

INTELLECTUALIZATION OF HUMAN RESOURCES POTENTIAL OF TRANSPORT  
INDUSTRY ENTERPRISES IN THE CONDITIONS OF DIGITALIZATION

ІНТЕЛЕКТУАЛІЗАЦІЯ ПОТЕНЦІАЛУ ЛЮДСЬКИХ РЕСУРСІВ ПІДПРИЄМСТВ  
ТРАНСПОРТНОЇ ГАЛУЗІ В УМОВАХ ЦИФРОВІЗАЦІЇ



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**Abstract.** The article examines the development of intellectual potential in the context of digital transformation of business entities and highlights the evolution of approaches to human resource management, demonstrating the transition from a mechanistic perception of employees to the integration of human capital concepts and strategic HR management. The study finds that the intellectualization of labor acts as a catalyst for the development processes of socio-economic systems at various levels. This process is based on the activation of intellectual labor of human resources and its optimal utilization, ensuring the penetration of the results of such intellectualization into various spheres of life and economic activities of enterprises in the transport sector. It is determined that the strategic resource for the formation of intellectual capital is human resources, which are shaped in the conditions of digital transformation of business entities and serve as a source of innovation in a transport enterprise.

Digitalization continuously affects all sectors of the economy, including the transport sector, which, in accordance with global demands, is forced to restructure its activities (due to military actions, pandemics). The article states that the development of digital systems is necessary for transport in order to make the sector more

convenient for people and for business development. Human resources generate a competitive advantage for a business entity, which is considered a specific factor distinguishing one enterprise from another.

The conclusions of the study emphasize that successful management of human resource potential in today's dynamic and complex business environment requires a comprehensive approach that takes into account both traditional aspects and modern challenges. A deep understanding and effective management of human resources are crucial for ensuring competitiveness, innovative development, and sustainable success of transport enterprises.

**Keywords:** intellectualization, potential, human resources, evolution, development, management, enterprises, transport, sector, digitalization, conceptual approaches

### **Introduction. Problem Statement and Relevance of the Chosen Topic**

Transport is an important part of the global economy and a social institution of modern society, meeting the population's needs for transportation. It has become an integral part of people's lives, influencing their reality and permeating virtually all types of human activity.

In today's conditions, the role of intellectual human resources has grown significantly. They determine not only the quality of produced goods and services but also the structure of the national economy, the efficiency of enterprise operations, and their innovative potential.

The transition to a digital economy is significantly changing approaches to managing transport industry enterprises, particularly in the field of human resource management. Constant changes in the market and across industries require a flexible organizational environment capable of continuously adapting to modernization. In a competitive reality, Human Resources Management (HRM) plays an important role, as new forms of business demand new ways of working with human resources.

The quality of personnel management in the transport sector is a key factor in enterprise success. HR specialists must analyze and adapt to modern social, economic, political-legal, technological, and environmental conditions. To meet current challenges, most HR professionals must abandon outdated habits and ways of thinking, helping enterprises identify modern strategies and develop programs for human capital development.

The pressing issue is not simply the management of transport but the management of transport systems using intelligent technologies. The foundation for creating competitive advantages lies not merely in labor based on IT technologies, but above all in innovative labor by personnel, intellectual development, and mobility. This primarily involves new means of creating, distributing, exchanging, and consuming goods and services, opening modern opportunities to improve the efficiency and competitiveness of enterprises.

At the center of these changes are human resources — the main resource of any enterprise. The success of transport enterprises in the digital economy depends on their skills, competencies, intellect, and readiness to adapt to digital transformations. Human resource development is becoming a key factor determining the ability of enterprises to implement new innovative technologies, optimize creative business processes, and remain competitive in the digital world.

### **Analysis of Recent Research and Publications**

The problem of intellectualizing enterprise activities cannot be solved without a priority focus on increasing the share of intellectual work in personnel activities, which, in turn, requires a systematic approach.

Given the complex security, economic, and political situation in Ukraine, intelligent management systems can become a powerful tool for stabilizing and ensuring the sustainable development of enterprises, especially under conditions of limited access to resources and constant changes in external factors. At the same time, the great diversity of intelligent systems and their technological foundations necessitates their classification to facilitate the selection of the most optimal solutions for enterprises. The further rational use of implemented intelligent management systems enables enterprises to enhance adaptability, flexibility, and resilience to external influences, which underscores the relevance of this research topic.

Theoretical aspects of the intellectualization of the economy and enterprises have been studied by many foreign scholars, including D. Bell, E. Brooking, P. Drucker, B. Sántho, and others. In Ukraine, this issue has

been examined by O. B. Butnik-Siverskyi, O. Bohutska, N. Briukhovetska, V. Heyets, M. Yu. Hryhorak, N. Huk, N. Kelchevska, E. M. Libanova, A. Merzlyak, M. Polyakov, Y. Sytnyk, Ye. Fomina, and others.

