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The Digital Twin of the Worker as a Legal and Information Projection in the Hybrid Work Model

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Abstract

This article examines the concept of the worker's digital twin as a new legal and informational projection emerging within the hybrid labor model under the influence of digitalization and the integration of artificial intelligence systems. The analysis builds upon the concepts of the hybrid labor subject and the extended labor function, previously introduced into labor law doctrine. It focuses on their further development through predictive and simulation models of labor behavior. The study argues that the digital twin is not merely a technical tool but constitutes an independent analytical layer in the organization of work, functioning as a dynamic representation of the worker's professional profile, decisions, and performance. In this sense, it is regarded as a legally relevant information structure that raises new questions concerning personal data protection, the limits of employer control, and the rights over and use of the digital employment profile. The article draws a conceptual distinction between the physical performance of the labor function and its digital modelling, thereby laying the foundations for a new theoretical perspective on the analysis of labor in the context of algorithmically assisted and autonomous systems. The proposed conceptual framework may serve as a basis for developing internal workplace rules, standards for human oversight and employer control, safeguards for personal data protection, and future regulatory approaches to the use of workers' digital twins.

Key words:

digital twin, hybrid labor entity, artificial intelligence, labor function, algorithmic management, digitalization of labor

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1. Introduction

Labor law arises and is distinguished as an independent legal branch, which is based on a clearly expressed protective function towards the natural person – worker or employee. Its historical development consistently follows this logic, being aimed at alleviating the legal and social situation of workers, as well as at seeking a sustainable balance between the parties to the employment relationship – the employer and the worker or employee. At the heart of this legal branch is precisely the employment relationship, which is traditionally built on the premise of personal provision of labor force by the individual. This structure has long ensured the stability of the system and defines its main institutions, including those related to labor protection, labor discipline, and responsibility.

However, modern technological reality presents labor law with qualitatively new challenges. The advent of digitalization and artificial intelligence systems leads to a transformation of the understanding of the workforce, gradually shifting the emphasis from isolated human performance to functionally integrated models of interaction between the individual and technological systems. This change does not affect only the tools of labor, but directly reflects on its essence and on the way in which the labor result is formed (Andreeva, A., Yolova, G., 2022) (Radev, 2021) (Radev, 2026).

It is on this conceptual basis that the present work is built, which is entirely theoretical and doctrinal in nature. It does not aim at a normative analysis of the current legislation, but draws attention to the need to rethink the classic labor law categories through the introduction of new analytical constructions capable of covering hybrid forms of labor performance in the context of digital transformation.

In the current labor law doctrine, there is a sustainable process of conceptual expansion aimed at making sense of the transformations in the content and the way of performing the labor function in the context of digitalization and the implementation of artificial intelligence systems. Within this process, the theoretical constructions of the hybrid labor subject and the extended labor function acquire particular importance, which introduces a new understanding of the interaction between the individual and technological systems in the labor process. These doctrinal models reflect the transition from the classical individual performance of labor to functionally integrated forms of work, in which the final result is formed through the joint participation of human and artificial intelligence. Thus, there is a tendency towards a structural reorganization of the labor function, in which the emphasis shifts from the isolated action of the worker to systematic interaction in a digital environment. (Andreeva, A., Yolova, G., 2020) (Andreeva, A., Yolova, G., 2020)

The accumulation of these theoretical developments necessitates their further development and analytical deepening through the introduction of additional conceptual tools. In this context, the theory of the digital twin of the worker is especially promising, as it allows modeling, simulation, and predictive analysis of labor behavior, thus expanding the classical boundaries of labor law knowledge.

The relevance of this study stems from the growing discrepancy between the dynamic development of technological forms of labor organization and the existing legal framework in the field of labor law. Despite the steady development of classical labor law institutions, the current legal framework remains conceptually bound to the understanding of individual and fully human performance of the labor function, based on the traditional model of employment relationship. At the same time, modern practice demonstrates an accelerated introduction of hybrid forms of work, in which the performance of labor tasks is carried out through functional interaction between the individual and artificial intelligence systems. These forms no longer represent a hypothetical perspective, but an actual organizational practice in a number of professional fields, including law, finance, administration, and industrial processes. This development is characterized by a regulatory incompleteness, as there is no comprehensive legal regulation that takes into account the specific nature of hybrid work, including issues related to the protection of the rights of the worker or employee, guarantees for the employer, as well as the legal certainty of third parties that may be affected by the results generated by interaction with artificial intelligence systems. In the legal doctrine, the issues of the impact of digitalization, employer control with new technological means, the personal-professional relationship and many other aspects

have been the subject of scientific research and debate with their respective proposals de lege ferenda, but the legislation has not yet responded with an adequate and comprehensive legal reform that would provide a solid basis and the necessary guarantees for the development of labor relations in these hybrid conditions.

