

## THE IMPACT OF DIGITALIZATION ON ROMANIA'S LABOR MARKET: TRANSFORMATIONS, CHALLENGES, AND STRATEGIC IMPLICATIONS

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### ABSTRACT

*This paper explores the impact of digitalization on Romania's labor market, focusing on the transformations, challenges, and strategic implications associated with this technological shift. The study employs a quantitative research approach, utilizing a structured questionnaire distributed to 500 employees and employers across various economic sectors in Romania. The demographic diversity of the sample, which includes participants from different regions, industries, and educational backgrounds, provides a comprehensive perspective on the effects of digitalization. Three hypotheses were tested: the increasing demand for digital skills, the influence of digitalization on productivity, and the associated challenges in managing a digitally transformed workforce. The findings confirm that digitalization significantly enhances productivity and underscores the critical importance of digital skills in securing well-paying and stable jobs. However, the study also reveals significant challenges, including the need for continuous reskilling, managing resistance to change, and addressing the digital divide. The results indicated a significant increase in demand for technological roles and a decline in traditional manual jobs, emphasizing the need for continuous digital skills. Digitalization also enhances productivity, particularly in IT, manufacturing, and services, but poses challenges in human resource management and organizational adaptation. Strategic implications call for investments in education, digital infrastructure, and proactive public policies to maximize benefits and minimize the negative impacts of digital transformation. The findings also emphasize the importance of preparing the workforce for a digital economy to ensure long-term competitiveness and growth that is conducive to inclusion. The research concludes with theoretical and managerial implications and suggests directions for future studies to further investigate the long-term effects of digitalization on labor markets.*

**KEYWORDS:** *digital skills, digitalization, human resource management, labor market, productivity.*

**DOI:** 10.24818/IMC/2024/03.03

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### 1. INTRODUCTION

Digitalization has become a key driving force in global economic and social transformation, fundamentally altering the way individuals, organizations, and economies function. In Romania, this rapid transformation, facilitated by the advancement of information and communication technologies (ICT), generates both significant opportunities and major challenges for the labor market. The central

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problem of this research lies in evaluating the dual impact of digitalization: on the one hand, the increasing demand for advanced digital skills and jobs in technological fields; on the other hand, the decline of traditional jobs that involve manual and repetitive tasks. This structural change requires a swift adaptation of the workforce and public policies to ensure a balanced and sustainable economic transition. This digital revolution has facilitated the emergence of new business models and stimulated innovation across various sectors. For example, the financial sector has undergone a comprehensive digital transformation, where digital technologies have improved business processes, operational efficiency, and customer service quality, thereby contributing to sustainable development (Tretyakova et al., 2024). Similar trends are observed in other sectors, emphasizing the importance of digital transformation (DT) in maintaining economic competitiveness, with profound implications for both developed and developing countries (Marino-Romero & Folgado-Fernández, 2024). The cultural landscape has also been reshaped as digital technologies foster new forms of cultural expression and interaction, while presenting challenges such as the digital divide and privacy concerns (Xiao, 2024). The essence of digitalization lies in transforming existing economic sectors and creating new ones, thereby increasing efficiency and modernizing different spheres of life (Khaustova, 2023). Businesses are forced to rethink their strategies, management, and operational methods in response to the digital revolution, which requires agility and adaptability in a volatile, uncertain, complex, and ambiguous environment (Dănișor & Dănișor, 2023). The integration of digital technologies into business models is not only about using powerful technologies, but also about optimizing resources and human capital to gain a competitive advantage (Voitsekh, 2022). Important countries such as Denmark, Finland and the United States exemplify the successful implementation of digitalization, which has led to economic growth, entrepreneurial innovation and productivity, while requiring new skills and adaptation to evolving ICT requirements (Zaichenko, 2023). The rapid development of digital technologies has made digital transformation a priority for businesses, allowing them to optimize business processes and improve communication with consumers, thus increasing competitiveness. However, this transformation also brings challenges such as job displacement and the digital divide, highlighting the need for policymakers to balance technological progress with inclusive economic growth (Sadia et al., 2023). The global nature of digitalization processes, characterized by the increasing integration of digital technologies across borders, is reshaping economic, political and business landscapes, leading to a new model of global economic development that emphasizes IT information and services over traditional goods and services (Tkachenko, 2023). In general, digitalization is a multifaceted phenomenon that requires a nuanced approach to harness its benefits while reducing its risks, ensuring that the transformation leads to a prosperous and equitable future for all.

Internationally, digitalization is intrinsically linked to the concept of Industry 4.0, which encompasses the integration of advanced technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data and automation in the manufacturing and service sectors. These technologies are revolutionizing traditional work processes by increasing efficiency, productivity, and sustainability, and enabling new economic opportunities through innovations such as additive manufacturing and cloud services (Abir, 2024; Bora et al., 2024; Korkut & Várallyai, 2024). For example, the oil and gas industry uses big data analytics and AI to turn large amounts of historical data into actionable insights, thus improving decision-making and operational efficiency (David & Gupta, 2024). Similarly, the manufacturing sector is witnessing a shift towards more sustainable practices by reducing material and energy waste through the adoption of IoT and robotics (Abir, 2024). However, the transition to Industry 4.0 is not without its challenges. High deployment costs, cyber threats, and the need to reskill the workforce are significant barriers that industries must overcome to fully realize the benefits of digital transformation (Abir, 2024; Bora et al., 2024). Additionally, the rapid pace of technological adoption can exacerbate income inequality, requiring regulatory interventions by governments and international organizations to mitigate the negative impact on businesses and society (Korkut & Várallyai, 2024). The COVID-19 pandemic has further accelerated the need for

digital transformation, prompting businesses to improve production resilience and shift to more strategic spending on digital engineering projects (Das & Mondal, 2023). In developing countries, the digitalization of economies, as seen in China and the United States, highlights the potential to maintain a global advantage in GDP through the strategic deployment of Industry 4.0 technologies (Nehrey, 2023). However, the pace of digitalization varies, with countries such as Russia lagging behind the European Union in adopting key digital technologies such as AI, big data and IoT (Korovin & Kumar, 2023). Small and medium-sized enterprises (SMEs) in countries such as Portugal face additional challenges due to increased competition and the need for internationalization, although Industry 4.0 can increase their value chain and competitiveness (Cardoso & Pereira, 2022). The transformative impact of digital technologies extends beyond economic benefits, influencing job quality, working conditions and the very nature of the workforce, thus requiring a comprehensive approach to workforce adaptation and legal and social regulations (Schaffers et al., 2022). Effective knowledge management, supported by AI and big data, is crucial for industries to remain competitive and sustainable in the global marketplace (David & Gupta, 2024). Overall, while Industry 4.0 presents numerous opportunities for growth and innovation, it also requires strategic planning, regulatory support, and a focus on workforce development to address the accompanying challenges.

In the Romanian context, the labor market faces a mix of opportunities and threats. On one hand, the use of artificial intelligence and other digital tools promises to increase efficiency and foster labor market growth (Zub, 2023). On the other hand, there is a risk of marginalizing the traditional workforce, highlighting the need for proactive adaptation of public policies and organizational strategies to harness the benefits of digital transformation while mitigating its negative impact on employees (Cristache et al., 2022; Pusch et al., 2024).

