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The impact of digitalization and automation on working time, flexibility and stability

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ABSTRACT

Digitalization and automation are radically changing the structure of the labor market, affecting the demand for various professions. Understanding these changes allows for the adaptation of educational programs and employment policies, ensuring the preparation of a skilled workforce for the future. Automation affects working conditions, including the length and flexibility of working hours, creating new opportunities for remote work and freelancing. Research helps better understanding of the ways in which these changes affect work-life balance and overall job satisfaction. Studying the impact of digitalization on labor productivity and employment stability is important for designing economic development strategies, ensuring the creation of stable and highly productive jobs. Research helps to identify which groups of people may be vulnerable or insufficiently protected from the negative effects of automation, contributing to the development of social programs and policies aimed at reducing inequality. Thus, in this article, authors have explored the advantages and disadvantages associated with the introduction of new technologies in labor relations. The authors have examined a number of scientific studies that show the attitudes of employees towards digitalization and its impact on their health. In addition, authors have proposed ways to overcome the negative effects of digitalization and automation in order to make the relevant measures more adaptive for employees. The purpose of the article is to analyze the impact of digitalization and automation on work flexibility and stability, as well as on working time, in order to identify the advantages and disadvantages of innovative technologies and suggest ways to improve and reduce the negative effects of these measures.

KEYWORDS

digital technology, labor law, working conditions, digitalization of work, work flexibility

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1 INTRODUCTION

Digitalization and automation are two key trends shaping the modern world and the labor market. These processes affect various aspects of economic and social life, from changes in production to the daily lives of ordinary people. Digitalization means the use of digital technologies to convert information into a digital format that allows for easy processing, storage, analysis, and transmission of data. Its roots go back to the invention of the personal computer and the Internet, which allowed a wide range of people to access information and digital tools. With the development of mobile technology, cloud computing, artificial intelligence, and the Internet of Things, digitalization has become pervasive, changing the way authors do business, communicate, learn, and entertain.

Automation refers to the use of machines, software, and other technologies to perform tasks that traditionally required human labor. Its history began with the Industrial Revolution, when mechanical devices started to replace manual labor in production. In the 20th century, automation reached a new level, due to electronics and computer technology, which allowed automating complex processes in production, management and service.

In the 21st century, global socio-economic dynamics are undergoing significant changes, including rapid development of technology and innovation, the growing role of the service sector, and intensification of globalization processes. These trends reflect the transition of most countries to a post-industrial type of society and the emergence of a knowledge-based economy (Danylina 2022). The latest advances in artificial intelligence and machine learning are expanding automation capabilities, allowing machines to perform tasks previously thought to be possible only for humans, such as driving, big data decision-making, and even creative processes.

In general, foreign experience shows the rapid spread of digital tools, interactive platforms, and information technologies in the labor market. Therefore, the current processes of labor relations development do not correspond to the classical theoretical concepts of the labor market. The law of supply and demand in the context of labor relations and digitalization has undergone significant changes. Thus, in the era of globalization changes, the segmentation and flexibility of the labor market acquire new adaptations and transformations for the current challenges.

This limits the possibility of substantiating and implementing effective policies in the labor sphere and in the economy (Butynska 2019). In this regard, the scientific community is facing new research challenges that require rethinking of methodological foundations and theoretical approaches to analyzing information labor, a new type of labor activity. This implies changing the methods of assessing its efficiency and dynamics, overcoming existing stereotypes and dogmas, and setting new priorities in policy and management of socio-economic processes that would correspond to the new historical reality.

The dynamics of digitalization processes have significantly accelerated, not least because of the challenges brought about by the COVID-19 pandemic, making AI increasingly important in modern economies (Brynjolfsson, Mitchell and Rock 2018). Organizations typically prioritize the development of their digital technologies and networks,

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both internally and externally, before incorporating artificial intelligence at a later stage, a practice currently observed in only a few establishments. Yet, the rapid spread of AI technology underscores the urgency for a comprehensive examination of its impact on the workforce, extending beyond the simple dichotomy of job creation and elimination. It's essential to proactively address potential adverse effects to prevent them from negatively affecting individuals, businesses, and the broader society (Warning, Weber and Püffel 2022).