In this sense, a normative vacuum is formed, in which real social relations are ahead of legal regulation. This circumstance necessitates the need for legal science to take a decisive and even more active role in the process of conceptualizing new forms of labor, while at the same time building on the stable classical foundations of labor law and building on them through the introduction of new analytical categories. It is in this direction that the current study proposes a rethinking of traditional labor law concepts, adapting them to the conditions of digital transformation and hybridization of labor, without denying their fundamental protective and balancing functions. (Andreeva,A., Yolova,G., 2025; Andreeva, A., Yolova, G., Dimitrova, D, 2022)

The aim of this study is to define and conceptualize the digital twin of the worker as a legal and informational projection in the conditions of a hybrid work model, formed by the interaction between the individual and artificial intelligence systems, as well as within the framework of the extended labor function. On this basis, the aim is to derive its place in the system of labor law categories and to outline its functional and legal dimensions as an analytical tool for evaluation, simulation and prediction of work behavior.

To achieve this goal**, the following scientific tasks have been set:**

1. **To analyze** the conceptual evolution of the hybrid labor subject and the expanded labor function as a prerequisite for the emergence of the need for new analytical models in labor law.
2. **To investigate** the meaningful transformation of the labor function in the conditions of interaction between an individual and artificial intelligence systems, including the role of algorithmically assisted labor performance.
3. **To justify the** need to introduce the concept of "digital twin of the worker" as a legal and informational projection, different from the classical means of organization and control of labor.
4. **To determine** the functional place of the digital twin within the hybrid work model, including its importance for the analysis of efficiency, predictability and organizational transformation of the labor process.

The present study defends the thesis that the digital twin of the worker represents an independent legal and informational projection within the hybrid labor model, which arises as a logical consequence of the transformation of the labor function in the conditions of interaction between the individual and systems with artificial intelligence. Without prejudice to the conceptual and established statements about the carrier – a natural person with his/her inherent characteristic and demands. Capacity to work and its central position in every emerging and developing employment relationship, is emphasized on the new perspectives in the understanding of labor transfer in the context of digitalization of employment relations and their urgent rethinking and upgrading with an adequate legal framework. In this sense, this projection does not replace or transform the subjectivity in the employment relationship, but functions as an analytical tool that expands the content of the understanding of labor performance through modeling, simulation and predictive analysis of labor behavior within the extended labor function. The methodological framework of this study is based on a complex, interdisciplinary approach, combining tools from the theory of law, labor law and digital sciences, with a view to adequately understanding the transformation of labor in the context of digitalization and the use of artificial intelligence systems.

The research is based **on the doctrinal method**, through which the existing theoretical constructions are analyzed and systematized as a hybrid labor subject and an extended labor function, to upgrade them in the direction of introducing a new conceptual category – the digital twin of the worker. Additionally, the following are applied:

- **A systematic approach** through which labor law is considered as a complete normative and functional system, in which new technological elements change the internal structure of the labor function without changing the subject composition of the employment relationship.

- **Functional analysis** aimed at studying the actual performance of labor duties in the conditions of interaction between human and artificial intelligence and at identifying new functional roles within the hybrid work model.
- **Legal modeling**, through which the theoretical image of the digital twin is constructed as a legal-informational projection related to the performance, control and prediction of the labor function.
- **A comparative and analytical approach** used to compare classical models of individual labor performance and emerging hybrid forms of work based on algorithmic assistance and autonomous systems.
- **A method of scientific forecasting**, through which the possible directions of future development of labor law are outlined in the context of algorithmic management, digital twins and extended models of labor efficiency.

The combination of these methods allows for the development of a comprehensive theoretical construction, which not only analyzes the existing transformations, but also offers a conceptual framework for their future normative and doctrinal development. From a methodological point of view, the research contributes to the introduction of an interdisciplinary approach to labor law that integrates legal modeling, functional analysis and predictive concepts traditionally used in digital sciences. This allows for a more precise understanding of the emerging forms of labor organization in the conditions of automation and algorithmic management.

The scientific contribution of this study is expressed in the introduction and conceptual justification of a new legal and informational category – the digital twin of the worker, considered as an analytical projection within the framework of the hybrid work model and the extended labor function. For the first time in the labor law doctrine, the digital twin is conceptualized not as a technological tool or technical means of human resource management, but as an independent theoretical model for describing, analyzing and predicting labor behavior in the conditions of interaction between an individual and artificial intelligence systems.

