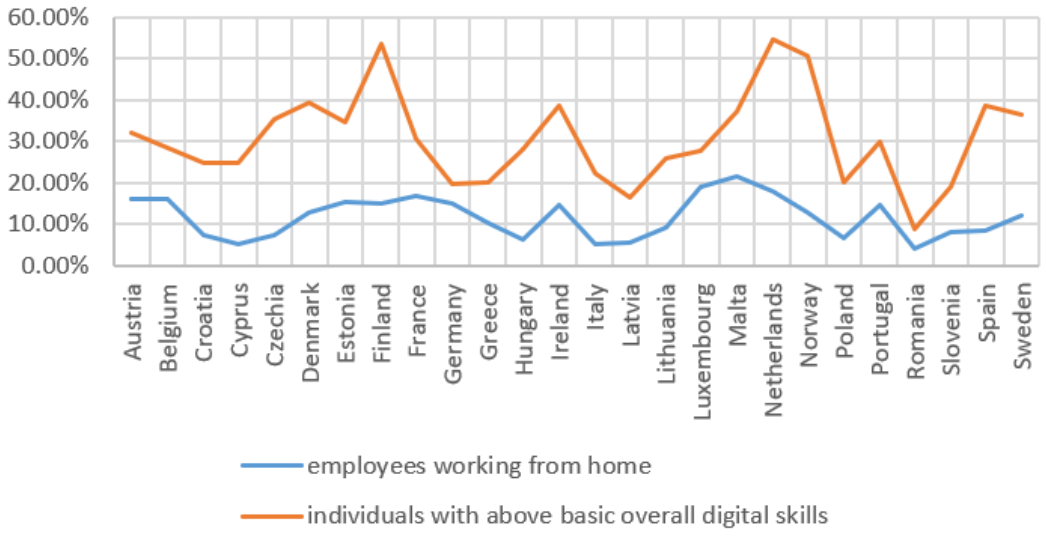

Figure no. 1. Correlation between the two variables for all 26 countries in Europe for the years 2021 and 2022

Conclusions

The study "Remote Working Risk Exposure - A Europe Digital Coverage Case Study" has yielded significant findings in the field. Through empirical analysis supported by secondary data collected from Eurostat, our hypothesis (H1) was validated, revealing a strong positive statistical correlation between working from home and the above average digital skills of individuals. This was demonstrated by a Pearson correlation coefficient of 0.544% and a significant P-value. Consequently, countries with low percentages of employees working from home, where remote and hybrid work types are not encouraged or supported by the government and companies, are exposed to a significant risk related to digitalization. Therefore, all policies and regulations regarding working from home must consider their impact on digital literacy at both the organizational and national levels.

There are several limitations associated with the study. Firstly, the analysis was conducted on data collected from only 26 countries in Europe, which means that the findings cannot be generalized to all other countries. Additionally, the data was gathered for the period of 2021 and 2022, limiting the temporal scope of the results. Therefore, the conclusions drawn from this study are applicable only to the 26 countries analyzed and for the specified time frame. The application of ths study can have an influence on policy recommendation, training courses and technology development to promote remote work ensuring digital literacy. Future extentions of this research could expand the study to include more countries and a longer period of time, potentially employing longitudinal statistical analysis to further investigate the relationship between remote working and digital skills as well as global comparison studies.

Despite the limitations, the paper "Remote Working Risk Exposure - An Europe Digital Coverage Case Study" underscores the significance of remote and hybrid work models for enhancing the digital competencies of individuals. Digital skills, or digital literacy, can be cultivated through various activities, and remote work provides an environment conducive to such skill development. This paper offers valuable insights that can be utilized by researchers, students, people managers, and governments to better understand the relationship between remote work and digital skills, and to formulate policies and strategies that sustain digital literacy through flexible remote work model.

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