Due to the increased number of armed conflicts around the world, digitalization and automation of work also seem to be relevant. This can protect employees from potential risks to their lives and health due to conflict. These innovations are fundamentally transforming labor processes at various levels. Therefore, the article is aimed at analyzing the impact of digitalization and automation on the main aspects in the working sphere, such as working time, flexibility, stability of work, and social consequences. Accordingly, it is important not only to describe the changes, but also to understand their consequences for employees, as well as to define strategies for ensuring stability and social security in the context of digital transformation. Not only do they modify the way work is done, but they also redefine the very nature of labor relations.

2 METHODS

The main method the authors used in writing this paper is the analysis and normative method. Employment as a holistic phenomenon was broken down into key components, such as the impact on working hours, flexibility of working hours, and employment stability, and these were subsequently analyzed separately. This included reviewing the existing research, articles, industry reports, and empirical data that described the changes brought about by digitalization and automation. The use of the analysis and synthesis method made it possible to analyze previous research on this issue, in order to identify the impact of the elements under study on respondents, and obtain a holistic picture of not only the positive impact of digitalization and automation, but also their negative features. Based on this, the authors were able to assess how digitalization and automation affect job stability and employment quality, as well as safety and working hours.

In addition, based on the analysis of the data concerning the situation in the Ukrainian labor market under martial law, it was also concluded that the sector of the economy involved in digitalization was not merely unaffected, but that it actually developed. Merging the collected information using the synthesis method into a single analytical review covering both broad and specific aspects of the impact of technology on working time, flexibility, and stability, allowed us to identify common trends, challenges, opportunities, and risks.

The historical method was applied to identify common trends, challenges, opportunities and risks. This method provided an identification and analysis of historical milestones related to the development of technology and its impact on working time and employment. This included studying past industrial revolutions, the introduction of machines, computers, and the Internet, and their impact on labor markets. The analysis of historical trends has led to the conclusion that the introduction of innovative

technologies into labor relations is a logical stage of human development in a particular historical period. Therefore, there is no point resisting such technological innovations, but they should rather be embraced and adapted, while mitigating possible negative consequences. The use of historical analysis is important for drawing lessons applicable in understanding current and future challenges related to digitalization and automation.

The systemic method has been used in the article to comprehensively analyze the relationship between technological change and its impact on the labor market. This is important for exploring the relationships between these components in order to understand how they interact with each other and affect the overall system of working relationships. Therefore, this method is applied to assess the way that technological change affects different aspects of working time, flexibility, and stability.

The authors also used the statistical method. This was applied where it was necessary to use statistical data for analysis. This approach allowed for quantitative analysis of large data sets to identify trends, dependencies, and impacts. It involved collecting data on advanced industries, types of employment, unemployment rates, wages, the introduction of new technologies, and other related variables from various sources, in creating a holistic view of the impact of automation and digitalization on certain aspects of labor relations.

In the article, the authors used a comparative method to analyze the impact of digitalization and automation on working hours, flexibility, and job stability. This method allowed comparing different studies to identify both positive and negative aspects of the introduction of new technologies in labor relations, as well as to assess the impact of digitalization and automation on job stability and employment quality. This made it possible to create a holistic picture of the impact of these technologies on the labor market and identify ways to minimize the negative consequences.

3 RESULTS

Technological innovations are profoundly transforming the labor market, affecting the structure of employment, the skills required of workers, as well as the creation of new jobs and the disappearance of old ones. This impact can be manifested in various ways, which can have both positive and negative aspects. As rightly noted by Stashkevych (2021), trends in the modern labor market include maximization of robotization and minimization of physical labor. Robotization is affecting a variety of industries, from manufacturing to services. It can significantly increase productivity while reducing production costs and improving product quality. Robots can work around the clock without interruption or fatigue, performing work faster and with fewer errors than humans. At the same time, minimizing human involvement in many production and service processes is a natural consequence of robotization. Automation of routine and monotonous tasks frees up employees to engage in more complex, creative, and strategic tasks, although it also creates challenges in the form of the need for retraining and the development of new skills.

The development of new creative and engineering professions will take place against the backdrop of the disappearance of many traditional professions. According to some forecasts, by 2035, cyber-physical systems could replace up

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to 50% of the jobs in the sectors related to routine labor (Danylina 2022). As a result, this will affect the reduction of jobs in traditional professions, since servicing automated machines is a new field of employment that arises in the labor market and contributes to retaining jobs.