An additional contribution is the systematic linking of already evolving doctrinal constructs – hybrid labor subject and extended labor function – into a higher order of analysis, in which the digital twin plays the role of an intermediate analytical layer between human performance and algorithmically assisted labor processes. In this way, the classical understanding of individual labor performance is built on, without affecting its subjective structure, but by expanding its functional content.

The practical significance of the development is expressed in the possibility that the proposed conceptual framework can serve as a basis for future regulatory development in several key areas. **First of all**, it creates prerequisites for a clearer definition of the boundaries of employer control when using systems with artificial intelligence. **Secondly,** it offers analytical tools for assessing the efficiency and quality of work in the context of hybrid implementation. **Thirdly**, it outlines the need to regulate the data and digital profiles generated in the process of forming the digital twin, with a view to protecting the personal rights of the worker and the legal certainty of third parties.

In this sense, the research has not only theoretical value, but also the potential to support the future development of labor law as an adaptive legal branch capable of responding to the challenges of digital transformation without abandoning its fundamental protective functions.

I. From subject of the legal relationship to subject of performance: functional reconstruction of work activity in a hybrid environment

1.1. Subject structure and functional reconstruction of the performance of the labor function

The current legal framework of labor relations is based on a clearly established and legally stable legal structure, according to which a party to the employment relationship, the holder of labor rights and obligations, as well as the performer of the labor function, is the natural person – worker or employee. In this sense, the labor force constitutes the main subject of the employment relationship, and it determines its individualized and personally bound nature. Insofar as it is typical and inseparable from its physical carrier, it is a typical and

basic characteristic of the subject – worker or employee, and the rights and obligations concerning it and arising in the course of the employment relationship and in relation to this bearer are the center of any employment relationship. Its provision concerns both the individualization of the work and the specifics of its performance in the conditions of irreplaceability (taking into account the intuitu personae nature of the employment contract), as well as the specification of the employer's legal personality in the specific employment relationship, disciplinary subordination, personalized property or disciplinary liability.

The introduction of the concept of hybrid labor subject does not change this fundamental subject structure. The natural person remains the only legal entity bearing labor rights and obligations and addressee of legal protection. The essence of the proposed concept is expressed not in the transformation of the subjectivity, but in the upgrading of the functional content of the labor activity, in which the performance of the labor function is carried out through integration between human intellectual activity and artificial intelligence systems. In this context**, the hybrid work entity** should be understood as a functional state of performance of work, in which the worker or employee retains his classic legal role, but at the same time exercises an extended set of actions, including management, control, validation and coordination of the results generated or assisted by artificial intelligence systems. Thus, a two-tier structure is formed: subject of the employment relationship (unchanged) and subject of performance of the employment function (functionally extended). This two-tier system necessitates a clearer regulatory and organizational distinction between labor performance regimes. In practical terms, the question arises under what conditions the worker acts in his classical mode of performing the labor function and in which cases he enters a hybrid mode, in which part of the labor result is formed through interaction with artificial intelligence systems.

This distinction is essential for guaranteeing labor rights as well as for the legal certainty of all participants in the labor process. It implies the need to develop internal organizational and regulatory instruments to regulate:

- the mode of use of artificial intelligence systems in the performance of labor duties;
- the extent and limits of human control over automated or semi-autonomous processes;
- the criteria for responsibility in the formation of the work result in a hybrid environment;
- and mechanisms to protect the worker when assigning tasks involving algorithmic support.

In this sense, the need to develop specific documents and internal organizational rules to regulate the functioning of the hybrid work regime is outlined. They should be of a guarantee nature and provide predictability as to when and under what conditions a worker performs a classic work function and when he or she acts in a hybrid interaction with artificial intelligence systems. In this way, the concept of the hybrid labor entity does not destroy the classical structure of labor law. Still, it builds on it by introducing a functionally differentiated model of work performance, consistent with the realities of digital transformation.

1.2. Documentary dimension of the hybrid work model and the need to upgrade the employment record

When the employment relationship arises, the current legal framework provides for the creation of a certain set of documents that form the content of the employment file of the worker or employee. These documents perform a multi-layered function – on the one hand, they have an informational and indicative nature, providing the employer with data on the professional experience, qualification and work path of the person; On the other hand, they constitute an element of the guarantee mechanism for the protection of the rights of the employee within the employment relationship.

In this sense, the employment record performs not only an administrative, but also a legal protection function, insofar as it documents both the origination, development and amendment of the employment relationship, as well as circumstances that are important for the exercise of labor rights, social guarantees and disciplinary liability.