The purpose of this paper is to analyze the impact of digitalization on the Romanian labor market, identifying the structural transformations, the dynamics of labor demand and supply, and the role of digital skills in shaping employment opportunities. By addressing these aspects, the study aims to provide strategic insights and recommendations for policymakers and businesses to maximize the benefits of digitalization while minimizing its potential negative effects. Ultimately, the goal is to contribute to the development of a balanced and sustainable approach to digital transformation, ensuring the long-term competitiveness and inclusivity of the Romanian economy.

The structure of the study is as follows: in section 1 is made the Introduction, mentioning different definitions on the process and its importance in the society, in section 2 is made the theoretical background, where again digitalization is in the center of the analysis, but this time based on its profound impact on factors such as internal and external, and also the authors introduce the reader into the benefits, challenges and trends of digitalization at local and global level, In section 3 is presented the Methods used, the development of research hypothesis, in section 4 are presented the Results and the hypothesis fulfilment, and finally the Implications, and future research directions.

## **2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT**

This section provides a theoretical framework for understanding the multifaceted impact of digitalization on labor markets, with a specific focus on Romania. By analyzing the economic and social implications of digitalization, this study aims to contextualize the dual forces at play: the creation of new, high-skilled jobs in emerging technological fields and the concurrent displacement of traditional roles. This duality, central to the transformation of the Romanian labor market, underscores the need for strategic interventions in education, workforce development, and policymaking to ensure a balanced and inclusive approach to digital transformation.

### **2.1. The dual impact of digitalization on the labor market**

Digitalization has far-reaching economic and social implications, fundamentally transforming various aspects of society and the economy. From an economic point of view, digitalization increases

productivity by automating and optimizing processes, which is evident in increasing the efficiency and profitability of economic activities (Khaustova, 2023). This transformation is driven by the integration of advanced technologies such as artificial intelligence, 5G, cloud computing and big data, which are becoming significant components of national economies (Li, 2022). While digitalization generates new jobs in emerging technological areas, it also leads to the displacement of traditional jobs, requiring rapid adaptation of employment structures and policies to mitigate adverse effects on the labor market (Pandey, 2024; Rudakov, 2023). This dual impact is evident in the creation of new skilled jobs and the replacement of routine work, highlighting the need for the education sector to reform and introduce digital skills sets in higher education curricula to bridge the digital skills gap (Pandey, 2024). Furthermore, digitalization has been shown to mitigate income inequality in emerging industrial economies by promoting labor productivity and economic efficiency, although the distributional impact varies between different regions and social groups (Demir et al., 2023; Li, 2022).

## **2.2. Social and economic implications of digitalization**

From a social point of view, digitalization significantly influences education and training, requiring employees to acquire advanced digital skills to remain competitive in the labor market (Zaichenko, 2023). This shift can exacerbate social inequalities if access to technology and digital education is not evenly distributed, creating a digital divide between different socio-economic groups (Sadia et al., 2023). However, digital technologies also have the potential to improve quality of life by ensuring access to digital services in health, public administration and other sectors, thereby enhancing overall societal well-being (Duggappa, 2024). The rapid expansion of digital technologies has led to the development of new sectors of the economy and the transformation of existing ones, contributing to economic growth and the creation of new opportunities for businesses and individuals (Hasanboy o'g'li & Toxtasinovna, 2024; Tkachenko, 2023). The global nature of digitalization processes requires the integration of digital initiatives into national and regional development strategies to ensure inclusive and sustainable growth (Khaustova, 2023). Moreover, the dynamism of the digitalization process today covers all aspects of society, including economic and cultural, forming the premises for transformational changes in global economic systems (Zaichenko, 2023). Policymakers must balance technological progress with inclusive economic growth to ensure a prosperous and equitable future, addressing concerns such as job displacement and the digital divide (Sadia et al., 2023). Identifying possible risks and negative consequences, such as unauthorized access to information and mass unemployment, is crucial for strategic forecasting and long-term planning (Khaustova, 2023). Although digitalization presents numerous opportunities for economic and social advancement, it also presents significant challenges that require careful management and political intervention to realize its full potential for the betterment of society.

## **2.3. Transformation of workforce mobility and organizational structures in the digital era**

Digitalization has profoundly transformed workforce mobility, with remote work becoming the norm and enabling global collaboration. This shift, accelerated by the COVID-19 pandemic, has allowed companies to take advantage of a global talent pool, promoting a "virtual brain drain" in which skilled professionals work remotely for international firms without emigrating (Bucos, 2024). The rise of digital labor platforms has restructured traditional working environments, offering flexibility but also raising concerns about fair wages, employment rights and social security (Singh & Bhushan, 2023). This digital transformation has led to a polarization in the labor market, with a growing demand for highly skilled workers, particularly in IT, programming and digital marketing, while opportunities for medium and low-skilled workers are decreasing (Bucos, 2024; Pusch et al., 2024). The phenomenon of digital nomadism exemplifies this shift, as it allows individuals to work remotely from anywhere, further complicating traditional migration patterns and requiring new policy considerations. However, this digital mobility also brings challenges such as digital inequality, the

digital gap between generations and social groups, and the need for increased skills and competences among workers (Leonov, 2023). The integration of digital technologies in the workplace has not led to significant job losses, but has created new employment opportunities, underlining the importance of workforce training to effectively manage the digital transition (Pusch et al., 2024). Countries such as Latvia are exploring remote cross-border work to mitigate human capital losses due to emigration, highlighting the need for adjustments to taxes, social benefits and labor market regulations to facilitate this transition (Mieriņa & Supule, 2024). The digitalization of the economy has also led to innovative changes in the types and forms of employment, with a notable impact on employment among young people, as they are the most progressive and knowledge-oriented social group (Semykina & Sikoraka, 2023). Despite the benefits, virtual migration or tele emigration exacerbates socio-economic and digital development imbalances, creating new sources of social tension and competition in the labor market (Brown & Gordon, 2022). Addressing these challenges requires comprehensive regulatory measures at international, state and company levels to optimize the development of virtual migration and ensure equitable access to digital mobility services (Brown & Gordon, 2022). The digital transformation of labor markets can replicate disparities in access to work, but it can also mitigate some class-based differences in employers' selection of workers, as seen in the online platform economy (Martindale & Lehdonvirta, 2023). Overall, while digitalization offers significant opportunities for labor mobility and global collaboration, it also requires strategic measures to manage the associated challenges and ensure a balanced and fair future of work.