Digitalization, maximum robotization and minimization of physical labor positively affect the physical and mental health of workers. Consequently, the problem of working burnout is minimized, which in turn helps in reducing the percentage of layoffs. This is especially important for Ukraine at the moment, as people are experiencing constant stress during the war, and minimizing the mental stress at work will be a significant advantage. According to researchers Nazareno and Schiff (2021), "…workers facing automation risk appear to experience less stress…", but at the same time, the researchers emphasize that this is the same group of respondents that "experience … minimal or negative impacts on job satisfaction".

Similar data are provided by researchers Warning, Weber and Püffel, referring to the DGB Index Gute Arbeit Institute. In Germany, nearly half of the workforce (46%) perceives digitalization as a factor that increases their workload, whereas only 9% report experiencing a decrease in their workload due to digitalization (Warning, Weber and Püffel 2022; Institut DGB Index Gute Arbeit 2016). Health insurance companies, on the other hand, have observed a rise in the conditions linked to escalating work demands, tighter deadlines, and variable working hours. They caution against the adverse health impacts associated with digitalization (Marschall et al. 2017). The researchers did not indicate what data they used in this analysis, but authors can assume that employee dissatisfaction with the introduction of technology may be related to the need to learn how to work with updated technologies and the fear of losing their jobs due to automation.

For example, occupations of the so-called middle class (i.e., those that require certain regulations, instructions, and procedures) can be easily automated. Within the general, flexible neoclassical model of the labor market, it can be argued that progress in automation forces workers to differentiate routine and minimize manual work. The neoclassical structure embodies an important compromise, that is, increasing the role of automation in employment occurs due to the redistribution of employment from routine to non-routine manual work. Cortes, Jaimovich and Siu (2017) show that advances in automation technologies, which are measured by the increases in ICT capital, estimated in units of efficiency, account for a relatively small proportion of the overall reduction in routine employment and the associated increase in non-routine physical employment and disability.

Thus, on the one hand, automation facilitates many aspects of work, but on the other, it should not be forgotten that innovations can have certain negative consequences. First of all, there is the disappearance of certain professions that will cease to be relevant. Automation can lead to the disappearance of some professions, especially those related to routine manual labor. Machines and robots are able to perform such work faster, more efficiently and without errors, which reduces the demand for labor in some sectors.

This can lead to a number of socio-economic changes and challenges. One of the consequences is an increase in unemployment among workers whose

skills become unnecessary due to automation (Simutina and Shumylo 2023). This may lead to increased social inequality, as jobs requiring high levels of skill or specialization remain, while low-skilled positions disappear. In addition, there may be a need to retrain a large part of the labor force. Such retraining will require significant investment from both the public and private sectors to ensure that people can learn new skills and adapt to the changing labor market.

However, despite this, authors can confidently state that there is no point in resisting the introduction of technology. It is necessary to use the right approaches to minimize the negative effects of technology and adapt employees to new working conditions. In addition, automation and digitalization lead to many positive changes, so if properly implemented, they can minimize the negative effect. For example, in order to address the problem of job losses, it is advisable to invest in educational programs and retraining of the employees whose professions are affected by automation. This will help workers adapt to new working conditions and find employment in the sectors that require higher qualifications and specialization (Yaroshenko et al. 2023).

It is also important to remember that automation not only "takes away" jobs from employees, but also creates new ones. It requires more qualifications to operate automated systems. Companies are having difficulty implementing new technologies because there is a lack of skilled personnel in the local labor market. In the absence of ready-made talent, employers are expected to offer retraining and advanced training to just over 70% of their employees by 2025 (Pyshchulina 2020). The "newest" jobs will differ from the classic model of stable employment, including temporary work, or work on a reduced schedule, due to the ability of technology to divide the workflow into segments. However, this shift to atypical forms of employment does not imply lowering of qualification requirements. On the contrary, such non-traditional roles will require a high level of skills, which could potentially put those without access to quality education at a disadvantage in the labor market (Frey and Osborne 2013). Therefore, an alternative solution may be to encourage the development of new industries and technologies that can create new jobs. This could include support for startups, research and development in high-tech sectors, for example medicine, services, military, etc. A striking example of working with automated systems are UAVs (Unmanned Aerial Vehicles) that cannot successfully function without the intervention of a human operator. Meanwhile, robotic weapons perform both functions simultaneously, that is, they are self-governing and preserve a warrior's life with proper use and direction.

