OLEG M. YAROSHENKO, ANATOLII P. GETMAN,
VLADYSLAV S. TKACHENKO,
OLEG L. MUSIIENKO, MARIYAP. PETROVA

Legal and Policy Dimensions of Using Digital Technologies to Monitor and Manage Working Time in the EU

The purpose of this article is to study the current state of legal regulation of the use of digital technologies for monitoring and managing working time in the EU and individual Member States. The purpose involves fulfilling the following research tasks: to analyze the regulatory framework of France, Germany, Spain, and Italy; to compare their national laws and Ukrainian and EU legislation in the field of labor relations; to evaluate litigations and possible risks related to the digital monitoring of working time; and to make recommendations for improving the regulatory framework in this area. The scientific novelty of this article concerns comprehensive legal analysis and recommendations aimed at increasing the clarity of regulatory policy in the field of labor relations. The developed legislative proposals and ethical recommendations that can become the basis for shaping future employment law policies signify the practical value of this article.

Keywords: *digital technologies, labor law, employee rights, general data protection regulation, right to disconnect.*

Author Information

Oleg M. Yaroshenko, **deceased**, Yaroslav Mudryi National Law University
https://orcid.org/0000-0001-9022-4726
Anatolii P. Getman, Yaroslav Mudryi National Law University
https://orcid.org/0000-0002-1987-2760
Vladyslav S. Tkachenko, Yaroslav Mudryi National Law University
https://orcid.org/0009-0008-0866-4174
Oleg L. Musiienko, Yaroslav Mudryi National Law University
https://orcid.org/0000-0001-6533-0359
Mariya P. Petrova, Varna Free University
https://orcid.org/0000-0002-1049-2323

How to cite this article:

Yaroshenko, Oleg M., Anatolii P. Getman, Vladyslav S. Tkachenko, Oleg L. Musiienko, MariyaP. Petrova. “Legal and Policy Dimensions of Using Digital Technologies to Monitor and Manage Working Time in the EU”.
Információs Társadalom XXIV, no. 4 (2024): 62–78.
https://dx.doi.org/10.22503/inftars.XXIV.2024.4.4

1. Introduction

The widespread adoption of digital technologies has transformed employment relations in the field of time tracking, remote work, and employee productivity measurement.Digital tools allow employers and employees to use flexible work schedules, optimize workflow, and ensure continuous communication even when working remotely. An important trend has been the growth of data and its processing (Ćormarković, Dražeta and Njeguš 2022). The development of quantum technologies can provide new approaches to computing and cryptography, making data processing more efficient (Krynytsia 2023). However, these technological advances raise significant legal and ethical challenges related to privacy, abuse of monitoring, and compliance with applicable labor laws (Yaroshenko et al. 2022).

Various studies have highlighted that engaged employees rely heavily on technology, which can lead to an overload of information and notifications. Consequently, they become susceptible to a new form of pressure called "technology-induced stress" (Marsh, Perez Vallejos and Spence 2022). All of this prompts a rethinking of legal concepts such as working time, time tracking, workplace, overtime, rest time, labor productivity, recall of employees from vacation, and temporary disability. Furthermore, the sense of job insecurity is growing, being driven by advancements in machine learning, artificial intelligence, and robotics (Getman et al. 2023). These technologies have enabled the automation of many repetitive and highly standardized tasks, leading to concerns about job stability (Nam 2019; Ghani et al. 2022). Based on the aforementioned trends, it is evident that digitalization alters the legal regulation of labor relations fundamentally. New questions arise regarding the protection of labor rights in a digital environment, where working hours and the workplace are blurred (Breque, De Nul and Petridis 2021). In this context, it is essential to develop new legal frameworks that account for the specifics of the digital economy and ensure the protection of employees' rights. Key aspects include transparency in the use of monitoring technologies, limiting working hours to prevent digital overload, and guaranteeing equal conditions for all employees regardless of their ability to adapt to new technological requirements.

This study analyzes how different EU Member States regulate digital monitoring of working time with a particular focus on legislative initiatives in France, Germany, Spain, and Italy. Such a choice is due to different approaches to the regulation of digital monitoring of working time and the right to disconnect in these countries. France was the first country to enshrine the right to disconnect in legislation. Germany has strong data protection laws, and work councils participate actively in overseeing digital technologies. Spain has introduced a law on digital rights that regulates digital monitoring, while Italy has established a flexible employment model with clear rules on the digital literacy of employees. The analysis of these countries helps to identify best practices and suggest common standards for regulation at the EU level.

The scientific novelty of this article is a comprehensive approach developed to analyze the legal implications of digital time-tracking technologies and suggest policy recommendations targeted to improve the clarity and coherence of legislation across the EU. The article also provides a critical comparison of national approaches

to digital monitoring, representing how different EU Member States address these issues in light of the wider EU regulatory framework. This study will be of particular interest to policymakers, lawyers, and employment law experts, seeking to understand how labor rights are changing in the digital age. It will also be useful for companies as guidelines to reconcile the use of digital monitoring tools with legal standards and employees' rights. By providing practical legislative recommendations, this study aims to contribute to the development of a more coherent and balanced regulatory framework that meets the needs of both employers and employees in the context of a digital workplace.

2. Materials and Methods

The research methodology consists of several stages, including document analysis, case law review, and policy comparison. Each stage is designed to clarify the current legal situation, identify existing gaps, and suggest possible legislative reforms. In this article, the legalistic method was used to analyze EU and Member State legislation in order to understand the regulation of working-time monitoring. This included the study of Directive 2003/88/EC concerning certain aspects of the organization of working time (European Parliament and Council 2003), the General Data Protection Regulation (European Parliament and Council 2016), and other regulations governing the use of digital technologies in the field of work.