Studies of the current state and prospects of digital transformation in Ukraine have been conducted by scholars such as A. Kolot, O. Herasymenko, O. S. Irtyshev, A. V. Harahulia, and R. V. Stavtsov. The expediency of applying digital technologies in Ukrainian HR management practices, especially under martial law, has been substantiated by Kh. Makhmudov and V. Chukhlib. I. Koloberdyanko and N. Metelska have examined modern approaches to personnel management to mitigate the negative effects of socio-economic changes. Certain issues related to the impact of digital technologies on modern HR practices and the influence of digitalization on HR have been addressed by I. Dluhopolskaya, Yu. Huk, V. E. Melnychuk, and K. O. Boyarinova, as well as in analytical reports by Deloitte, the European Commission, and the World Economic Forum.

**The purpose of this article is** to examine the role of intellectualizing human resource potential in ensuring the successful operation of transport industry enterprises in the context of a digitalized economy, to identify the main challenges and opportunities faced by enterprises, and to develop effective ways for organizations to adapt to the changing challenges of the environment.

#### **Presentation of the main research material and obtained results**

In the context of modern society's development, transport performs important functions in all areas of social life. It increases the efficiency of public production, creates conditions for the rational placement of productive forces across the country's territory—taking into account the specifics of enterprise locations, sources of raw materials, and consumers—promotes the development of international relations, trade, tourism, agriculture, and addresses social issues related to professional, educational, cultural, leisure, and other activities. Thus, transport is an important social system of society and occupies a significant place in the socio-territorial and spatial organization of people.

Transport is a set of means and systems used for moving people, cargo, and other material resources in geographical space. It is a necessary and objectively existing social institution that has become an integral part of people's lives under modern conditions. It is deeply embedded in people's everyday reality, in its systems and structures. As a social institution, transport determines the spatial mobility of individuals and social groups, contributes to the development of social ties, relationships, and interactions, exchange of cultural experiences and achievements, and integration processes in society [19].

Analyzing the essence of the concept of transport, O. Dubinsky defines it in both narrow and broad senses. In the narrow sense, transport is defined, in accordance with current legislation, as a means intended for the movement of people, cargo, resources, information, electronic signals, etc. In the broad sense, it is an integral and strategically important intersectoral area of the national economy, aimed at meeting state, social, personal, public, industrial-production, or other needs for transportation and movement [3]. Under modern conditions, transport is one of the most important branches of the economy and a social institution that performs important functions and meets the needs of people, society, and all forms of social production in transportation.

The modern transport industry faces a number of large-scale challenges, most of which cannot be solved in the short term. In particular, there is an urgent need to strengthen state regulation of transportation processes, as companies often fail to adapt quickly to dynamic changes in the competitive environment.

The issue is not merely transport management, but managing transport systems using intelligent technologies, in which communication, control, and monitoring tools are initially embedded in vehicles and transport infrastructure facilities, and decision-making capabilities are available to all transport users. The intellectualization of management processes requires additional research in such areas as: developing optimized knowledge base structures; improving systems for collecting current information and remotely transmitting signals and data [9].

An Intelligent Transport System (ITS) is the systematic integration of modern information and communication technologies and automation tools with transport infrastructure, vehicles, and users, aimed at increasing transport process safety and efficiency, as well as driver and passenger comfort. Examples of

intelligent systems for vehicles include: collision avoidance systems, collision notification systems, and driver assistance systems.

The development of an ITS can be grouped into priority areas:

- Optimal use of road and traffic information, ensuring the receipt of up-to-date and verified information at all levels of transport management, regardless of the operator's ownership form or type of transport, and ensuring its availability to all users.
- Facilitating barrier-free cargo movement and optimal freight management in international transport corridors and urban agglomerations through automatic vehicle identification, the provision of various services (e.g., customs) online, and spatial positioning based on satellite navigation systems.
- Increasing road safety by developing automatic systems that warn of and prevent dangerous situations between vehicles and between vehicles and pedestrians.
- Ensuring data security in ITS, including personal and financial user data.
- Integrating the vehicle into the transport infrastructure through the use of open "applications" in onboard computer systems and ITS software, enabling compatibility of information systems and the automatic transfer of data necessary for optimal control of both individual vehicles and traffic flows [9].

In developed countries, intelligent transport systems and their components have already proven their effectiveness and relevance. The global practice of ITS implementation is perceived as a general transport ideology for integrating telematics achievements into all types of transport activities to solve economic and social problems: reducing accidents, increasing freight transport efficiency, ensuring transport safety, improving environmental performance, etc.