It is also important to note the feasibility of developing policies that support workplace flexibility, including the possibility of part-time, flexible, and remote work, which can help reduce the impact of automation on the workforce. Social strategy plays a key role in addressing the challenges posed by non-standard employment, including work based on digital platforms. Social protection systems need to be strengthened to support individuals who lose their jobs due to automation (Kniazieva et al. 2021). This could include unemployment insurance, job search assistance, and social support programs. States use policy initiatives to increase the level of protection for workers. Some EU countries

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are already implementing or developing legislation to regulate the working conditions on digital platforms. For example, the Law on the Rights of Workers in the Digital Era (*Ley de derechos de los trabajadores en la era digital*) was adopted in Spain, to regulate work on platforms, including rights to salary, leave and protection in case of refusal to work. Many EU countries (Germany, Czech Republic, Belgium) invest in vocational training and retraining programs aimed at providing employees with the necessary skills and knowledge for employment in a digital environment. Many nations are implementing measures aimed at strengthening social protection for workers in the digital transformation era. They develop mechanisms for social dialogue between the government, employers and trade unions to jointly address issues related to the protection of workers' rights in the digital age (Rudakova et al. 2021). In general, the authors may claim that automation of work processes leads to a better balance of work and leisure, which has a positive impact on people's health.

In this study, the authors would like to pay special attention to workplace safety and the impact of new technologies on it. In the case of Ukraine, which is currently in a state of military conflict, safety is currently a priority, especially with air raids. As mentioned earlier, the introduction of innovative technologies leads to the emergence of new professions that did not exist before. For example, the development of cybersecurity, artificial intelligence, big data, and the Internet of Things (IoT) requires specialists ready to work in these areas. This encourages educational institutions to develop new programs and courses to train qualified specialists. The introduction of new technologies can help protecting workers and optimizing work processes in a way that minimizes risks to health and life, particularly during air raids, or other hazards. For example, automation allows many categories of employees to work remotely, significantly reducing the need to be in the office or at work, where they may be vulnerable during military operations or air raids.

Digital safety management systems can be integrated with emergency notification systems, ensuring that employees are informed quickly and effectively of hazards and the need to evacuate. In addition, automated control systems can help plan and execute evacuation measures based on the specificities of the premises and the current situation, minimizing risks to the employees. However, safety is also manifested in other aspects of the use of the latest technologies.

The fundamental strategy for ensuring safety in automated production systems is to minimize or completely eliminate the chances of situations with a potential risk of danger that could lead to accidents or other troubles to a level that society considers acceptable. Also critical is the approach to the cost-effectiveness of safety, which involves the selection of technologies, methods of work and protective equipment that ensure the achievement of safety requirements at the lowest possible cost. Given that achieving absolute security is a difficult task in the context of modern technological development, the choice of effective security measures that guarantee an acceptable level of risk at optimal costs is the key (Osipova and Khalil 2021).

Automation plays a crucial role in ensuring the safety of work processes, as it minimizes human error, reduces the

impact of harmful and hazardous conditions on employees' health, and ensures a high level of control over production processes. The use of automated systems helps to avoid many of the risks associated with direct human involvement in potentially hazardous operations and contributes to a safer and more efficient production environment. Thus, automation not only increases productivity, but is also a key factor in preventing occupational injuries and diseases, making it indispensable in ensuring safety at work. In the same context, it is worth noting that the technological process is changing the requirements for skills and qualifications of the existing professions. Automation and digitalization force employees to adapt, learn new technologies, and improve their skills. This applies not only to technical professions, but also to the service, logistics, marketing, and other sectors.

This represents an essential progress and, simultaneously, a challenge for education. For example, in many European Union countries, universities have AI departments, as well as experimental laboratories and research centers. This provides students with a unique opportunity to develop new skills and contributes to the growth of their productivity, which, in turn, has a positive impact on the productivity of the society as a whole, forming qualified specialists who meet the requirements of the modern labor market (Stashkevych 2021). However, other countries have not adequately adapted to the requirements of modernity, which may increase the technological gap. Since access to the latest technologies is not equal in all regions, or in all segments of the population, this can lead to widening the income and opportunity gaps between different society groups.