The study provides an in-depth analysis of relevant case law related to the use of digital technologies for monitoring working time. It examines issues related to the right to privacy, data protection, and employee consent. The analysis of such cases helps to reveal how courts interpret existing laws in practice, in particular regarding the balance between employer control and employee rights.

The authors also used the comparative method to analyze the legislative approaches to working-time monitoring in different EU Member States. By comparing the regulations in France, Germany, Spain, and Italy, the study identifies national peculiarities and best practices that may be useful for the development of common standards at the EU level. The systemic method is based on considering the object of study as part of a larger system. The systemic method was applied to consider the monitoring of working time not only as a separate process but also as part of the overall system of labor law and human resources management.

In this article, the analysis method was used to study certain components of legal regulation of digital technologies, such as data protection, the right to disconnect, and other aspects that affect the monitoring of working time. This approach allowed for a deeper understanding of how different legal norms and practices affect the overall picture of regulation in this area. The synthesis method was used to combine the results of the analysis of legislation, comparative studies and other components of the article to formulate general conclusions about the need to develop new legislative initiatives in the field of working-time monitoring. This made it possible to summarize the findings and propose comprehensive solutions to improve legal regulation at the EU level.

Such a comprehensive approach to the analysis of legal documents, case law, and comparative study provides for a deep understanding of the current regulation of digital monitoring of working time in the EU and contributes to the practical recommendations for improving regulatory policy in this area.

3. Results

3.1. Modern tools for tracking and controlling working hours

Modern digital technologies provide new opportunities for counting and controlling working time, which significantly changes approaches to managing employees and organizing work processes. One of the most common tools is time-tracking software, which allows you to automatically record hours of work, track productivity, and analyze how time is allocated to different tasks. Such programs are often integrated with other project and resource management systems, which simplifies workflow management. With these tools, employers can get detailed reports on working hours, identify inefficient processes, and optimize resource allocation (Gao 2018). This helps to minimize errors that can occur when manually entering data and provides more accurate time tracking. Many time-tracking programs integrate with other project management systems, such as Asana, Trello, or Jira, to combine planning, execution, and reporting functions. This provides a seamless workflow where all time and task data is collected in one place, making it easier to manage projects and monitor task completion (Tang 2017; Li and Zheng 2018).

Biometric technologies, such as fingerprint, face, or retinal recognition, are also being actively used for time tracking (Vaivio, Järvenpää and Rautiainen 2021; Liakhovych and Vakun 2023). Such systems allow for a high level of security, as they reduce the risk of time-related fraud, such as when employees clock in for their colleagues. In addition, the use of biometrics simplifies the process of entering and leaving the workplace, which is especially important for large enterprises and organizations (Villadsen 2021). Cloud technologies and mobile apps are opening up new possibilities for time and attendance, allowing employees to easily log their time from anywhere and at any time. These tools are especially useful for remote teams and freelancers, providing flexibility and real-time data availability (Pfister and Lukka 2019). The use of artificial intelligence and data analytics for time tracking is quite popular as it helps to automate routine processes, predict resource needs, identify trends and patterns in employee productivity, and make informed decisions about HR management (Jans and Hosseinpour 2019; Yaroshenko et al. 2023).

However, the use of digital tools for tracking working hours can pose risks associated with employee data privacy, as constant monitoring may create a sense of excessive surveillance and raise concerns about the protection of personal data. The case of Copland v. the United Kingdom (European Court of Human Rights 2007) highlighted the importance of employees' consent to install digital monitoring tools, particularly on personal devices. The applicant complained that her telephone conversations, emails, and internet use were monitored without her consent. This was done on the

instructions of the deputy headmaster of the college she worked at. According to the case law, telephone calls from office premises are directly linked to the concepts of "private life" and "correspondence" within the meaning of Article 8 of the ECHR. Interpreting the Convention, the Court observed that the same level of protection should apply to emails sent from the workplace and information obtained through the monitoring of personal internet use. In this case, the Court found a violation of Article 8 of the ECHR and held that the collection and storage of personal information about the applicant's telephone, email, and internet use without her consent constituted an interference with her right to respect for the private life and correspondence.

It is necessary to note that excessive control and continuous tracking of working hours can lead to decreased employee motivation and even cause stress (Gusarov and Melnyk 2023). Research shows that "technology-induced stress" can negatively impact employees' mental health, especially if they feel their privacy is being invaded. Employers may believe that monitoring is necessary to ensure discipline and productivity. However, they should also consider that excessive monitoring can lead to a decline in trust within the team and increased tensions between employees and the management team. A striking example is the case of Antović and Mirković v. Montenegro (European Court of Human Rights 2018). A university in Montenegro installed a system to monitor the presence and activities of students during lectures. The students brought a lawsuit, claiming that the use of such a system violated their right to respect for private life, guaranteed by Article 8 of the ECHR. The students claimed that the constant monitoring of their presence and participation in lectures without their explicit consent caused stress. The Court concluded that the establishment of a monitoring system at a university constituted an interference with the student's right to respect for private life. The Court emphasized that such interference shall comply with the law, pursue a legitimate purpose, and be necessary in a democratic society. In this case, the Court found that the national authorities had not provided sufficient reasons to justify such an interference and that it therefore failed to comply with Article 8 of the Convention.