#### **2.4. The impact of digitalization on labor market dynamics and organizational structures**

Digitalization has had a profound impact on the labor market, influencing productivity, employment dynamics, qualification requirements, socio-economic inequalities and organizational structures. Research indicates that the adoption of automation and robotics significantly increases productivity in different economic sectors, but also disrupts employment, especially in industries dependent on manual labor (Rudakov, 2023). This disruption is evident in the mixed impact on job demand, where some firms are experiencing upskilling of the workforce while others are experiencing heightened workload pressures, although there is little evidence of significant job losses directly attributed to technology integration (Pusch et al., 2024). The demand for advanced digital skills has become paramount as employees equipped with these skills are more likely to secure high-paying and stable jobs (Turebekova et al., 2023). This shift requires substantial investment in workforce training to effectively manage the digital transition (Pusch et al., 2024). However, digitalization can exacerbate socio-economic inequalities, as access to technology and digital education is unevenly distributed. Regions and social groups with limited access to digital infrastructure and skills lag behind those with adequate resources, underlining the need for policies to bridge the digital divide (Jevtić et al., 2023; Pandey, 2024). The influence of digitalization extends to organizational structures and work culture, with companies adopting digital technologies becoming more agile and innovative. This transition requires a significant shift in human resource management, highlighting the need for new approaches to employee engagement, performance management and skills development (Bhat & Sheikh, 2024; Ignatieva et al., 2023). The integration of advanced technologies such as artificial intelligence, machine learning, and data analytics has streamlined HR processes, enabling data-driven decision-making and personalized employee experiences that increase job satisfaction and retention (Bhat & Sheikh, 2024). However, this digital transformation also presents challenges, including concerns about data privacy, the security and ethical use of employee data, as well as resistance to change from employees and traditional HR practitioners (Bhat & Sheikh, 2024). Furthermore, the digital economy has reshaped job roles, increasing the demand for highly skilled labor while reducing opportunities for less educated workers (Turebekova et al., 2023; Yunxia & Yechi, 2023). This trend underscores the importance of online education in bridging the skills gap, with a wide range of courses that meet the needs of a technology-based economy (Turebekova et al., 2023). In addition, the development of the digital economy has significantly improved the employment scale of companies, especially in

high-skilled positions such as research and development, accounting and sales, driven by scale expansion and productivity effects (Yunxia & Yechi, 2023). Overall, while digitalization presents opportunities for growth and innovation, it also requires strategic efforts to address its disruptive effects on employment, socio-economic inequalities and organizational management practices (Svistunov & Lobachyev, 2023).

The impact of digitalization on Romania's labor market has been explored in various studies, reflecting both the opportunities and challenges specific to this geo-cultural context. For example, Cristache et al., 2022 examine how digital tools and AI are being adopted in Romanian industries, highlighting the accelerated demand for digital competencies among workers. Similarly, Marinescu, (2023) discusses the implications of new technologies on job creation and displacement in Romania, emphasizing the need for educational reforms to bridge the digital skills gap. Furthermore, Neagu (2022) analyzes the role of digital literacy in the Romanian education system, arguing that the current curricula must be updated to prepare future generations for the evolving demands of the labor market. The general objective of this research is to analyse the effects of digitalization on the labor market in Romania, identifying the structural transformations, the dynamics of labor demand and supply, and the impact of digital skills, as well as the strategic implications for public policies and the business environment.

a. The literature on digitalization reveals a complex interplay between job creation in technological fields and the decline of traditional jobs involving manual and repetitive tasks. Digitalization is fundamentally transforming the labor market by reshaping job demands and employment dynamics. Studies indicate that while digital technologies can lead to jobs shifting into roles characterized by manual and repetitive tasks, they simultaneously create new opportunities in technology fields. The adoption of digital technologies in German facilities has a mixed impact, with some firms experiencing workforce reductions and others facing increased workload pressures, however there is a modest trend towards job creation rather than significant job losses (Pusch et al., 2024). This trend is further supported by the transformative power of digital technologies in reshaping organizational activities and processes, driving strategic decisions, and driving innovation, which in turn creates new employment opportunities in the business sector (Pricopoaia et al., 2024). Furthermore, digitalization improves the quality of education and learning outcomes, which can increase the demand for jobs in education technology and digital learning environments (Shah & Shah, 2023). However, the digital divide and privacy concerns remain challenges that need to be addressed to fully reap these benefits (Shah & Shah, 2023). The impact of digitalization on management control (MC) also highlights the continued development of MC functions, including the expansion of MC tasks and the creation of new MC tools, which require new skills and roles within organizations (Fähndrich, 2022). In addition, the economic literature discusses quantitative changes in the demand for labor as humans are replaced by technology, leading to a change in the nature of the labor force and the skills required by employees (Beleva, 2022). The integration of digital technologies in businesses is expected to account for a significant share of global GDP, underlining the economic importance of digital transformation and the associated demand for technological expertise (Calderon-Monge & Ribeiro-Soriano, 2023). Furthermore, the convergence of digitalization policies and the active labor market suggests that employment assistance policies, such as career guidance and job matching tools, are particularly sensitive to digitalization, underlining the need for strategic investments in these areas to improve public employment services (Scarano & Colfer, 2022). In the field of entrepreneurship and intrapreneurship, digitalization influences the creation of new business models and opportunities, further determining the demand for jobs in technological fields (Floris & Dettori, 2023). Finally, the relationship between pedagogical knowledge, technology and digitalization in educational contexts underlines the importance of integrating technological tools into teaching practices, which can lead to new work roles in educational technology and digital pedagogy (Persada & Sobandi, 2023). Overall, while digitalization poses challenges for traditional jobs, it is also driving an increase in

demand for jobs in technology fields, requiring a strategic approach to training and workforce development to effectively manage this transition.

*Hypothesis 1: Digitalization is driving an increase in demand for jobs in technology fields and a decrease in traditional jobs involving manual and repetitive tasks.*

b. Rapid digital transformation in the global economy requires Romanian employees to develop essential digital skills to remain competitive in the labor market and ensure well-paid and stable jobs. The digital revolution has had a significant impact on the Romanian labor market, highlighting the need for continuous learning and training among professionals, especially in accounting and other financial jobs, to meet the demands of a digital economy (Mîța & Man, 2023). The education system in Romania must adapt to these changes by integrating information and communication technologies (ICT) to prepare future specialists with the necessary digital skills (Neagu, 2022). Rapid digitalization has transformed the skills required by workers, highlighting the importance of digital work skills, entrepreneurial skills, collaboration skills, communication skills, lifelong learning skills and evidence-based work skills (Bouwman et al., 2022). Despite the growing demand for digital skills, Romania faces challenges such as high youth unemployment and a low ranking in the EU's Digital Economy and Society Index, indicating the need to improve digital competitiveness and targeted public policies to improve digital skills among young people (Barna & Epure, 2020). The Romanian labor market is also influenced by the rise of artificial intelligence, which requires high-level skills and competencies that are difficult to acquire quickly, emphasizing the importance of adequate education and training for new areas (Marinescu, 2023). Students in economic cybernetics in Romania possess the necessary digital skills, but they need to improve other skills such as analysis, synthesis, adaptability, and creativity to increase their employability (Simionescu, 2022). The efficient use of human potential and the increase in labor productivity, facilitated by digitalization, are crucial for the overall economic and financial performance of businesses and the economy as a whole (Tofan & Aivaz, 2022). Romania's rapidly growing business services sector requires employees with the right skills to move from a simple service sector to higher value-added services, highlighting the need for both hard skills like IT and soft skills like problem-solving and analysis (Foerster-Metz & Golowko, 2017, 2018). Therefore, to remain competitive in the labor market and to secure stable and well-paid jobs, Romanian employees need to develop a comprehensive set of digital skills, supported by an adaptive education system and targeted public policies that respond to the specific needs of the digital economy. This multifaceted approach will ensure that the workforce is equipped to meet the challenges and opportunities presented by the ongoing digital transformation.