In modern conditions, in the absence of an explicit legal framework on hybrid forms of labor performance, labor law has only a classical model of employment record, which is conceptually built on the premise of fully human and individual performance of the labor function. This model does not take into account the specific characteristics of hybrid work, in which part of the labor result is formed through interaction with artificial intelligence systems. In this context, the adoption of the concept of a hybrid labor entity raises the need to rethink and upgrade the documentary framework of labor law. This includes both the adaptation of existing documents and the creation of new information elements that reflect the specifics of the hybrid performance of the labor function and provide legal certainty to all participants in the employment relationship.

In cases of the emergence of new employment relationships, in which it is clear at the time of their establishment that the position held implies the use of artificial intelligence systems and the application of a hybrid mode of employment, this requirement should be taken into account already at the stage of negotiation. In such situations, the documentary reflection of the hybrid nature can be integrated ex ante by means of the relevant clauses in the employment contract and the accompanying documents.

In the case of already existing employment relationships, in which the hybrid element arises subsequently or is introduced as a new organizational model, legal and documentary formalization should be implemented through an additional agreement to the employment contract. In this way, legal continuity is ensured, while ensuring the adaptation of the existing employment relationship to the new technological and functional conditions of work performance.

1.3 Hybrid work regime as a legal and organisational form and the responsibility of the employer

The adoption of the hypothesis of a hybrid labor entity inevitably leads to the introduction of a new functional category in labor law – the hybrid labor regime as a legal and organizational form of performance of the labor function. It is a specific model of labor organization, in which classical individual performance is combined with the use of artificial intelligence systems integrated into the work process as a functional participant, supporting the formation of the final labor result. However, this transformation does not affect only the content of the labor function of the worker or employee but also imposes significant requirements on the employer as a holder of the employer's legal capacity and organizer of the labor process. In the conditions of hybrid work, its role expands and acquires qualitatively new content that goes beyond the traditional function of assigning, controlling and evaluating labor.

The employer is a key actor in creating the necessary regulatory, organizational and technological environment within which hybrid work can be carried out in a safe, predictable and legally protected way. This includes not only the introduction of internal rules for the use of artificial intelligence systems, but also the provision of appropriate technical solutions, control mechanisms and procedures for monitoring the interaction between the worker and algorithmic systems. Of particular importance in this context is the employer's obligation to ensure safe and healthy working conditions in a hybrid digital environment. The traditional understanding of occupational safety, focused mainly on the physical risks of the working environment, should be extended to cover the emerging risks associated with digital dependence, algorithmic loading, cognitive stress and possible negative effects on the mental health of the worker or employee.

In this sense, employer liability under a hybrid work regime acquires a complex character, including both technical and organizational measures and measures to protect the physical and mental health of the worker. This implies the development of new standards for risk assessment, adapted to the specifics of human-artificial intelligence interaction, as well as the introduction of mechanisms to prevent excessive dependence on automated systems in labor decision-making, by positioning it at the center of the guaranteed system for the protection of the worker in the conditions of digital transformation.

The arguments presented in the first part of the study outline a clear conceptual line, according to which the classical construction of labor law remains stable in terms of the subjective structure of the employment relationship but undergoes a significant transformation in terms of the way of actual performance of the labor

function. The analysis shows that the natural person – worker or employee – continues to be the sole holder of labor rights and obligations, and there is no need to introduce a new legal entity. At the same time, however, there is a structural change in the content of labor activity, expressed in functional integration between human intellectual activity and artificial intelligence systems. In this context, the concept of a hybrid labor regime is established as a legal and organizational form of labor performance, in which the worker retains his classical legal role, but performs an expanded set of functions, including management, control, and validation of results generated or supported by algorithmic systems. This transformation creates a need to rethink the documentary and organizational framework of labor law, including by adapting the employment file and using additional legal instruments that reflect the specifics of hybrid work performance at the time of the emergence or amendment of the employment relationship.

It is particularly significant that in the conditions of hybrid work the content of the employer's legal capacity is also expanded, and the employer is assigned an enhanced responsibility for the creation and maintenance of a regulatory, organizational and technological environment that guarantees safe and healthy working conditions, including the protection of the physical and mental health of the worker in a digital environment. In this sense, the first part of the study establishes the theoretical basis of the hybrid labor model as a functional upgrade of classical labor law, without a change in the subject structure, but with a profound transformation in the way of performance and organization of labor activity. (Andreeva, A., Yolova, G., 2024) (Andreeva, A., Yolova, G,, 2020)

II. The digital twin as a legal-informational projection in the hybrid work model

2.1 Justification of the digital twin model

The functional integration between the individual and the AI system can be extended by incorporating the digital **twin model of the labor entity**. The concept of the digital twin, initially developed in engineering sciences and industrial modeling systems, is gradually being applied to socio-economic systems, including the world of work, insofar as it allows the creation of a virtual information projection of the labor activity of the worker or employee, based on data from the actual performance of the labor function.