To address this problem, the authors propose to take a number of steps. First of all, it is necessary to improve the quality of education, including ensuring access to high quality education for all segments of the population, with a focus on STEM (science, technology, engineering, mathematics) disciplines and digital literacy. In addition, it is important to create training and retraining programs for adults to improve their skills in line with the changes in the labor market.

A number of measures should also be taken in the area of infrastructure. For example, to ensure the construction of affordable broadband Internet and other digital services in remote and low-income regions (Petryshyn and Hilyaka 2021). It is crucial to stimulate innovation and entrepreneurship through grants, loans, and other financial instruments. These measures require a comprehensive approach, involving both public and private resources, and the active participation of civil society. Reducing the technology gap and overcoming inequality will help create a more equitable and inclusive global economy (Demianchuk 2020).

Automation and digitalization are leading to significant changes in working hours as they change the way labor is produced, distributed and managed. On the one hand, the adoption of these technologies can lead to increased efficiency and productivity by reducing the need for long working hours to complete certain tasks, while on the other, they can also lead to the need for greater flexibility in schedules, including irregular working hours, remote work, and altered employment models such as freelance or contract work.

Speaking of digitalization and automation, it is impossible not to note their impact on labor market flexibility.

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Technology also contributes to greater flexibility in the labor market. Remote work, freelancing, and flexible work schedules are becoming increasingly popular, allowing employees to better balance their work and personal lives. This also opens up access to the global labor market for specialists from different countries. Researchers A. Warning and E. Weber conducted a study based on the work of German companies and the findings indicate that, among various observations, the employers engaged in digitalization efforts, such as implementing artificial intelligence, tend to demand significantly more flexibility in terms of workplace location, working hours, and self-management from their new hires, in comparison to the employers who do not engage in digitalization activities (Warning and Weber 2018). Sociological studies are deeply engaged in examining the potential impacts of enhanced working-time flexibility. This can bring significant drawbacks for employees who struggle to align fluctuating work schedules with other life commitments, a task that often leads to conflict and is not always free of consequences (Brough et al. 2020). However, there are those who gain from greater job flexibility in terms of work-life balance, especially when such flexibility is accompanied with a greater degree of personal autonomy, rather than intensified monitoring of one's every action (Warning, Weber and Püffel 2022).

The type of employment significantly influences the opportunity for skill enhancement. A quality job offers training access, promotes career advancement, and opens new pathways. The adoption of innovative technologies prompts employers to provide suitable training programs for their staff, whereas those in informal employment (such as freelancers or gig economy workers) often lack access to these opportunities. These individuals must proactively seek to enhance their skills and develop the competencies demanded by the labor market. Without such efforts, their situation could deteriorate over time compared to those in traditional employment, potentially leading to a higher risk of prolonged joblessness (Stefancic and Zirnstein 2018). Digital skills shortage prompts companies to invest in training in order to develop digital competencies of their employees (Lavrynenko 2021).

Overall, digitalization offers new opportunities for increased work flexibility, but it also requires employers and employees to adapt to the changed working conditions, given the potential challenges and impact on work and personal life.

The data collected in Ukraine since the beginning of the full-scale invasion are important evidence of the positive impact of digitalization in the context of stability. Almost 40% of Ukrainians have lost their jobs because of the war, 24% work part-time or online, and 32% continue to work as usual. The labor market in Ukraine is in a state of crisis due to the war. The number of vacancies has sharply decreased, and the average salary has fallen in the first year of the war. At the same time, the IT industry is the one that has suffered the least from the labor market crisis. Therefore, despite the fact that companies in various sectors of the economy have either already returned to work or are beginning the process of resuming their activities, the share of job offers for IT specialists is much higher than for representatives of other professions (Danylina 2022). These data show that digitalization and automation of the economy can have a positive impact on job stability. The IT sector,

which is precisely related to digital technologies, is one of the most resilient and dynamically developing industries, able to adapt to changing conditions and continue to grow even in times of crises. Dependence on traditional sectors of the economy makes the country vulnerable to external shocks. The development of IT and other innovative industries can reduce this vulnerability. The growing share of remote work and freelancing in the IT industry indicates a trend toward more flexible forms of employment that may become the norm in the future, changing the standard labor law relations which are based on work contract as principle. These observations point to the need for active policies to develop skills, support innovation, and stimulate the growth of high-tech industries to create a sustainable and competitive economy.