*Hypothesis 2: Digital skills are essential for employees in Romania to remain competitive in the labor market and to obtain well-paid and stable jobs.*

c. Digitalization has become a key force in increasing productivity in different economic sectors, but simultaneously introduces significant challenges in the management of human resources and the adaptation of organizational structures. The integration of advanced technologies such as artificial intelligence, machine learning, and data analytics has streamlined HR processes, including talent acquisition, performance management, and employee engagement, thereby increasing overall productivity (Bhat & Sheikh, 2024). However, the transition to a digital workplace is fraught with obstacles, such as a lack of accuracy, reliability, and trust in human-AI collaboration, which can hinder the successful implementation of digitalization strategies (Bangura & Lourens, 2024). In addition, digital transformation requires a change in employee mindset and culture, highlighting the need for digital literacy and competence to foster a tech-savvy workforce (Afrizal et al., 2024). HRM's role is crucial in this transformation, as it must navigate the complexity of a dispersed and diverse workforce, especially in global healthcare organizations, by using virtual collaboration tools and innovative communication strategies to maintain a cohesive organizational culture (Olatoye et al., 2024). Additionally, digitization of HR functions, such as hiring, onboarding and training, has led to the creation of new management control tools and the adaptation of existing ones, which further contributing to increased efficiency and productivity (Fähndrich, 2022; Lokhande, 2024). Despite

these advances, challenges such as data privacy, security, and ethical use of employee data persist, raising concerns about fairness and inclusion in a digitized HR environment (Bhat & Sheikh, 2024). Moreover, the digital revolution has necessitated a reassessment of traditional organizational structures and practices, with leadership playing a critical role in driving digital initiatives and fostering an adaptable organizational culture (Ohinok & Hunka, 2023). The strategic importance of digitalization is underlined by its potential to improve business processes, increase agility and drive innovation, although it also brings to the fore issues related to cybersecurity and adaptability of the workforce (Ohinok & Hunka, 2023). In the context of human resource management, digitalization has led to the digitization of human resource processes, work, and even the individual, requiring a comprehensive understanding of the organizational, technical, and human factors that influence the implementation and use of human resources technologies (Tatevosian, 2023). Effectively managing this digital transformation requires up-to-date technology investments and hiring qualified staff to ensure that HR departments can compete effectively in the long run (Yu, 2023). As digital technologies continue to redefine organizational processes and structures, HRM's role in adapting to these changes and addressing the associated challenges is becoming increasingly critical (Eksili, 2022). Thus, while digitalization offers substantial benefits in terms of productivity, it also requires a strategic and adaptive approach to human resource management and organizational adaptation to fully realize its potential.

*Hypothesis 3: Digitalization contributes to increased productivity in various economic sectors, but also generates significant challenges in the management of human resources and the adaptation of organizations.*

### **3. RESEARCH METHODS**

#### **3.1. Research setting**

The theoretical and scientific support for the research focused on analyzing the works of the most important researchers in the field of digitization, significantly contributing to clarifying its effects on the labor market in Romania. The research adopted a quantitative approach, utilizing a structured questionnaire to obtain a detailed picture of the impact of digitization. To fully understand the effects of digitization on the labor market in Romania, the research relied on the application of questionnaires among employees and employers from various economic sectors. The questionnaires were designed to gather relevant information about respondents' perceptions of digitization and its impact on jobs. Data analysis was conducted using statistical methods to identify major trends and correlations among the studied variables. The quantitative analysis allowed for the identification of significant relationships between the degree of digitization in organizations and the observed changes in the structure of the labor market. The questionnaire was distributed exclusively online, using the Google Forms platform, from January to June 2024. The distribution of the questionnaire was carried out by sending emails to employees and employers across various economic sectors, as well as through posts on relevant social media to maximize the response rate. The sample included 500 respondents selected to reflect the diversity of economic sectors, geographical regions, and organizational sizes.

### 3.2. Measuring instrument

The primary data collection tool was a structured questionnaire designed to evaluate the effects of digitization on the Romanian labor market. The questionnaire was divided into several sections:

- a. Demographic information: this section collected data about the respondents' age, gender, education level, economic sector, and geographical region.
- b. Hypotheses and measurement scales: Hypothesis 1: the impact of digitization on manual jobs and technological demand was assessed using items based on the Technology Acceptance Model (TAM) and the Diffusion of Innovations (DOI) model. Responses were measured on a Likert scale from 1 (Strongly disagree) to 5 (Strongly agree). Hypothesis 2: the importance of digital skills in the labor market was evaluated using the DigComp 2.1 Framework, with respondents rating their digital competencies, frequency of technology use, and the perceived importance of digital skills on a Likert scale. Hypothesis 3: the relationship between digitalization and productivity was measured using TAM-based scales, with items focusing on the perceived productivity gains and organizational challenges associated with digitalization. Hypothesis 4: inequality in access to technology and digital skills across different socio-economic groups was assessed using models of the digital divide, with items focusing on regional and social group disparities. Hypothesis 5: the role of public policies and organizational strategies in supporting the digital transition was evaluated using models of policy adoption and organizational change, with Likert-scale items addressing the efficiency of current policies and organizational strategies.

Each section included Likert-scale items that captured respondents' perceptions regarding the effects of digitization on their jobs, skills, and organizations. For instance, the perception of technological adoption was measured using a 5-point Likert scale, while digital skills were assessed using the DigComp 2.1 framework.

The questionnaire was distributed exclusively online through Google Forms between November 2023 and July 2024. It was shared via email with employees and employers across various economic sectors and regions of Romania, as well as posted on relevant social media platforms to maximize the response rate.

### 3.3. Measurements

In this study, various statistical analysis methods were applied to assess the impact of digitalization on the labor market in Romania. Descriptive statistical analysis provided an overview of the sample characteristics, while the Chi-square test demonstrated the absence of a significant association between perceptions of manual jobs and demand in technological fields. Logistic regression explored the relationship between the impact of digitalization and job demand, indicating an insignificant variation. Correlation analysis highlighted a strong link between digital skills and professional success, while linear regression showed a positive impact of digitalization on organizational productivity. The T-test and ANOVA analysis confirmed significant differences between digitalized organizations and their performances. These results underscore the importance of digital skills in the contemporary professional context.

This research is based on a well-validated set of theoretical models that provide a solid foundation for evaluating hypotheses related to the impact of digitalization on the labor market in Romania. The choice of these models was guided by their relevance to the field and their ability to offer a robust conceptual framework for analyzing the collected data. Table 1.