The concept is based on the developed and evolving theory and conceptual solutions for the perception and implementation of virtual (digital) twins, generally understood as a software model of a physical object, process or system based on real-time data to simulate behavior to predict problems and optimize processes or activities without risk in the real world. As part of the most common technological processes, its conception varies according to the nature and needs of the simulation or activity, and in this sense it adopts different definitions in its concept or nature. In this sense, when generally based on AI, ML, 5G, or edge computing technologies, it is perceived as:

- A near-real-time digital image of a physical object or process that helps optimize its business performance. (Deloitte)
- A digital representation of a real-world object or system, the implementation of which is the process of creating a software object or model that reflects a unique physical object, process, organization, person, or other abstraction. (Gartner)
- A virtual representation of a physical object or system throughout its lifecycle by using real-time data, enabling analysis, insights and knowledge accumulation." (IBM).

Pointing out that digital twins often "eliminate the need for physical prototypes, reduce development time, and improve quality by combining multi-physics simulation, data analysis, and machine learning to demonstrate the impact of design changes, use cases, environmental conditions, and other variables", they also highlight their main key features, namely: (Anon., 2026)

Real-time data integration – by updating with real-time data from sensors, IoT devices, and other sources, ensuring an accurate representation of the physical asset or system at all times.

Simulation and modeling – by simulating the behavior and performance of a physical asset or system under different conditions, allowing predictive analysis, optimization and scenario planning.

Two-way communication - between the virtual model and its physical counterpart, as data and insights from the digital twin can inform decisions and actions in the physical world and vice versa.

Monitoring and control - in real time of the physical asset or system from a virtual environment, which allows remote monitoring, diagnostics and predictive maintenance to optimize performance and reduce downtime.

In this sense and taking into account the needs of the labor law concept**, the digital twin of the worker can be defined as a dynamic legal and information structure that reflects the professional profile, behavior in the performance of work tasks, decision-making patterns and parameters of efficiency of the individual within the employment relationship**. This structure does not constitute an independent legal entity, nor a bearer of rights and obligations, but functions as an analytical and simulation extension of the worker in a digital environment. Its importance in the hybrid work model derives from the possibility of continuously collecting, processing, and interpreting data generated in the performance of the work function. In this way, the digital twin becomes a tool for modeling work behavior, which allows not only retrospective analysis, but also predictive assessment of future actions, decisions and results. This position is a key element in managing the hybrid work environment.

The relationship between the digital twin and the extended labor function is manifested in the fact that while the extended labor function encompasses the real interaction between the worker and artificial intelligence systems, the digital twin operationalizes this interaction at the data and model level. It creates an opportunity for continuous improvement of the work process through feedback between real execution and simulated scenarios, which leads to a higher degree of organizational efficiency and optimization of decisions.

At the same time, the introduction of such a concept raises significant legal and ethical questions. **First of all,** there is the question of the limits of the permissible collection and processing of data related to the worker's work behavior, as well as the risk of excessive algorithmic interpretation of his activity. **Secondly**, the problem of ownership and control of the digital profile arises, especially in cases of termination of the employment relationship, when it should be clearly regulated whether and under what conditions the digital twin can continue to exist or be deactivated.

Last but not least, the potential risk of affecting the personal dignity and autonomy of the worker should be taken into account, insofar as the digital twin can lead to objectification and constant evaluation of labor behavior. This requires its consideration not only as a technological tool, but also as a legally sensitive construction that requires clearly defined guarantees and control mechanisms.

In this sense, the digital twin should be considered as a key legal and informational projection in the hybrid labor model, which builds on the classical understanding of the performance of the labor function, without changing the subject structure of the employment relationship, but significantly expands its functional and informational content.

2.2 Upgrade of the extended labor function

The labor function of the worker or employee arises directly from the position held and its content, determined by the job description. It is a statutory and organizationally fixed set of obligations that should be performed in a way that guarantees the simultaneous achievement of the required quality of the work result, effective realization of the interest of the employer, and observance of the rights and legitimate interests of the worker or employee.

In the classical labor law paradigm, this fulfillment was carried out almost entirely through the personal intellectual and physical activity of the worker, and technological means were auxiliary. However, with the development of digitalization and the introduction of artificial intelligence systems, a new content of the labor function is being formed, which goes beyond its traditional limits. This is the so-called extended labor function, which combines the classic performance of labor duties with the active use of artificial intelligence systems as a functional component of the labor process. In this model, part of the analytical, technical, or even creative operations are assigned to algorithmic systems that generate solutions, proposals, or ready-made results.