Furthermore, the implementation of new digital tools can be technically complex and financially burdensome for some businesses, particularly small and medium-sized enterprises. Employees may have varying levels of proficiency with new technologies, which requires additional training and support. The use of time-tracking tools also raises several legal and ethical questions, such as what rights employees have regarding access to data about their working hours and how to ensure a balance between monitoring work processes and employees' right to personal space (Asiaei et al. 2022). Understanding the benefits and challenges of these tools will enable organizations to effectively implement them while maintaining a balance between productivity and employee well-being.

3.2. Working-time management vs. digital technologies: the legislation of the EU and certain Member States

In the European Union, where the protection of workers' rights is a priority, there is a need to adapt existing legal norms to the new conditions created by digital

technologies (Kotwinski 2017). European legislation already has certain regulations concerning working hours, data protection, and the right to disconnect, but the rapid development of digital technologies requires further refinement of the legal framework. In the European Union, the regulation of working hours is primarily governed by Directive 2003/88/EC, commonly referred to as the Working Time Directive. It aims to protect the health and safety of workers by providing minimum standards for working hours, breaks, rest periods and overtime conditions. The main provisions of the Directive include limiting the maximum working week to 48 hours, including overtime, the right to daily and weekly rest, and special rules for night work (European Parliament and Council 2003).

Digital tools can automatically log when an employee starts and finishes work, track the total hours worked, and even monitor breaks and rest periods. This automation helps prevent overworking and ensures that employees receive their entitled rest, thereby supporting the directive's goal of promoting a healthy work–life balance. Moreover, these tools can generate reports and alerts when employees are approaching or exceeding their legal working-hour limits, enabling proactive management to prevent violations of working-time regulations (Genç-Gelgeç 2022).

While digital technologies offer significant benefits for compliance, they also raise concerns about the continuous monitoring of employees. In response to these concerns, there is a growing emphasis on the importance of respecting employees' privacy rights under the General Data Protection Regulation (European Parliament and Council 2016). The GDPR standardizes data protection regulations across the EU, ensuring they are uniformly enforced in every Member State. As a result, each Member State is required to modify or update its national data protection legislation to comply with the GDPR (Voigt and von dem Bussche 2017). Although the GDPR requires that the collection and processing of personal data be reasonable, proportionate, and transparent, many employees do not fully understand what data is being collected, how it is being used, and who has access to it. This can lead to litigations, especially if employees believe their rights to data protection have been violated. For example, the judgment in the case of Bărbulescu v. Romania (European Court of Human Rights 2017) is one of the most famous in the context of digital monitoring at the workplace. An employee, Bărbulescu, was dismissed for using a corporate account for personal correspondence. His employer monitored his emails without warning. The Court found that monitoring an employee's emails must be proportionate and justified. The Court recognized that the employer was obliged to ensure transparency in monitoring and inform employees of the possibility of such monitoring. This case was an important precedent on the balance between digital surveillance and the right to privacy.

According to the GDPR, employers must ensure that data collection and processing are:

1) Lawful: Employers have the legal right to process employee data only when it is necessary for the performance of the employment contract, compliance with legal obligations, or based on the consent of employees.
2) Proportionate: Data processing should be limited to only the data that is necessary to achieve specific purposes. This means that employers cannot collect or store more data than is necessary to monitor working time.

3) Transparent: Employees should be fully informed about what data is being collected, how it will be used, and for what purpose. They also need to know who will have access to their data and how long it will be stored (Hoofnagle et al. 2019; Müller and Kettemann 2023).

Digital tools for monitoring working hours can also impact employee flexibility and work–life balance. While these technologies can support flexible work arrangements by accurately tracking hours worked regardless of location, they can also contribute to an "always-on" culture (Pansu 2018; Jaworska 2022). For example, employees might feel pressured to remain accessible or respond to work-related communications outside of their contracted hours, undermining the directive's provisions on maximum working hours and minimum rest periods (Bokor-Szőcs 2023).

The European Union has recognized these challenges and addresses them through initiatives such as the **right to disconnect**. This concept allows employees to disengage from work communications outside of regular working hours without facing negative consequences. Implementing and enforcing the right to disconnect is crucial to ensuring that digital tools for monitoring do not erode the protections afforded by the Working Time Directive (Lerouge and Pons 2022). However, this right is often difficult to implement in practice. It specifically applies to industries where employees work in global teams or have irregular working hours. The regulatory landscape varies significantly among the Member States, reflecting different legal traditions, labor market conditions, and cultural attitudes toward work–life balance. Here, we examine how certain EU Member States have approached the legal aspects of digital time-management technologies, focusing on issues such as privacy, data protection, and the right to disconnect.

France serves as a notable example because it was the first country to formally establish and protect the right to disconnect through legislation. The El Khomri Law, formally known as Labor Law No. 2016-1088, was enacted in France in 2016 and took effect on January 1, 2017. Named after Myriam El Khomri, the French Minister of Labor at the time, this law introduced comprehensive reforms designed to modernize labor regulations, enhance working conditions, and address the evolving dynamics of the modern workplace. This law requires companies with more than 50 employees to negotiate with their workforce to establish mechanisms for limiting the use of digital tools, such as email, outside working hours (Sampaio 2020). The aim is to protect employees from the encroachment of work on their personal lives, which can lead to burnout and other health issues (El Khomri 2016).

Even though the right to disconnect is enshrined in law in France, some organizations here do not comply with this rule due to the lack of strict sanctions. Companies in France have been obliged to implement digital disconnection policies since the passage of the El Khomri law, but many employees still feel pressured to respond to emails and messages outside of working hours. Employers may believe that the right to disconnect may limit workflow flexibility, especially in remote work. Furthermore, they may argue that, in the contemporary business environment, where transactions are frequently executed in real time, constant employee availability is essential to competitiveness (Sandul and Kudinska 2022).