Thus, automation and digitalization undoubtedly bring both positive and negative changes to our lives. On the one hand, they provide significant improvements in production efficiency and productivity, open up new business opportunities, and offer consumers a wider choice of goods and services. On the other hand, these processes can lead to job losses in certain sectors (in manufacturing areas such as automotive, textile, transport, logistics, banking, and finance), increased employment instability, and the need for constant retraining of workers. The tasks previously performed by humans can now be automated using robots, machines, and other artificial intelligence systems. The introduction of autonomous vehicles and logistics management systems can reduce the need for drivers and other workers in this area. Moreover, the use of chatbots, virtual assistants and other digital tools can reduce the need for workers who provide telephone or online customer support. In addition, the use of automated systems for data processing, working with documents and other office tasks can reduce the need for clerks and administrative workers.

Despite these challenges, the continuous development of society and innovation is essential for progress. This will inevitably lead to an increasing role for technology in all aspects of employment and production. In this context, it is critical to take advantage of the benefits offered by automation and digitalization and to adapt to them. Resistance to these changes is not only futile, but can also slow down the development and innovation potential of the economy.

Therefore, it is important to focus on developing and implementing strategies that will minimize negative impacts, such as job losses and inequality, while maximizing the positive effects of new technologies. This includes investing in education and retraining, expanding social insurance to accommodate more flexible forms of employment, and stimulating innovation to create new opportunities in the workplace. Adapting to these changes will not only promote economic growth, but also help ensuring that the benefits of technological progress are shared by a broader population.

4 DISCUSSION

In the context of the study of labor relations' digitalization, the authors found the work of Canadian researchers Lévesque, Fairbrother and Roby (2020) to be interesting. In their research, they consider the future of labor relations in the context of the development and implementation of innovative technologies. In academic and public circles,

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there are numerous discussions and debates about the destructive impact of the current stage of digitalization. In this context, the authors explore the boundaries of interaction between the introduction of new technologies and possible challenges (Lévesque, Fairbrother and Roby 2020).

Nazareno and Schiff's (2021) research is based on respondent data and expresses both positive and negative feedback from employees regarding workflow automation. This work is important for a comprehensive understanding of people's attitudes and reactions to significant technological changes in the workplace. It provides a comprehensive understanding of the impact of automation on the work environment from the perspective of employees themselves, allowing us to consider both the benefits and potential drawbacks of this process. Real-world feedback from the employees who experience the effects of automation on a daily basis provides valuable insights into the practical impact of technology on the workplace, which helps informing the conclusions and recommendations. In addition, the use of data reflecting both positive and negative aspects of automation helped to ensure a balanced approach in the article, avoiding a one-sided assessment and taking into account different points of view.

The impact of digitalization, in particular artificial intelligence, has been studied by German researchers Warning, Weber, and Püffel. The integration of Artificial Intelligence (AI) across various economic sectors holds significant potential for enhancement and is anticipated to witness rapid growth in the near future. This evolution is expected to bring about notable shifts in employment conditions, potentially exposing workers to severe health hazards. The study pioneers an empirical investigation into the escalating demands for flexibility by employers amidst the progression of digital transformation. Merging the establishment-level data from this survey with occupation-specific characteristics from additional sources, and employing non-linear random effects models, reveal that office and secretarial roles are experiencing the most pronounced shifts in flexibility demands. These changes are also significantly impacting other professions critical to the AI-driven landscape (Warning, Weber and Püffel 2022).

Despite the negative consequences that digitalization and automation may bring, it should be noted that these phenomena are still becoming widespread, and their positive features outweigh the negative ones. Given this, it can be argued that such innovations will be increasingly integrated into labor relations. Therefore, it is necessary to take all measures to reduce their negative impact. The impact of digitalization and automation on the economy is huge and multifaceted, covering a wide range of aspects, from changing the structure of the labor market, to stimulating innovation in products and services. These technological changes make an important contribution to increasing productivity, production efficiency, and the quality of life of citizens.