The essential thing about this transformation is that regardless of the degree of participation of artificial intelligence, the final labor result is subject to mandatory human validation. It is the worker or employee who retains the role of the bearer of responsibility for the result by exercising control, evaluation, and confirmation of the proposals generated by the system. In this way, the principle of personal responsibility is preserved, albeit in a modified, functionally extended environment. By this logic, the digital twin of the worker is the next evolutionary step in the development of the expanded labor function. While the latter describes the real interaction between humans and artificial intelligence systems in the process of performing work tasks, the digital twin represents an information-model projection of this interaction. It is built on the basis of data generated in the performance of the labor function and allows simulation, prediction, and analysis of future actions, decisions, and behavioral patterns of the worker.

In this way, a two-way dynamic relationship is formed between the actually performed labor activity and its digital modeling, which allows for continuous improvement of both the labor process and the organizational environment. The digital twin does not replace the worker, nor does it independently participate in the performance of the labor function, but functions as an analytical and predictive tool that expands the information base of the hybrid work model.

2.3 Legal protection and ethics when using a digital twin

The introduction of the digital twin as a legal and informational projection of the worker in the hybrid work model inevitably raises essential questions from the point of view of the protection of fundamental rights, personal dignity, and privacy. Although the digital twin does not constitute an independent legal entity, it contains a highly concentrated volume of personal and professional data that allows detailed modeling of the employee's work behavior, performance, and cognitive patterns.

A trend towards protecting the rights and data of individuals regarding digital twins, albeit in the field of health and care, has already been launched with the **European Virtual Human Twins Initiative (VHT),** as a flagship initiative within the Apply AI strategy, which accelerates innovation and personalized medicine in healthcare as well. (Anon., n.d.)[1] It is based on a digital platform for the integration and validation of advanced virtual human twins, funded by the Digital Europe Programme, offering access to data, assets and resources to develop, improve, connect and combine VHF models while mimicking specific physical partners. Optimised for AI innovation across a wide range of use cases, the platform provides access to supercomputing power for advanced modeling through the use of synthetic and anonymized data, bringing together different types of users, through a common space to integrate their VHF (collaborative simulation) models. The need for adequate and guaranteed protection of models is also emphasized here, especially the lack of access to personal health data, and in this direction it is proposed to develop guaranteed legal frameworks for compliance with EU rules on data protection, intellectual property management, cybersecurity, artificial intelligence, sectoral legislation on data spaces, and supporting effective regulatory guidance.

In this sense, priority should also be given in the sphere of the provision of the employment relationship, the risk of excessive transparency of the employment activity, as well as the possibility of disproportionate monitoring and algorithmic evaluation, which may affect the personal dignity and professional autonomy of the worker. Therefore, the use of digital twins should be linked to clearly defined data protection safeguards and to regulatory or internal organizational restrictions on the use of digital twins and the scope of their application. In this context, there is a need to develop a specialized **code of ethics for the use of a digital twin in a hybrid working environment**, which would complement the classic standards of professional ethics and personal data protection. Such a code could be independent in nature or be integrated as a specialized section

[1] Here, a virtual human twin (VHT) is taken as a digital representation of human health or disease condition pertaining to different levels of human anatomy (e.g., cells, tissues, organs, or organ systems), constructed using software models and data, and designed to mimic and predict the behavior of their physical counterparts, including interaction with additional diseases.

in the general ethical rules of the organization, by establishing minimum standards regarding the collection, processing, storage, and use of data related to a worker's digital profile.

Of particular importance is the issue of ownership and control of the data that forms the digital twin. It should be explicitly regulated whether and to what extent the employer has the right to store and further process such data, as well as under what conditions the worker may request their deletion, restriction of processing or transfer. This issue becomes especially acute upon termination of the employment relationship, when there is a need for a clear determination of the fate of the digital twin – its archiving, anonymization or complete deletion. No less significant are the hypotheses of a dispute between the worker and the employer, in which the data contained in the digital twin may have evidentiary value regarding the quality of work performance, disciplinary liability or performance evaluation. In such cases, a balance should be ensured between the employer's interest in provable and manageable processes and the right of the worker to protection against unlawful interpretation or automated assessment.

In this sense, the digital twin cannot be considered solely as a technological tool but should be normatively and ethically framed by a set of rules that ensure its use in accordance with the principles of proportionality, transparency, data minimization and protection of human dignity in the work process, which does not change the subject structure of the employment relationship but significantly expands its functional and analytical content.