A notable challenge is that in the absence of stringent penalties, some organizations might not place a high priority on enforcing disconnect policies (Pélicier-Loevenbruck and Daubin 2017). Additionally, the advent of the digital age has increasingly blurred the distinction between personal and work life, complicating the creation of universal solutions. Employees in fields like IT or international business often require a level of flexibility that conventional working hours do not provide (Lerouge and Pons 2022). Additionally, French data protection laws, in line with the GDPR, impose strict conditions on the collection and processing of employee data. While the Regulation fully governs the processing of employees' data, the unique nature of the employer–worker relationship introduces specific challenges that a general data protection framework cannot sufficiently address. These challenges include the extensive use and potentially invasive nature of technologies justified under the notion of legitimate interests in the workplace, the collective aspects of labor law, and the inherent imbalance of power between employers and employees in most employment agreements. These distinctive factors have led to ongoing demands for tailored data-protection rules specifically designed for the employment context (Tambou 2018; Abraha 2022).

Another example we will consider is Germany. Germany has a strong tradition of protecting employee rights, particularly regarding privacy and data protection. German labor laws require employers to respect the privacy of employees, even in the digital age (Klinger and Weber 2020). This means that digital tools used for working-time management must comply with stringent data protection regulations. German law also mandates that any monitoring of employees, including through digital means, must be proportionate and necessary for legitimate business purposes (Jäger, Noy and Schoefer 2022). Under the GDPR and *Bundesdatenschutzgesetz* (Federal Data Protection Act) employers are required to conduct data protection impact assessments (DPIAs) when implementing new technologies that may pose a high risk to employee privacy. These assessments help ensure that any risks associated with the use of digital monitoring tools are identified and mitigated (*Bundesministerium der Justiz* 2021). Furthermore, works councils (*Betriebsräte*) in Germany have a significant role in overseeing the implementation of digital technologies within companies. Employers must consult with works councils before introducing systems that affect employee monitoring or data collection, ensuring that employees have a say in how these technologies are used.

Another EU member, Spain, has also taken steps to regulate the use of digital technologies in managing working time, emphasizing the importance of flexibility while protecting employee rights. In 2020, Spain amended its labor laws to include provisions for remote work and telecommuting, acknowledging the growing trend toward flexible working arrangements facilitated by digital tools. These amendments require employers to ensure that remote working conditions comply with existing labor laws, including working-time regulations (Jefatura del Estado 2021; Donnelly 2022; Troadec 2022). Additionally, Spain introduced its own version of the right to disconnect in 2018, granting employees the right to digitally disconnect from work outside their working hours. Spanish companies must develop policies that define how employees can exercise this right, aiming to prevent the erosion of

personal time due to constant connectivity (Lerouge and Pons 2022). Spanish data protection laws, aligned with GDPR, also require employers to be transparent about the data collected through digital time-management tools and to ensure that such data is not used for purposes other than those explicitly stated and agreed upon by the employees (Jefatura del Estado 2018).

Italy has been proactive in addressing the challenges posed by digitalization in the workplace, particularly regarding the balance between work and personal life. Italy was among the earliest EU nations to follow in France's footsteps by implementing similar policies. Italy's Smart Working Law, formally known as Law No. 81/2017, established a broad framework for flexible working arrangements, commonly known as smart working or agile work. The purpose of this legislation was to modernize the Italian labor market by encouraging flexibility and enhancing work–life balance for employees. A key feature of this law is the provision that includes the right to disconnect, allowing employees to disengage from work-related communications outside of standard working hours (Nespoli 2018).

The law mandates that all smart working arrangements be established through a formal written agreement between the employer and the employee. This agreement must clearly outline the terms, including the duration and location of the work, and importantly, it must address the employee's right to disconnect. Article 19 of Law No. 81/2017 specifically requires that the smart working agreement includes provisions safeguarding the worker's right to disconnect. This provision ensures that employees are not compelled to participate in work-related communications outside their designated working hours, thereby protecting their personal time and mental well-being (Presidente della Repubblica 2017). Italian data protection laws, in line with GDPR, also provide strong protections for employee data. Employers must be transparent about the data they collect and ensure that employees' rights to privacy are respected. Additionally, any monitoring or surveillance of employees through digital technologies must be justified, proportionate, and conducted in a manner that respects workers' dignity (Garante per la protezione dei dati personali 1996).

Monitoring working time is a crucial aspect of modern labor management; however, it currently lacks clear legal definition in both European Union legislation and the national laws of its Member States. EU regulations and the national laws of Member States primarily provide general guidelines on working hours, breaks, night work, and other labor conditions. These regulations are intended to ensure the basic protection of workers' rights and promote a healthy work–life balance. However, specific rules and requirements regarding the monitoring of working time are not directly addressed in the legal framework.

Despite the absence of explicit regulations on time monitoring, these technologies significantly impact other important areas of labor law and data protection rights. For instance, the right to disconnect, which protects employees from being constantly available and responding to work requests outside of working hours, is already part of the legislation in some EU countries. However, it is not uniformly regulated across the EU and lacks a unified legal framework (Tkachenko 2022, 2023). In contrast, data protection is comprehensively regulated by the GDPR, which sets strict rules for the collection, processing, and storage of personal data, including

data collected through time monitoring. This uneven legal landscape highlights the need for expanding and clarifying legislative frameworks specifically concerning working-time monitoring.