Thus, based on our research, the authors can identify a number of benefits that automation and digitalization bring to the workflow: increased productivity and efficiency; improved mental and physical health; workplace safety; flexibility and stability of work; reduced working hours; increased new forms of employment; and the emergence of new specialties. At the same time, automa-

tion brings new forms of employment that are unstable and socially less secure.

For the companies and employees adapting to new forms of employment, it is important to consider a number of recommendations to ensure effective cooperation and mutually beneficial working conditions. For employers, authors can emphasize the need to develop flexible work models that allow employees to choose the optimal work mode, ensuring high productivity and job satisfaction. It is important to invest in the professional development of employees, providing them with access to training programs and courses to improve their skills in the context of digitalization. It is also advisable to develop social protection systems for all categories of workers, including freelancers and independent contractors, offering flexible pension programs, life and health insurance.

In turn, it would be appropriate for employees to develop self-organization and self-regulation skills to work effectively in a flexible or remote environment. This is especially important for Ukraine and other countries experiencing military conflicts. A high level of technological literacy should be maintained, as most new forms of employment require the ability to use digital tools and platforms. In addition, employees should be ready and open to learning and self-improvement, and actively use opportunities to acquire new knowledge and skills that are in demand in the labor market.

Implementation of these recommendations will help employees not only adapt to the changes in the labor market caused by digitalization and automation, but also take advantage of new opportunities for professional and personal development. At the same time, the companies that implement these strategies will be able to create stronger, more motivated and adaptive teams that can effectively meet the challenges of today's dynamic business environment.

The research on the impact of digitalization and automation on working hours, flexibility, and job stability is of great interest for understanding the transformation of the labor market in the future. The main areas for further research in this area are an in-depth analysis of the impact of technological changes on various sectors of the economy, identification of industries with the greatest growth potential, and determination of the needs for retraining the workforce. An essential aspect is to study the impact of digitalization on the quality of working life, including job satisfaction, work-life balance, and emotional well-being of employees. International comparisons will reveal how different national social protection systems and labor market organizations are adapting to innovations, as well as point to effective adaptation strategies.

Thus, comparing the level of social protection in different countries, regarding the unemployment benefits, health insurance, pension programs, determines how countries respond to changes in the labor market and innovation. In this regard, the analysis of the legal and regulatory framework helps finding out how countries ensure the rights and protection of workers in modern conditions, including labor legislation, collective agreements and other regulations. This can reveal not only the diversity of strategies for adapting to innovation, but also the effectiveness of these strategies in the context of modern globalization and the rapid development of technologies, which stipulates further research in this area.

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5 CONCLUSION

Innovative development is not something that can or should be resisted. On the contrary, it is a natural stage in the evolution of society that provides new opportunities for progress and improvement of the quality of life. The meaningful adoption and active use of innovations and adaptation to the changed technological landscape will maximize the potential of these changes to benefit the people, economy and society as a whole.

Automation and digitalization are bringing about significant transformations in employment and production, which are accompanied by both positive and negative aspects. On the one hand, these processes help in increasing the efficiency of operations, expand opportunities for business innovation, and provide end users with a widened range of products and services. On the other hand, automation and digitalization may lead to a reduction in the number of traditional jobs, increased volatility of working conditions and the need for continuous professional development of employees.

Given the need for social development and innovation, the inevitable increase in the technological component in all areas of employment and production processes requires an adaptive approach. Therefore, it is critical to optimize the benefits of automation and digitalization by adapting to new conditions, as ignoring these trends may lead to a slowdown in progress.

Digitalization and automation have an important impact on labor market flexibility, offering significant benefits and challenges for employers and employees. On the one hand, technology is contributing to an increased flexibility in the workplace by enabling remote work, freelancing, and flexible schedules, which helping workers better maintaining their work-life balance and accessing the global labor market. At the same time, research shows that the employers who are digitizing require significantly more flexibility from their new employees in terms of workplace, working hours, and self-organization than those who are not.

On the other hand, increased working time flexibility can have negative consequences for employees who find it difficult to reconcile variable work schedules with other areas of life, which often leads to conflicts and is not always without consequences. However, some employees benefit from increased flexibility in their work, which contributes to a better work-life balance, especially when this flexibility is accompanied with a greater degree of personal freedom rather than increased control over one's every action.