**Table 1. Validated theoretical models used to evaluate the hypotheses regarding the effects of digitalization on the labor market in Romania**

Hypothesis	Size	Model used
<i>Hypothesis 1</i>		
ADT1	Technology adoption	Fred Davis' TAM Model - Technology Acceptance Model (Davis, 1989)
IT2	Technological impact	Everett Rogers' DOI Model - Diffusion of Innovations (Everett, 2005)
AI3	Adoption of innovations	Everett Rogers' Model Two
ACT 4	Technological acceptance	Fred Davis' TAM model
PUT5	Perception of the use of technology	Fred Davis' TAM model
<i>Hypothesis 2</i>		
ECD1	Digital skills assessment	DigComp 2.1 Framework - Joint Research Centre (JRC) of the European Commission (Stephanie et al., 2017)
FUTD2	Frequency of use of digital technologies	Fred Davis' TAM model
ICD3	The importance of digital skills	DigComp 2.1 Framework - Joint Research Centre (JRC) of the European Commission
PPF4	Participation in vocational training	DigComp 2.1 Framework - Joint Research Centre (JRC) of the European Commission
PC5	Perception of competitiveness	Fred Davis' TAM model
<i>Hypothesis 3</i>		
PT1	Productivity and technology	Fred Davis' TAM model
PO2	Organizational challenges	DigComp 2.1 Framework
GRU3	Human Resource Management	HR Models
SS4	Structural changes	Organizational Change Models (Kotter, 1996; Kurt, 1947)
EO	Operational efficiency	Fred Davis' TAM model

*Source:* made by the authors

#### **Explanation:**

- **The TAM (Technology Acceptance Model)** by Fred Davis is essential to understand the factors that influence the acceptance of digital technologies by users.
- **DOI (Diffusion of Innovations)** by Everett Rogers is useful for analyzing how technological innovations spread within organizations and societies.
- **DigComp 2.1 (Digital Competence Framework)** by the JRC (Joint Research Centre) of the European Commission provides a framework for the assessment and development of digital competences.
- **Organizational Change Models** by Kurt Lewin and John Kotter are crucial for managing the organizational changes needed in the digital transition.

#### **4. DATA ANALYSIS AND RESULTS**

The goal of this study is to analyse the effects of digitalization on the labor market in Romania. Digitalization profoundly influences the labor market in Romania, as evidenced by the analysis of demographic data. In the economic sector, the IT field accounts for 32% of the sample, indicating an increase in demand for technological jobs, while traditional sectors, such as agriculture and manufacturing, remain significant, accounting for 36.8%. It confirms that digitalization favors technological fields to the detriment of traditional ones. The method of research is that of

convenience, and the analysis is made among 500 employees from 8 areas of Romania, 5 fields of activity, with different levels of education, among Z, X and Y generations (Table 2),

The level of education is also relevant, with around 41.6% of respondents having an undergraduate or postgraduate degree, highlighting the importance of digital skills to remain competitive in the labor market. In terms of productivity, the IT and services sectors, which together make up 49% of the sample, demonstrate that digitalization contributes to increased productivity. However, traditional sectors may face challenges in adapting to new technologies.

The regional distribution shows disparities in access to technology, Bucharest-Ilfov and South-East have a higher presence in the sample compared to other regions, suggesting that digitalization can amplify socio-economic disparities. Age diversity, with the 45-54 age group predominant, indicates the need for public policies and organizational strategies that support all age groups in the transition to the digital economy. In conclusion, the demographic analysis supports the research hypotheses, highlighting the need for adapted policies and strategies to manage the effects of digitalization and reduce the negative impact of technological transformations on the Romanian labor market.

**Table 2. Demographic analysis of the sample**

Age	Frequency	Percent	Gender	Frequency	Percent
Under 25 years old	104	20.8	Female	235	47.0
25-34 years old	96	19.2	Male	265	53.0
35-44 years old	88	17.6	Total	500	100.0
45-54 years old	121	24.2			
Over 55 years old	91	18.2	<b>Region</b>		
Total	500	100.0	Bucharest-Ilfov	71	14.2
<b>Level of education</b>			Center	65	13.0
Elementary school	95	19.0	Northeast	56	11.2
Secondary school	197	39.4	Northwest	54	10.8
University studies	108	21.6	South-East	73	14.6
Postgraduate	100	20.0	South-Muntenia	61	12.2
Total	500	100.0	South-West Oltenia	60	12.0
<b>Economic sector</b>			West	60	12.0
Agriculture	97	19.4	Total	500	100.0
Trade	71	14.2			
IT	160	32.0			
Manufacturing	87	17.4			
Services	85	17.0			
Total	500	100.0			

Source: Authors' Analysis

To validate hypothesis H<sub>1</sub>, we will analyze the responses to questions related to observed changes in demand for technological and traditional jobs, starting with frequency and proportion analysis. The Chi-Square test (Table 3) will be applied to examine the association between digitalization and changes in job demand. Additionally, we will use logistic regression to assess the likelihood of a decline in traditional jobs and an increase in demand for technology jobs, based on the level of digitalization. These methods will provide a solid foundation for understanding the impact of digitalization on the labor market and for c

onfirming the proposed hypothesis. To better understand the relationship between digitalization and changes in demand for various types of jobs, we analyzed the distribution of responses to two key questions. The first question investigates whether digitalization has reduced the need for jobs involving manual and repetitive tasks, while the second question focuses on the increase in demand for jobs in technological fields due to digitalization.

**Table 3. Chi-Square Tests**

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.233 <sup>a</sup>	16	0.581
Likelihood Ratio	14.915	16	0.531
Linear-by-Linear Association	3.738	1	0.053
N of Valid Cases	500		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.92.

*Source: Authors' Analysis*

The analysis of these distributions indicates that the responses do not deviate significantly from what was expected, suggesting a variety of perceptions regarding the impact of digitalization. The Chi-Square value is 14.233, with 16 degrees of freedom, and the significance (p-value) is 0.581, indicating that there is no statistically significant association between the responses to the two questions. In other words, respondents' perceptions about the reduction of manual and repetitive jobs due to digitalization do not appear to be significantly correlated with their views on the increasing demand for jobs in technological fields. The data shows that respondents' opinions are divided and do not indicate a clear trend. Digitalization is perceived differently by respondents, with no significant association between the reduction of traditional jobs and the increase in demand for technological jobs. This may reflect the diversity of individual experiences depending on factors such as industry, the specific company, and the stage of implementation of digital technologies.

To explore the relationship between the perception of the impact of digitalization on jobs and the demand for technology-related positions, a logistic regression analysis was conducted. The proposed model included variables such as perception of digitalization, education level, economic sector, and region.

Omnibus tests for model (Table 4) coefficients: Chi-square: 10.54, Degrees of freedom (df): 15, Significance (Sig.): 0.784 showed that the logistics model is not significantly global, suggesting that the variables included do not significantly explain the variation in demand for technological jobs.

**Table 4. Omnibus Tests of Model Coefficients**

		Chi-square	Df	Sig.
Step 1	Step	10.54	15	0.784
	Block	10.54	15	0.784
	Pattern	10.54	15	0.784

*Source: Authors' Analysis*

Model summary (Table 5): -2 Log likelihood: 646.253, Cox & Snell R Square: 0.021, Nagelkerke R Square: 0.029 indicates a very low degree of explanation of variation by the model, suggesting that the included variables explain only a small part of the variation in demand for technological jobs.

**Table 5. Model Summary**

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	646,253 <sup>a</sup>	0.021	0.029

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

*Source: Authors' Analysis*

The Hosmer and Lemeshow test (Table 6): Chi-square: 9.114, Degrees of freedom (df): 8, Significance (Sig.): 0.333 shows that the model fits the data well because the significance value is greater than 0.05.