Summing up, digital technologies have improved working-time management but raised concerns about privacy, monitoring, and the right to disconnect. While the EU regulates these aspects through the Working Time Directive and the GDPR, the development of digital tools requires updating the legislation. EU countries such as France, Germany, Spain, and Italy are taking varying approaches, which highlights the need for uniform and comprehensive regulation.

3.3. The need for legal regulation of working-time monitoring: risks and proposals for legislative initiatives in the EU

To address the problems associated with the lack of proper legal regulation of working-time monitoring, several legislative initiatives need to be implemented at the EU level. These initiatives are aimed at protecting the rights of employees, minimizing the risks associated with the use of monitoring technologies, and promoting fair working conditions. First of all, there is a need to introduce clear rules for monitoring working hours. Specific legislation should be developed or amended to regulate the use of digital technologies for working-time monitoring (Bodie et al. 2017).

These rules should take into account the balance between employers' needs to increase productivity and ensure compliance with legal norms and employees' rights to privacy and freedom from excessive monitoring.

The second important element is to ensure transparency and informed consent. It is important to establish requirements for transparency in the process of data collection and processing, and to ensure that employees provide informed consent to the use of monitoring technologies. Employees should clearly understand what data is being collected, for what purpose, how it will be used and stored, and have the opportunity to opt out of monitoring or withdraw their consent at any time. The third important step is to properly regulate the employee's right to disconnect. The right of employees to disconnect from work communications outside of working hours should be enshrined in EU law. Many individual EU Member States currently have such initiatives in place. The EU Strategic Framework on Health and Safety at Work 2021–2027 emphasizes the significance of ensuring the right to disconnect. According to this document, it is crucial to develop and implement suitable measures to safeguard employees who work remotely or rely on digital tools. The Framework highlights the need for research into the psychosocial risks linked to digital and remote working environments and advocates for the establishment of minimum standards and conditions to guarantee that workers have the right to disconnect from work outside their regular working hours (European Commission 2021). This right should protect employees from constant availability and ensure their right to rest and personal time, reducing the risk of burnout and improving work–life balance (Kossek and Lautsch 2009).

The fourth step should be to develop ethical standards for time tracking. It is important to introduce ethical standards for the use of time-tracking technologies,

including best practice guidelines for employers. Such standards should emphasize proportionality in the use of technology, respect for employee privacy, and maintaining a positive work environment (Griep et al. 2021). Most of the relevant legislative initiatives are not new, but they are currently fragmented in different legal acts. We propose to implement them in a single legal act. It may even be advisable to create a Code of Labor Recommendations of the European Union. This document could contain comprehensive and unified information on aspects of labor relations and law, and could respond in a timely manner to new trends in the employment sector. Finally, employers should be required to conduct a privacy impact assessment before introducing any new work time-monitoring technologies. This approach will allow identifying potential risks to employee privacy and taking the necessary measures to minimize them.

Thus, such legislative initiatives will help to create a more balanced and secure work environment where monitoring technologies are used responsibly and with respect for the rights of employees. They will contribute to ensuring fair labor practices across the EU by adapting legislation to the current challenges of the digital economy. And their adoption at the EU level will ensure their comprehensive adoption in all Member States.

Several key legislative initiatives are needed at the EU level to address the issues of working-time monitoring and employees' rights. These include establishing clear rules on working-time monitoring, ensuring transparency and informed consent, enshrining a right to disconnect, developing ethical standards for time-tracking technologies, and assessing a privacy impact. Such initiatives will help reduce the risks associated with digital monitoring while promoting fair labor practices across the EU.

4. Discussion

With the development of digital technologies, we are witnessing significant changes in working-time management, which opens up new opportunities and prospects for further improvement of work processes. With rapid digitalization, automation, and the shift to remote work, organizations are striving to make the most of digital tools to increase productivity and ensure work–life balance. In this context, it is important to consider what innovations are already being implemented and what development prospects exist for the further use of digital technologies in this area. One of the most promising innovations in working-time management is the use of artificial intelligence (AI) and data analytics. AI allows for the automation of planning, monitoring, and analyzing working time, which helps to better allocate tasks and optimize workflows (Lohvinenko 2022). Data analytics, in turn, enables the identification of trends and patterns in time usage, which can lead to increased work efficiency and the discovery of potential productivity reserves. As these technologies continue to develop, employers will be able to gain more detailed insights into the work of their teams, facilitating more informed management decisions (Lohvinenko 2023).

At the same time, innovations in biometric technologies, such as facial recognition, fingerprint scanning, or retina scanning, are already being actively implemented

for time tracking. These technologies provide a high level of security and reduce the risk of time-related fraud since employee identification is based on unique physiological characteristics (Pizhuk 2019). In the future, further improvements in biometric systems and their broader application across various industries can be expected. In this article, we have explored the current state of legal regulation of working-time monitoring in the EU and individual Member States, and identified significant gaps in this regulation. Despite the existing general rules on working hours, breaks, night work and data protection, the lack of specific rules on working time-monitoring creates risks for employees and employers.

The analysis shows that while the general framework of labor law and data security establishes some protections for employees, it does not cover all aspects of working-time monitoring, which is becoming increasingly important in the digital age. The lack of clear regulation in this context is comparable to the results of previous studies, which also pointed to the need for a more detailed legal framework for digital technologies in the field of labor. Establishing specific legal regulations on working-time monitoring can have a significant positive impact on the work environment. It will help protect employees' privacy rights, ensure work–life balance, and create clear rules for employers, which will help avoid legal conflicts and improve morale and trust in the team.