Theoretically, it is established that the digital twin is a dynamic model system that reflects the professional behavior, skills and decision-making patterns of the worker based on data from the actual performance of the labor function. It functions as a predictive and simulation tool that allows analysis of labor activity in the context of interaction between the individual and artificial intelligence systems.

The relationship between the digital twin and the extended labor function is expressed in the fact that the former represents its informational and analytical continuation. While the extended labor function encompasses the actual involvement of artificial intelligence in the performance of work tasks, the digital twin models this participation at the level of data, behavioral models, and predictive scenarios, thus creating the basis for a higher degree of organizational effectiveness and manageability of the work process.

At the same time, it is found that the introduction of the digital twin raises significant legal and ethical issues related to the protection of personal data, privacy and dignity of the worker. Particularly sensitive are the hypotheses related to the ownership of the data, their storage and deletion after the termination of the employment relationship, as well as their use in a labor dispute. In this regard, it is necessary to develop specialized ethical rules or an independent code of ethics regulating the use of a digital twin in the working environment, which will complement the current regulatory mechanisms for personal data protection and introduce additional guarantees for transparency, proportionality and control.

In conclusion, it can be assumed that the digital twin represents a key stage in the evolution of the hybrid work model, which transforms the way of analysis, management and evaluation of labor activity, without changing the classical subject structure of the employment relationship, but significantly expanding its informational and functional dimension.

III. Analysis of the effectiveness and the organizational and legal dimensions of the hybrid work model

For the completeness of the study and in view of its practical applicability, it is necessary to consider the concept of the hybrid labor entity and the digital twin through the prism of organizational and managerial effectiveness. This allows the theoretical model to be evaluated not only as a doctrinal construction, but also as a functional tool for optimizing the labor process in the modern digital environment.

3.1. Analysis of efficiency and functionality in the organizational structure

In the conditions of the classical labor model, labor efficiency is measured mainly by quantitative and temporal indicators related to the direct performance of labor duties by the worker or employee. Control over the process is mainly direct, hierarchically organized, and oriented towards monitoring individual actions

within the labor function. Performance measurement is shifting away from traditional indicators to qualitative and functional criteria related to the interaction between the worker and AI systems. Thus, the indicators for the accuracy of the set parameters to AI, the speed of validation of generated results, as well as the degree of efficiency in integrating technological solutions into the labor process become key.

Control and accountability are also undergoing a significant evolution. Instead of the classic direct managerial control over each action, the emphasis shifts to controlling the quality of interaction between humans and artificial intelligence, as well as the ability of the worker to manage, validate, and adjust the results generated by the systems. In this way, a new model of responsibility is formed, oriented towards the result and its validated credibility. (Andreeva, A., Yolova, G, 2020)

The organizational structure in a hybrid environment is also transforming, with a tendency to move from strictly hierarchical models to flatter, dynamic and result-oriented structures. Hybrid teams operate with a higher degree of technological autonomy, in which coordination is carried out through digital systems and algorithmic support, and not only through classical management mechanisms.

3.2. Spatial dimensions of work and transformation of the working environment

The concept of the hybrid labor subject and the extended labor function has a direct impact on the spatial organization of work. Digitalization and integration of artificial intelligence systems lead to a rethinking of the need for the physical presence of the worker at a specific workplace.

In this new environment, **three main trends** emerge:

- **Elimination of the need for permanent physical presence**, as a significant part of the work functions is carried out through digital platforms, artificial intelligence management systems and cloud infrastructure;
- **Redefining the workplace**, which is increasingly perceived not as a physical space, but as a digital environment for interaction and performance of work tasks;
- **Expansion of remote work (online mode),** in which the work activity is carried out regardless of the geographical location of the worker.
- This transformation poses new challenges to labor law related to the accounting of working hours, control over the performance of tasks, and the protection of the worker in conditions of continuous digital connectivity, including in hypotheses where artificial intelligence systems can generate results outside the traditional timeframes of the work process.

3.3. Summary assessment: practical value of the hybrid model

The presented analysis shows that the hybrid work model, upgraded through the concept of a digital twin, has significant potential for increasing organizational efficiency, optimizing management processes, and expanding the tools for labor evaluation. At the same time, it introduces a new legal and organizational reality that requires a rethinking of the classical approaches to control, responsibility, and protection of the worker. Its most significant feature is the combination of technological autonomy with the preservation of human control as a guaranteed mechanism, which allows the preservation of the basic principles of labor law in the context of digital transformation.

In this sense, the hybrid work model is not just a technological upgrade, but a functional reconstruction of the organization of work, which offers a new balance between efficiency, technological progress, and legal protection of the worker.