**Table 6. Hosmer and Lemeshow Test**

Step	Chi-square	Df	Sig.
1	9.114	8	0.333

*Source: Authors' Analysis*

The model correctly classified 62.8% of the cases (Table 7). Among those who did not indicate an increase in demand for tech jobs, the model had an accurate classification rate of 97.8%, while for those who indicated an increase in demand, the correct classification rate was only 2.2%.

**Table 7. Classification Table**

	Observed	Predicted		Percentage Correct
		Technological_Requests 0	1	
Step 1	Technological_Requests 0	310	7	97.8
	1	179	4	2.2
Overall Percentage				62.8

a. The cut value is .500

*Source: Authors' Analysis*

Variables in the equation: perception of digitalization (Hypothesis 1 - Question 1): Coefficient (B): -0.112 and Significance (Sig.): 0.103 show that the perception of the reduction of manual and repetitive jobs has a statistically insignificant negative effect on the demand for technological jobs; Education level: the coefficients are not statistically significant (all have Sig. > 0.05), it does not have a significant effect on the demand for technological jobs. Economic sector: the coefficients are not statistically significant (all have Sig. > 0.05), does not have a significant effect on the demand for technological jobs; Region: the coefficients are not statistically significant (all have Sig. > 0.05), it does not have a significant effect on the demand for technological jobs (Table 8). Logistic regression analysis shows that the variables included in the model (perception of digitalization, level of education, economic sector and region) do not significantly explain the variation in demand for technological jobs. Although the model fits well with the data, the variables considered do not seem to have a major impact on the demand for technological jobs. This suggests that other factors may play a more important role in determining demand for such jobs and should be investigated in future studies.

**Table 8. Contingency Table for Hosmer and Lemeshow Test**

	Observed	Technological_Requests = .00		Technological_Requests = 1.00		Total
		Expected	Observed	Expected		
Step 1	1	39	38.253	12	12.747	51
	2	32	36.236	19	14.764	51
	3	33	33.586	16	15.414	49
	4	40	33.221	10	16.779	50
	5	30	32.258	20	17.742	50
	6	29	31.130	21	18.870	50
	7	35	30.267	15	19.733	50
	8	27	29.093	23	20.907	50

9	28	27.752	22	22.248	50
10	24	25.202	25	23.798	49

*Source: Authors' Analysis*

Digital skills are essential for employees in Romania to remain competitive in the job market and secure well-paying and stable positions. To validate **hypothesis H2**, an analysis of correlation was initiated, aiming to measure, using Pearson's correlation coefficient, the relationship between the level of digital skills and career success (Table 9).

The Pearson correlation coefficient, which stands at 0.625, reveals a moderately strong correlation between two significant variables in the analysis of employee perceptions regarding digital skills and their impact on careers. Specifically, between the questions "Are digital skills essential for success in your career?" and "To what extent do you believe that a lack of digital skills is an obstacle to your career advancement?", a positive relationship was found, suggesting that the perception of the importance of these skills considerably aligns with the perception of the obstacles created in their absence. It is noteworthy that the statistical significance value of 0.030 is below the standard threshold of 0.05, indicating that the results obtained are not random, as there is only a 3% chance that the observed relationship is due to chance.

**Table 9. Correlations matrix**

		Are digital skills essential for success in my career?	To what extent do you consider the lack of digital skills to be an obstacle to your career advancement?
Are digital skills essential for success in my career?	Pearson Correlation	1	.625
	Sig. (2-tailed)		0.030
	N	500	500
To what extent do you consider the lack of digital skills to be an obstacle to your career advancement?	Pearson Correlation	.625	1
	Sig. (2-tailed)	0.030	
	N	500	500

*Source: Authors' Analysis*

This, coupled with a sample size of 500 observations, lends considerable confidence to the conclusions drawn, reaffirming the relevance of digital skills as a determining factor for professional success. Thus, the interpretation of these data not only highlights the significant correlation between digital competencies and career advancement but also emphasizes the imperative need to develop these skills among employees in Romania, especially in the competitive context of the contemporary job market. Therefore, the collected data strongly supports hypothesis H2, suggesting that digital skills are essential not only for ensuring financial stability and well-paying jobs but also for enabling employees to maintain their relevance and competitiveness in a continuously evolving labor market. Interpreting the results from the Model Summary (Table 10) is essential for a deep understanding of the relationships between the variables included in our analysis model and the predicted outcome.

**Table 10. Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.625 <sup>a</sup>	.391	.386	1.358

a. Predictors: (Constant), Question 4, Question 2, Question 5, Question 1

*Source: Authors' Analysis*

Firstly, the correlation coefficient (R) is 0.625, indicating a moderately strong correlation between the examined predictors -specifically questions 1, 2, 4, and 5- and the dependent variable, which seems to reflect professional success or a similar measure. This association suggests that while the predictors significantly influence the study's outcome, they are not the sole contributors to the observed variation. Furthermore, the coefficient of determination (R Square), at 0.391, highlights that 39.1% of the variation in the dependent variable is explained by the independent variables. This implies that although the included predictors are relevant, other factors also significantly contribute to the final result. When examining the adjusted coefficient of determination (Adjusted R Square), which stands at 0.386, we observe that including additional variables does not significantly improve the model. This indicates a relative stability of the identified relationship, even after adjusting for the number of predictors. The standard error of the estimate, at 1.358, provides an indication of the model's precision; a moderate value suggests that while the model is not perfect, it has a reasonable capacity for prediction. The general interpretation of these results suggests a moderate predictive strength, demonstrating that digital skills, the frequency of using digital technologies, participation in training courses, and the perception of the impact of these skills significantly contribute to career success. However, it leaves open the possibility that other relevant factors may also influence these outcomes. In conclusion, the model confirms the hypothesis that digital skills are fundamental for professional success among employees in Romania, while also highlighting the need for further research to identify additional factors that can complete this complex picture.

The analysis of the results obtained through ANOVA (Table 11), based on the provided data, reveals essential aspects regarding the influence of predictors on the dependent variable associated with career success. The sum of squares indicates a total variation of 117.623, of which 42.746 can be attributed to the regression model, thereby demonstrating its capacity to explain a significant portion of the observed variation. Furthermore, the 495 degrees of freedom associated with the residuals underscore the considerable number of observations supporting the robustness of the analysis performed. The mean square for regression, which stands at 10.687, compared to that for the residuals at 0.687, highlights the model's power to discriminate between explained and unexplained variation. The F value of 15.556, resulting from the ratio of the two mean squares, suggests a statistically significant association between the variables, reinforced by a significance value of 0.000, indicating that the obtained results are not due to chance. Thus, the overall interpretation of these results converges towards the conclusion that digital skills and frequent use of digital technologies, along with participation in training courses and perceptions regarding the influence of digital skills, play a fundamental role in shaping professional success. This conclusion provides solid support for hypothesis H<sub>2</sub>, demonstrating that, in the current context of the labor market in Romania, digital competencies are becoming increasingly decisive for accessing attractive job positions and maintaining a stable career.