The findings indicate an urgent need to develop and implement legislative initiatives at the EU level to regulate working-time monitoring. This is necessary to strike a balance between technological advances and the fundamental rights of workers, as well as to promote the sustainable development of the digital economy. Establishing clear legal rules will help to avoid risks associated with excessive control, data protection, and the right to disconnect, while creating transparent and fair working conditions for all labor market participants. This study is limited to analyzing the legal framework in the EU and individual Member States, without taking into account specific industries or types of organizations. Additional research could focus on the impact of working-time monitoring in different sectors of the economy or in the context of different cultural practices.

Future research could focus on evaluating the effectiveness of specific legislative initiatives that have already been introduced in some Member States, such as Italy and France, to develop best practices that can be applied across the EU. Furthermore, it is important to investigate how monitoring technologies affect workers' psychological health and productivity.

5. Conclusions

The analysis of the legal aspects of using digital technologies for working-time monitoring revealed that both EU legislation and the national laws of individual Member States lack clear regulations on these technologies. The existing rules mainly cover general issues related to working hours, breaks, and data protection without taking into account the specifics of digital time monitoring. Therefore, it is necessary to develop new legislative initiatives that clearly regulate the use of digital tools for

managing working time. We advise the creation of a Code of Labor Recommendations of the European Union. This document could contain comprehensive and unified information on aspects of labor relations and law, and could respond in a timely manner to new trends in the employment sector.

In conclusion, to ensure fair and sustainable labor practices in the digital age, it is essential to adapt the legal framework to the new realities. This will not only protect workers' rights but also create a favorable environment for business development, balancing innovation with fundamental human rights. To address the challenges posed by digital technologies in working-time management, it is also important to foster a culture of transparency and communication within organizations. Employers should engage in open dialogue with employees about the implementation and use of monitoring tools, clearly outlining the purposes, benefits, and boundaries of these technologies. This approach not only helps in gaining employees' trust and acceptance but also encourages a collaborative environment where both parties can voice concerns and suggestions for improvement. By involving employees in the decision-making process related to digital monitoring, organizations can ensure that these tools are used ethically and effectively, promoting a healthier and more supportive workplace culture.

References

Abraha, Halefom. "A Pragmatic Compromise? The Role of Article 88 GDPR in Upholding Privacy in the Workplace." *International Data Privacy Law* 12, no. 4 (2022): 276–96, https://doi.org/10.1093/idpl/ipac015

Asiaei, Kaveh, Nick Bontis, Raziye Alizadeh, and Mehdi Yaghoubi. "Green Intellectual Capital and Environmental Management Accounting: Natural Resource Orchestration in Favor of Environmental Performance." *Business Strategy and the Environment* 31, no. 1 (2022): 76–93, https://doi.org/10.1002/bse.2875

Bodie, Matthew, Miriam Cherry, Marcia McCormick, and Jintong Tang. "The Law and Policy of People Analytics." *University of Colorado Law Review* 88, no. 1 (2017): 961–1042.

Bokor-Szőcs, Izabella. "The Right to Disconnect." *Journal of Public Administration, Finance and Law* 29 (2023): 88–96, https://doi.org/10.47743/jopafl-2023-29-08

Breque, Maija, Lars De Nul, and Athanasios Petridis. *Industry 5.0—Towards a Sustainable, Human-Centric and Resilient European Industry.* European Commission, 2021.

Bundesministerium der Justiz. "Bundesdatenschutzgesetz." Accessed April 11, 2024, https://www.gesetze-im-internet.de/englisch_bdsg/

Ćormarković, Teodora, Lazar Dražeta and Angelina Njeguš. "The Levels of Artificial Intelligence Application in Human Resource Systems." *European Journal of Applied Economics* 19, no. (2022): 28–42, https://doi.org/10.5937/ejae19-39535

Donnelly, Drew. "A Guide to Spain's Remote Working Law." Accessed April 11, 2024, https://joinhorizons.com/remote-working-law-decree-spain/

El Khomri, Myriam. "Projet de loi visant à instituer de nouvelles libertés et de nouvelles protections pour les entreprises et les actifs." Accessed August 15, 2024, https://www.assemblee-nationale.fr/14/projets/pl3600.asp

European Court of Human Rights. "Case No 61496/08 of Bărbulescu v. Romania." Accessed February 12, 2025, https://hudoc.echr.coe.int/fre#{%22itemid%22:[%22001-177082%22]}

European Court of Human Rights. "Case No. 62617/00 of Copland v. The United Kingdom." Accessed February 12, 2025, https://hudoc.echr.coe.int/eng#{%22itemid%22:[%22001-79996%22]}

European Court of Human Rights. "Case No. 70838/13 of Antović and Mirković v. Montenegro." Accessed February 12, 2025, https://rm.coe.int/t-pd-2018-15-case-law-on-data-protection-may2018-en/16808b2d36

European Parliament and Council. "Directive 2003/88/EC Concerning Certain Aspects of the Organisation of Working Time." Accessed August 7, 2024, https://eur-lex.europa.eu/eli/dir/2003/88/oj

European Parliament and Council. "Regulation (EU) 2016/679 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation) (Text with EEA relevance)." Accessed August 7, 2024, https://eur-lex.europa.eu/eli/reg/2016/679/oj

Gao, Qian. "Research on the Application of Accounting Tools of Integrated Management of Business Finance under the Background of Supply-Side Reform." *Advances in Social Science, Education and Humanities Research* 236 (2018): 532–6, https://doi.org/10.2991/meess-18.2018.99