Table 1: Comparison table: traditional vs. hybrid employment entity

Analysis criterion	Traditional labor entity	Hybrid work entity (with digital twin)
Performance measurement (KPIs)	Time for execution and volume of work performed by the worker personally.	Speed of validation of AI-generated results, accuracy of the set parameters for AI operation.
Control and accountability	Direct managerial control over the process.	Control over the quality of integration and the effectiveness of AI management by the employee.
Organizational structure	Hierarchical structure with a clear and firm distribution of tasks.	A flat and dynamic results-based structure where hybrid teams have higher technological autonomy.

Source: Authors' own work

The analysis of the organizational-managerial and spatial dimensions of the hybrid work model allows us to formulate several main conclusions about its functional and legal significance.

First of all, the introduction of the hybrid work subject leads to a significant transformation in the criteria for assessing labor efficiency. Classical quantitative indicators based on the time and volume of work performed are gradually giving way to qualitative and functional indicators related to the interaction between the worker and artificial intelligence systems. Effectiveness of AI management and the ability to integrate technologically generated results into the work process.

Secondly, a new model of control and accountability is emerging, in which the emphasis shifts from direct observation of individual labor actions to control over the result and quality of interaction between the person and the technological system. This determines the emergence of functionally oriented responsibility, in which the worker is committed not only to his own performance, but also to the proper management and validation of artificial intelligence solutions.

Thirdly, the organizational structure of work is undergoing a gradual transformation from classical hierarchical models to more flexible, flat and results-oriented systems. In them, labor coordination is carried out to a significant extent through digital tools, which increases the technological autonomy of individual hybrid labor units and changes traditional management relations.

Fourthly, the spatial dimension of work is being reformatted under the influence of digitalization. Physical presence at the workplace is gradually losing its universal necessity, remaining only in limited cases related to security, infrastructural constraints or the specific nature of the activity or function.

In conclusion to this part of the study, it can be assumed that the hybrid labor model, considered through the prism of organizational efficiency and spatial transformation of labor, represents an essential stage in the evolution of labor law structures. It does not abolish the classical principles of labor law, but resets them to a new technological reality, in which the human factor and artificial intelligence function in a joint, mutually conditioned system of performing the labor function.

Conclusion

This study **aims** to substantiate and develop the concept of the digital twin of the worker or employee in the context of the hybrid labor subject and the extended labor function, as a tool for a deeper understanding of

the transformation of the labor process in the context of digitalization and integration of artificial intelligence systems. The goal is achieved through a systematic study of functional changes in the performance of the labor function, which do not affect the subject structure of the employment relationship, but change its content and the method of realization. As a result of the analysis, the main scientific thesis is confirmed that modern work is less and less an isolated human activity and is increasingly realized as a functionally integrated interaction between the individual and artificial intelligence systems, which determines the need for new analytical categories such as the hybrid labor subject and the digital twin.

The scientific contribution of the study is expressed in the upgrading of the existing labor law doctrine by introducing and systematizing the concept of the digital twin of the worker as a legal and informational projection within the framework of the hybrid labor model. It allows for a more precise assessment of labor efficiency, a new approach to labor process management, and a more detailed understanding of the role of the worker as an active coordinator and validator of results generated by technological systems.

The practical significance of the development is expressed in the possibility for the proposed concepts to be used as a basis for:

- optimization of organizational models of work in a digital environment;
- improving performance assessment systems;
- developing new internal rules on the interaction between worker and artificial intelligence;
- introduction of more precise mechanisms for the protection of the worker in an algorithmically assisted labor process.

In view of the outlined conceptual conclusions and the identified need to adapt the legal framework to the new forms of work, the following proposals are formulated de lege ferenda**:**

- **Normative definition of the digital twin of the worker or employee** as a legally relevant information and analytical projection used within the performance of the labor function.
- **Introduction of regulation of the hybrid work regime** as a specific form of labor organization, including interaction between an individual and artificial intelligence systems in the performance of labor duties.
- **Establishment of minimum standards for data protection and the algorithmic profile of the worker**, including a clear legal framework regarding their storage, use and destruction upon termination of the employment relationship.
- **Development of an ethical and professional code for the use of digital twin systems** to ensure the protection of the personal dignity, privacy and autonomy of the worker in conditions of algorithmically assisted work.
- **Introduction of rules for accountability and control in hybrid work performance**, oriented not only to the result, but also to the process of interaction between the worker and artificial intelligence systems.

Obviously, the labor law legislation is at risk both in terms of preserving basic human and social rights, and constantly building on their guarantee. In this sense, the proposed model aims at both the urgent adaptability of the labor law framework and the urgent need to uphold the fragile balance between progressive labor legislation and the inherent protection function of labor law.

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