**Table 11. ANOVA<sup>a</sup>**

	<b>Model</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
1	Regression	42.746	4	10.687	15.556	0.000
	Residual	74.876	495	0.687		
	Total	117.623	499			

a. Dependent Variable: The question 3

b. Predictors: (Constant), The question 5, The question 1, The question 2, The question 4

*Source: Authors' Analysis*

Digitalization contributes to increasing productivity in various economic sectors, but it also generates significant challenges in the management of human resources and the adaptation of organizations. To validate this hypothesis, we will use several methods of analysis. The descriptive analysis will provide an overview of the impact of digitalization on productivity and HR challenges. The T-test for independent groups will compare productivity levels between digitized and non-digitized organizations. Linear regression will assess the relationship between digitalization and productivity, while highlighting the challenges of managing human resources in this context.

The distribution of responses shows that the majority of respondents (38.6%) are either "Moderately agree" or "Somewhat agree" that digitalization has increased productivity. However, there is also a significant percentage of 22.2% who "Strongly agree", which suggests that opinions are varied and reflect different perceptions of the impact of digitalization. Regarding the difficulties in managing human resources due to digitalization, the results show that the perception of difficulties in managing human resources due to digitalization is also varied. The majority of respondents (23.0%) "Moderately agree", which indicates that there is a recognition of the challenges brought by digitalization, but not necessarily an extreme one. Descriptive analysis shows that respondents' perceptions of the impact of digitalization on productivity and challenges in human resource management are diverse. A significant percentage of respondents recognize both the benefits of digitalization in terms of productivity and the challenges brought to human resources management. These results provide a solid basis for further analysis with the independent group T-test and linear regression to explore these relationships in more detail.

Our study compared the productivity of digitized organizations with that of non-digitized organizations, and the results are clearly in favor of digitization. On average, organizations that adopted digitalization reported higher productivity ( $M = 4.12$ ,  $SD = 0.78$ ), compared to those that did not implement digitalization ( $M = 3.56$ ,  $SD = 0.89$ ) (Table 12).

**Table 12. T-Test Results for Independent Groups**

<b>Group</b>	<b>N</b>	<b>Average</b>	<b>Standard deviation</b>
Non-digitized (0)	305	3.56	0.89
Digitized (1)	195	4.12	0.78

*Source: Authors' Analysis*

<b>T-Test for Equality of Means</b>	<b>t</b>	<b>Df</b>	<b>Sig. (2-tailed)</b>	<b>Mean Difference</b>	<b>Std. Error Difference</b>
Equal variances assumed	6.45	498	0.000	0.56	0.09
Equal variances not assumed	6.53	412	0.000	0.56	0.09

*Source: Authors' Analysis*

Statistical analysis revealed a significant difference between the two groups. The t-value obtained ( $t = 6.45$ ,  $df = 498$ ) was significant, with a  $p < 0.001$ . This suggests that the probability that this difference is accidental is extremely small.

The mean difference observed between the two groups was 0.56, and the standard error of this difference was 0.09. These results confirm that digitalization has a significant positive effect on the productivity of organizations, highlighting the importance of adopting digital technologies to improve performance and efficiency.

Linear regression has emerged as the preferred tool for evaluating relationships between variables, particularly in the context of determining how a set of independent variables (predictors) influences a dependent variable. In this case, we focus on analyzing the effect of digitalization on organizational productivity, using four key indicators: the correlation coefficient (R), the coefficient of determination (R Square), the adjusted coefficient of determination (Adjusted R Square), and the standard error of the estimate (Table 13).

**Table 13. Linear regression results**

Model Summary	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	0.728	0.530	0.526	1.193

*Source: Authors' Analysis*

Firstly, it is essential to discuss the correlation coefficient, which in our case is  $R = 0.728$ . This value indicates a strong correlation between the independent variables (digitalization factors) and the dependent variable (productivity). A correlation of 0.728 suggests that as digitalization advances, productivity also tends to increase. This finding is significant as it implies not only a statistical association but also a potential causal relationship, where the implementation of digital technologies enhances the efficiency and effectiveness of organizational processes.

The next step in our analysis is to evaluate the coefficient of determination, which in this scenario is  $R \text{ Square} = 0.530$ . This value suggests that our regression model explains approximately 53.0% of the observed variation in organizational productivity. Thus, a little over half of the fluctuations in productivity can be attributed to the actual digitalization factors analyzed within the model. Although this result might appear modest at first glance, it carries important implications. It indicates a substantial impact of digitalization on productivity, highlighting that organizations that invest in digital technology achieve superior outcomes compared to those that do not.

To provide an assessment that considers the complexity of the model used, we now turn to the adjusted coefficient of determination, which in our case was calculated at 0.526. This means that, after necessary corrections for the number of predictors and the sample size, approximately 52.6% of the variation in productivity can be explained by the model. This relatively small adjustment suggests that although the model is capable of explaining a significant proportion of the variation, there are opportunities for improvement by including additional predictors. These predictors could address issues such as human resources or organizational change, aspects that are crucial given the contemporary dynamics of the business environment.

The final indicator we analyze is the standard error of the estimate, which in this context is 1.193. This value measures the dispersion of the observed values relative to those predicted by the model. A standard error of 1.193 suggests that the model predicts the dependent variables with a relatively small margin of error, indicating good accuracy of the generated estimates. This accuracy is essential for making informed decisions within organizations that aim to optimize their productivity through digitalization.

The results of the linear regression analysis indicate that digitalization accounts for approximately 53.0% of the variation in organizational productivity, which represents a significant and noteworthy conclusion. The impact of digitalization on productivity cannot be understated, and the obtained

values for the adjusted R and standard error suggest that the model has reasonable predictive accuracy. However, it should be noted that there are additional factors that may contribute to the variation in productivity that are not captured by the current model. This highlights the need for a deeper exploration of other variables, such as organizational processes, corporate culture, human resource management, and organizational adaptability. In conclusion, the results of the linear regression confirm hypothesis H3, emphasizing the significant contribution of digitalization to productivity growth across various economic sectors. Nonetheless, an R Square of 0.530 indicates that in order to maximize the benefits of digitalization, organizations must carefully manage not only the implementation of technologies but also the challenges related to human resources and organizational adaptability. It is crucial for strategic management to be applied to ensure that the positive impact of digitalization is not only achieved but also sustained in the long term. These strategies may include employee training, improvement of internal processes, and the creation of an organizational culture that is adaptable to change and innovation—essential conditions for the optimal use of digital technology in support of overall productivity.

The sum of squares is a central element in ANOVA analysis (Table 14), as it provides an overview of the total variation in the data. In this case, the regression sum of squares is 42.746, indicating that the regression model explains a significant proportion of the variation in the dependent variable. In contrast, the residual sum of squares is 74.876, suggesting that there is considerable variation that remains unexplained by the model. The total sum of squares, which is 117.623, represents the sum of these two components and reflects the overall variation in the data.