Garante per la Protezione dei Dati Personali. "Legge n. 675 Tutela delle persone e di altri soggetti rispetto al trattamento dei dati personali." *Gazzetta Ufficiale 5*, no. 3 (1996). Accessed August 7, 2024, https://www.garanteprivacy.it/web/guest/home/docweb/-/docweb-display/docweb/28335

Genç-Gelgeç, Berrak. "Regulating Digital Platforms: Will the DSA Correct Its Predecessor's Deficiencies?" *Croatian Yearbook of European Law and Policy* 18 (2022): 25–60, https://doi.org/10.3935/cyelp.18.2022.485

Getman, Anatolii, Oleg Yaroshenko, Roman Shapoval, Roman Prokopiev, and Maryna Demura. "The Impact of Artificial Intelligence on Legal Decision-Making." *International Comparative Jurisprudence* 9, no. 2 (2023): 155–69, https://doi.org/10.13165/j.icj.2023.12.001

Ghani, Bilqees, Khalid Rasheed Memon, Heesup Han, Antonio Ariza-Montes, and Juan Arjona-Fuentes. "Work Stress, Technological Changes, and Job Insecurity in the Retail Organization Context." *Frontiers in Psychology* 13 (2022): 918065, https://doi.org/10.3389/fpsyg.2022.918065

Griep, Yannick, Ivanna Vranjes, Madelon Van Hooff, Debby Beckers, and Sabine Geurts. "Technology in the Workplace: Opportunities and Challenges." In *Flexible Working Practices and Approaches: Psychological and Social Implications,* edited by Christian Korunk. Springer, 2021.

Gusarov, Serhii and Kostiantyn Melnyk. “Protection of Personal Data of the Employee.” *Law and Safety* 2, no. 89 (2023): 133–44, https://doi.org/10.32631/pb.2023.2.12

Hoofnagle, Chris Jay, Bart van der Sloot, and Frederik Zuiderveen Borgesius. “The European Union General Data Protection Regulation: What It Is and What It Means.” *Information and Communications Technology Law* 28, no. 1 (2019): 65–78, https://doi.org/10.1080/13600834.2019.1573501

Jäger, Simon, Shakked Noy, and Benjamin Schoefer. “The German Model of Industrial Relations: Balancing Flexibility and Collective Action.” *Journal of Economic Perspectives* 36, no. 4 (2022): 53–80, https://doi.org/10.1257/jep.36.4.53

Jans, Mieke and Marzie Hosseinpour. “How Active Learning and Process Mining Can Act as Continuous Auditing Catalyst.” *International Journal of Accounting Information Systems* 32 (2019): 44–58, https://doi.org/10.1016/j.accinf.2018.11.002

Jaworska, Katarzyna. “The Right to Disconnect.” *Studia z Zakresu Prawa Pracy i Polityki Społecznej* 29, no. 1 (2022): 51–8, https://doi.org/10.4467/25444654SPP.22.005.15373

Jefatura del Estado. “Ley 10/2021 de Trabajo a Distancia.” *Boletín Oficial Del Estado 164* (2021): 82540-83.

Jefatura del Estado. “Ley Orgánica 3/2018, de 5 de diciembre, de protección de datos personales y garantía de los derechos digitales.” *Boletín Oficial Del Estado* 294 (2018): 8-68.

Klinger, Sabine and Enzo Weber. “GDP-Employment Decoupling in Germany.” *Structural Change and Economic Dynamics* 52 (2020): 82–98, https://doi.org/10.1016/j.strueco.2019.10.003

Kossek, Ellen Ernst and Brenda Lautsch. *CEO of Me: Creating a Life that Works in the Flexible Job Age*. Pearson, 2008.

Kotwinski, Anna. “It’s Up to Managers to Make Sure Employees Disconnect from Work.” Accessed July 17, 2024, https://www.peoplemanagement.co.uk/article/1746080/its-managers-sure-employees-disconnect-work

Krynytsia, Sergii. “The Current Trends in the Digital Technologies Development and Their Impact on Public Finances.” *Bulletin of the State Tax University* 2 (2023): 82–120, https://doi.org/10.33244/2617-5940.2.2023.82-120

Lerouge, Loïc and Francisco Trujillo Pons. “Contribution to the Study on the ‘Right to Disconnect’ from Work. Are France and Spain Examples for Other Countries and EU Law?” *European Labour Law Journal* 13, no. 3 (2022): 450–65, https://doi.org/10.1177/20319525221105102

Li, Zehong and Li Zheng. “The Impact of Artificial Intelligence on Accounting.” *Advances in Social Science, Education and Humanities Research 181* (2018): 813–6, https://doi.org/10.2991/icsshe-18.2018.203

Liakhovych, Galyna and Oksana Vakun. “Use of Artificial Intelligence to Increase the Efficiency of the Management Accounting System.” *Problems of Theory and Methodology of Accounting, Control and Analysis* 3, no. 56 (2023): 28–33, https://doi.org/10.26642/pbo-2023-3(56)-28-33

Lohvinenko, Bohdan. "Socio-economic Tool of Job Search Based on Artificial Intelligence." In *The 24th International Scientific and Practical Conference 'Multidisciplinary Academic Notes. Science Research and Practice'*, 93–6. Madrid, Spain: International Science Group, 2022, https://isg-konf.com/multidisciplinary-academic-notes-science-research-and-practice-two/