Therefore, strategies should be formulated and implemented to minimize potentially negative consequences, such as increased unemployment and social inequality, while maximizing the positive impact of new technologies. This includes investing in education and training systems, expanding social protection to accommodate more flexible employment models, work engagement, as well as stimulating innovative research and development aimed at creating new jobs. Adapting to these changes will not only stimulate economic growth, but also ensure that the benefits of technology are distributed equally among different groups of the population.

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Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

Coauthor contributions

Dmytro V. Hryn: Writing – Original Draft, Conceptualization. **Oleg M. Yaroshenko:** Writing – Original Draft, Methodology. **Oleksii Y. Tykhonovych:** Writing – Review & Editing, Data Curation. **Larysa Y. Velychko:** Writing – Original Draft, Software**. Natalya M. Vapnyarchuk:** Writing – Review & Editing, Supervision.

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Uticaj digitalizacije i automatizacije na radno vreme, fleksibilnost i stabilnost

PROŠIRENI SAŽETAK

Digitalizacija i automatizacija preoblikuju tržište rada, utiču na potražnju za različitim profesijama i redefinišu tradicionalne modele rada. Ovaj članak istražuje kako tehnološka dostignuća utiču na radno vreme, fleksibilnost i stabilnost, naglašavajući kako mogućnosti tako i izazove za poslodavce i zaposlene.

Sa pozitivne strane, automatizacija i digitalizacija povećavaju fleksibilnost na mestima rada, omogućavajući rad na daljinu, *freelancing* i prilagodljive rasporede rada. Ove opcije mogu značajno poboljšati ravnotežu između profesionalnog i privatnog života, nudeći zaposlenima veću kontrolu nad radnim vremenom i lokacijom rada, dok istovremeno omogućuju pristup globalnom tržištu rada. Osim toga, povećanje efikasnosti upotrebom informaciono-komunikacionih tehnologija promoviše inovacije i utiče na ekonomski rast na način koji podrazumeva optimizaciju poslovanja i pružanje potrošačima šireg spektra proizvoda i usluga.

Međutim, navedene promene takođe dolaze sa značajnim izazovima. Iako nudi veću fleksibilnost, digitalizacija često zahteva od zaposlenih da se prilagode dinamičnijim uslovima rada, kao što su promenljivo radno vreme i nekonvencionalna radna okruženja. Za neke, ova promena može biti korisna, omogućavajući bolju ravnotežu između profesionalnog i privatnog života. Ipak, za druge, to dovodi do konflikta, stresa i poteškoća u upravljanju profesionalnim i privatnim aspektima života. Osim toga, digitalizacija može dovesti do povećane nesigurnosti radnog mesta i veće potrebe za kontinuiranim profesionalnim razvojem. Tradicionalna radna mesta postepeno nestaju, dok se pojavljuju nova, koja zahtevaju različita znanja i veštine koje pak ne poseduju svi zaposleni. Ova situacija rizikuje povećanje socijalne nejednakosti i utiče negativno na nezaposlenost onih koji se ne mogu brzo prilagoditi ili prekvalifikovati/dokvalifikovati.

Za adresiranje navedenih izazova, u članku su date strategije delovanja. Ulaganje u sisteme obrazovanja i unapređenje profesionalnih obuka je od suštinskog značaja za sticanje novih znanja i ovladavanje veštinama potrebnim za napredovanje u digitalnoj ekonomiji. Pored toga, širenje obima socijalne sigurnosti i zaštite kako bi se pokrili fleksibilniji i netradicionalni modeli zapošljavanja i rada mogu pomoći u ublažavanju negativnih posledica od gubitka posla i nestabilnosti. Kreatori javnih politika i kompanije takođe treba da podstiču inovacije i istraživanje kako bi stvorili nove mogućnosti zapošljavanja koje su stabilne i produktivne.

U zaključku, digitalizacija i automatizacija su prirodne faze u društvenoj evoluciji, koje donose i mogućnosti i izazove. Proaktivnim prihvatanjem ovih promena i usvajanjem adaptivnih mera, moguće je maksimizirati njihov pozitivan uticaj na ekonomiju i društvo uz minimiziranje potencijalnih nedostataka, obezbeđujući pravednu raspodelu tehnoloških koristi svim kategorijama stanovništva.

KLJUČNE REČI

digitalna tehnologija, radno pravo, uslovi rada, digitalizacija rada, fleksibilnost rada

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