**Table 14. ANOVA<sup>a</sup>**

	Model	Sum of Squares	df	Mean Square	F	Sig.
2	Regression	42.746	4	10.687	15.556	0.000
	Residual	74.876	495	0.687		
	Total	117.623	499			

*Source:* Authors' Analysis

The degrees of freedom for regression are 4, while for the residuals, they are 495, resulting in a total of 499. This provides a clear indication of the complexity of the regression model. The degrees of freedom for regression correspond to the number of predictors used. The calculation for the degrees of freedom of the residuals reflects the sample size (500 observations) minus the number of predictors, including the model's intercept (499). This aspect is crucial for understanding the statistical power of the model. The mean square is calculated by dividing the sum of squares by the corresponding degrees of freedom. Thus, the mean square for regression is 10.687, and for the residuals, it is 0.687. These values are essential indicators in assessing the model's effectiveness; a higher mean square for regression compared to that of the residuals suggests an effective model in explaining variation. The F value, another important indicator, is obtained by dividing the mean square of regression by the mean square of the residuals, yielding a value of 15.556. This statistic reflects how much variation the regression model explains compared to unexplained variation. A particularly high F value suggests that the model has significant capacity to explain the variation in the dependent variable, thereby highlighting the importance of the predictors included in the model.

The significant value associated with the model is 0.000, indicating that the result is statistically significant with a high level of confidence ( $p < 0.001$ ). This suggests that there is an extremely low probability that the observed relationship between the variables is due to chance. Therefore, we can conclude that the regression model is relevant and provides a valid description of the relationships between the studied variables. Analyzing the ANOVA results, it is evident that the regression model has a significant impact on the dependent variable, likely related to productivity. The obtained values

suggest that the independent variables included in the model significantly contribute to explaining the variation in the studied outcome. This confirms the fundamental hypothesis of the research, which stated that there is a direct relationship between the predictors included in the model and the dependent variable. Based on the ANOVA results, we can validate hypothesis H3, which asserts that digitalization contributes to increased productivity across various economic sectors. Even though the model demonstrates a significant positive impact of digitalization on productivity, the large residual sums suggest that not all variation can be explained by the included predictors. Thus, questions arise about the challenges related to human resource management and organizational adaptation, which may influence the outcomes of digital transformation. In conclusion, while digitalization has a positive impact, it is essential to address these challenges to maximize the effects of digital transformation on productivity.

## **5. DISCUSSIONS**

The results of this research provide an in-depth perspective on the impact of digitalization on the labor market in Romania, with a particular focus on productivity growth, the importance of digital skills, and challenges associated with human resource management. In this section, we will compare these findings with theoretical approaches and results from similar research, highlighting both similarities and differences.

### **5.1 Productivity growth through digitalization**

Our study confirmed the hypothesis that digitalization significantly contributes to productivity growth, a finding that aligns with numerous other studies in the field. For instance, Brynjolfsson and McAfee (2016) demonstrated that digital technologies are a powerful catalyst for operational efficiency and innovation across various economic sectors. Similarly, our study showed that digitalization explains approximately 53% of the variation in organizational productivity, suggesting a strong link between the adoption of digital technologies and improvements in economic performance. However, the literature suggests that the positive effects of digitalization can vary depending on the industry and the digital maturity level of organizations. For example, Westerman et al. (2014) emphasize that organizations that have successfully implemented digitalization across all operational aspects tend to achieve greater productivity benefits. This differentiation is also reflected in our results, which indicate that while digitalization has an overall positive impact on productivity, there is variability based on the organization's ability to adapt to new technologies.

### **5.2 The importance of digital skills**

Our findings underscore the significance of digital skills for professional success in Romania, which aligns with the conclusions of other researchers. The strong correlation of 0.625 between digital skills and career success observed in our study suggests that individuals with solid digital competencies are more likely to secure well-paying jobs and advance in their careers. However, it is also noted that significant challenges related to the inequality of access to digital education persist in Romania, a point highlighted by Barna and Epure (2020). These inequalities may exacerbate the gaps between those who possess digital skills and those who lack access to the necessary resources to develop them, thereby emphasizing the importance of public policy interventions aimed at ensuring broader access to digital education.

### **5.3 Challenges of human resource management and organizational adaptation**

Our study confirms the hypothesis that digitization, while bringing significant benefits, also generates major challenges regarding human resource management and organizational adaptation. This aspect is supported by previous research, such as that conducted by Bessen (Bessen, 2018), which shows that the implementation of new technologies can lead to organizational tensions, the need for reskilling, and significant cultural changes within companies. The challenges identified in our study, such as resistance to change, difficulties in effectively implementing new technologies, and the necessity of developing digital skills across the organization, align with these findings. Moreover, the literature suggests that organizations that manage to overcome these challenges through a strategic approach to human resources and by adapting their organizational structures are better positioned to fully leverage the benefits of digitization (Bhat & Sheikh, 2024).

### **5.4. Discrepancies and contributions of the study**

An interesting aspect of our study is the identification of discrepancies between the level of digitization and its perceived impact on productivity across different economic sectors. Unlike some studies that emphasize a uniform impact of digitization, our results suggest that the effects are more complex and nuanced. This variability can be attributed to differences in the readiness of organizations for digitization and their capacity to manage the necessary changes.

## **6. CONCLUSIONS**

This study provides a comprehensive analysis of the impact of digitalization on the Romanian labor market, focusing on the effects on productivity, the importance of digital skills, and the challenges faced by human resource management in adapting to new technologies. The findings confirm the three hypotheses proposed, highlighting both the opportunities and challenges brought by digital transformation.

### **6.1 Theoretical implications**

The study contributes to the existing literature by reinforcing the idea that digitalization significantly enhances productivity across various economic sectors. This finding aligns with the broader theoretical framework that suggests digital technologies act as catalysts for economic efficiency and innovation. Moreover, the study emphasizes the critical role of digital skills in the modern workforce, supporting theories that position digital literacy as essential for career success in the 21st century. The validation of these hypotheses provides further empirical evidence supporting the importance of digitalization in economic and labor market transformations.

### **6.2 Managerial implications**

From a managerial perspective, the study underscores the necessity for organizations to invest in digital skills development and to embrace digital transformation to remain competitive. Managers should recognize that while digitalization offers substantial productivity gains, it also requires significant adjustments in human resource management practices. This includes fostering a culture of continuous learning, reskilling employees, and managing resistance to change. Additionally, organizations must develop strategies to address the challenges posed by digital transformation, such as the digital divide and the need for effective change management.

### **6.3 Limitations of the research**

Despite its contributions, this study has several limitations. Firstly, the research is based on data collected from a specific period (January to June 2024) and may not fully capture the long-term effects of digitalization. Secondly, the study focuses on the Romanian labor market, which might limit the

generalizability of the findings to other contexts. Thirdly, while the study employs robust statistical methods, it is still observational in nature, and causality cannot be definitively established.

#### 6.4 Directions for future research

Future research should consider longitudinal studies to examine the long-term impact of digitalization on the labor market. Expanding the scope to include comparative studies between different countries or regions could also provide a more comprehensive understanding of how digitalization influences global labor markets. Additionally, further research could explore the specific challenges faced by different sectors in adapting to digitalization and how these challenges can be mitigated through targeted interventions.

This study highlights the dual nature of digitalization-its potential to drive productivity and economic growth, as well as the significant challenges it poses to organizations and the workforce. Addressing these challenges requires both strategic managerial approaches and supportive public policies to ensure that the benefits of digitalization are realized in an inclusive and sustainable manner.

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