Lohvinenko, Bohdan. "Study of Artificial Intelligence Tools in the Management of the Behavior of Economic Agents in the Digital Space at Enterprises." *Journal of V. N. Karazin Kharkiv National University* 15 (2023): 45–53, https://doi.org/10.26565/2310-9513-2022-15-05

Marsh, Elizabeth, Elvira Perez Vallejos, and Alexa Spence. "The Digital Workplace and Its Dark Side: An Integrative Review." *Computers in Human Behavior* 128 (2022): 1–21, https://doi.org/10.1016/j.chb.2021.107118

Müller, Martin and Matthias Kettemann. "European Approaches to the Regulation of Digital Technologies." In *Introduction to Digital Humanism*, edited by Hannes Werthner, Carlo Ghezzi, Jeff Kramer, Julian Nida-Rümelin, Bashar Nuseibeh, Erich Prem, Allison Stanger, 623–37. Springer, 2023, https://doi.org/10.1007/978-3-031-45304-5_39

Nam, Taewoo. "Technology Usage, Expected Job Sustainability, and Perceived Job Insecurity." *Technological Forecasting and Social Change* 138 (2019): 155–65, https://doi.org/10.1016/j.techfore.2018.08.017

Nespoli, Emanuela. "Italy – Employment Law Review 2017." Accessed July 22, 2024, https://iuslaboris.com/insights/italy-employment-law-review-2017/

Pansu, Luc. "Evaluation of 'Right to Disconnect' legislation and Its Impact on Employee's Productivity." *International Journal of Management and Applied Research* 5, no. 3 (2018): 99–119, https://doi.org/10.18646/2056.53.18-008

Pélicier-Loevenbruck, Sophie and Sarah Daubin. "Sorting Out the Truth about the Right to Disconnect in France." Accessed July 22, 2024, https://www.jdsupra.com/legalnews/sorting-out-the-truth-about-the-right-5707/

Pfister, Jan and Keri Lukka. "Interrelation of Controls for Autonomous Motivation: A Field Study of Productivity Gains Through Pressure-Induced Process Innovation." *Accounting Review* 94, no. 3 (2019): 345–71, https://doi.org/10.2308/accr-52266

Pizhuk, Olha. "Artificial Intelligence As One of the Key Drivers of the Economy Digital Transformation." *Economics, Management and Administration* 3, no. 89 (2019): 41–6, https://doi.org/10.26642/ema-2019-3(89)-41-46

Presidente della Repubblica. "Misure per la tutela del lavoro autonomo non imprenditoriale e misure volte a favorire l'articolazione flessibile nei tempi e nei luoghi del lavoro subordinato." Accessed July 22, 2024, https://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:legge:2017-05-22;81!vig=

Sampaio, Leonardo. "The 'El Khomri Law' on François Hollande's Employment and Competitiveness Politics (2012–2017)." Accessed May 2, 2024, https://www.researchgate.net/publication/366696487_The_El_Khomri_Law_on_Francois_Hollande's_Employment_and_Competitiveness_Politics_2012-2017

Sandul, Heorhii and Kudinska, Inna. "The Right to Disconnect: Let Them Take a Break." Accessed February 12, 2025, https://trudovi.org.ua/analytics/pravo-na-vidkliuchennia-vidpochyvayte-na-zdorovia/?utm_source=chatgpt.com

Tambou, Olivia. "The French Adaptation of the GDPR." Accessed May 14, 2024, https://blogdroiteuropeen.com/wp-content/uploads/2018/06/olivia.pdf

Tang, Tao. *Optimization Study on the Research Institute of AIS Based on the Integration of Financial and Business*. Chongqing: Chongqing University of Technology, 2017.

Tkachenko, Vladyslav. "Evolution of Normal Working Hours in the EU: Some Issues." *Legal Novels 22* (2024): 265–70, https://doi.org/10.32782/ln.2024.22.36

Tkachenko, Vladyslav. "Features of the Legal Regulation of the Organization of Working Time in the European Union." *Pravo.ua* 4, no. 2 (2023): 254–9, https://doi.org/10.32782/LAW.UA.2023.4-2.41

Troadec, Marie Laure. "Labor and Employment Law in Spain." Accessed May 14, 2024, https://joinhorizons.com/spanish-labor-and-employment-law/

Vaivio, Juhani, Marko Järvenpää and Antti Rautiainen. "Accounting in Identity Regulation: Producing the Appropriate Worker." *European Accounting Review* 32, no. 3 (2021): 693–716, https://doi.org/10.1080/09638180.2021.1997780

Villadsen, Kaspar. "'The Dispositive': Foucault's Concept for Organizational Analysis?" *Organization Studies* 42, no. 3 (2021): 473–94, https://doi.org/10.1177/0170840619883664

Voigt, Paul and Alex von dem Bussche. *The EU General Data Protection Regulation (GDPR): A Practical Guide*. Springer, 2017, https://doi.org/10.1007/978-3-319-57959-7

Yaroshenko, Oleg, Dmytro Sirokha, Larysa Velychko, Liubov Kotova, and Valentyna Sobchenko. "Current Problems of Legal Regulation of Remote Work in the Context of the Introduction of Restrictive Measures Caused by the Spread of COVID-19 in Ukraine and the EU." *Relações Internacionais no Mundo Atual* 1, no. 34 (2022): 1–16, http://dx.doi.org/10.21902/Revrima.v1i34.5575

Yaroshenko, Oleg, Olena Lutsenko, Nataliia Melnychuk, Leonid Mohilevskyi, and Natalya Vapnyarchuk. "The Impact of Digitalization on Labor Relations in Ukraine." *InterEULawEast* 10, no. 1 (2023): 67–82.