The transport sector is undergoing a large-scale digital transformation caused by rapid technological progress and changing consumer behavior. This determines the future development of transport and creates new opportunities for industry modernization [32].

The modernization shifts in the global economy, moving it toward an innovative development path while making it more socially oriented, are important strategic priorities of socio-economic development. The success of solving these tasks directly depends on forming a new-quality human potential that meets modern requirements. Thus, in recent decades, issues of quality of life, human development, and the development of human potential have become important vectors of scientific research.

An inherent phenomenon and process of modern economic and social development is intellectualization, defined in dictionaries as increasing or strengthening the spiritual, mental, and intellectual foundations of something [22], or as the growth in the share of mental functions (management, control, adjustment) in the structure of a worker's labor efforts based on scientific and technological progress [27]. Linking intellectualization to various changes in an enterprise's activities, it should be noted that its main generator and implementer is a person with their inherent level of intellectual development. Therefore, the problem of enterprise intellectualization cannot be solved without prioritizing the growth of the intellectual component in staff activities, which in turn requires a systematic approach.

The accelerated intellectualization of economic activity has become a hallmark of global social progress at the turn of the century. Of course, knowledge has always been used in economic activity, but the 20th century demonstrated how quickly new ideas are developed, information is processed, and new knowledge is applied in production, work, and daily human life. Despite a number of crisis phenomena in the global economy, the importance of education, science, applied research, innovations, and high-tech industries for sustainable development and improved quality of life has not diminished.

There is no doubt about the importance of developing the intellectual component of social development. Knowledge and accumulated ideas have always been regarded by progressive economies as the basis for development and a necessary condition for leadership. The development of this intellectual component is impossible without proper attention to human potential [23].

Intellectual potential is the set of a person's abilities and capabilities for creative activity, accumulation and use of knowledge, ideas, and results of intellectual work for the purpose of social development. It includes the ability to learn, solve problems, think critically, and creatively address challenges. Components of human resources' intellectual potential include:

- Cognitive abilities (memory, attention, thinking, imagination, perception);
- Knowledge and skills (scope and depth of knowledge, ability to apply it);
- Creativity (ability to generate new ideas, find non-standard solutions);
- Learning (ability to learn throughout life);
- Critical thinking (ability to analyze information, evaluate arguments, and draw reasoned conclusions);
- Emotional intelligence (ability to understand and manage one's own emotions and those of others).

The development of intellectual potential is a key factor for personal growth and successful self-realization. Today, the problem of forming, assessing, and rationally using the intellectual potential of Ukrainian transport enterprises is one of the most important for Ukraine [25].

In official printed publications, there are different interpretations of the term “intellectual potential,” which has been the subject of scientific research by many domestic and foreign scholars.

The concept of “intellectual potential” as an economic category has been addressed in a number of scientific works and studies, the analysis of which is presented in Table 1.

In our view, these definitions do not fully and clearly reflect the essence, structure, and modern characteristics of an enterprise's intellectual potential. They mainly emphasize that human resources should accumulate and apply knowledge for the successful operation of the enterprise.

Thus, it can be argued that, in a broad sense, the intellectual potential of an enterprise (individual, or society) is the totality of a wide range of intellectual abilities and intellectual resources utilized by a given system to achieve the goals of self-preservation and development. In a narrower sense, the intellectual potential of an enterprise is often compared to the intellectual potential of society (factors related to its reproduction) or to intellectual capital, namely its structural or managerial component, which includes organizational, economic, and managerial experience, knowledge, skills, abilities, qualifications, intellectual capital, corporate culture, ethics, creative thinking, and so forth.

At the scale of the national economy, intellectual potential possesses significant reserves of economic activity and serves as a key vector for the development of innovations in a modern information society. It is the only factor whose development has virtually unlimited resources—both in qualitative and quantitative terms, as well as in time parameters [5].

According to the scholar Melnyk L.H., intellectual potential facilitates the creation of new material and spiritual assets thanks to the accumulated knowledge, experience, and high qualifications of enterprise employees [17].

Dyba V. defines the concept of “intellectual potential” as the ability to accumulate, generate, and apply new knowledge, ideas, projects, behavioral models, and scientific and technical information, which will become the intellectual property of Ukraine and will actively contribute to its development and integration [31].

“Intellectual potential of an enterprise” is an economic category composed of science, education, innovation, technologies, ideas, and all types of intellectual activities, and is capable of creating, applying, implementing, and developing innovative products and technologies by transforming knowledge, skills, projects, and accumulated experience [5].

Some researchers [2] closely associate the term “intellectual potential” with the term “intellectual capital.” Accordingly, intellectual potential serves as the basis for calculating the volume and efficiency of the use of intellectual capital, which is successfully implemented in production and economic activities to generate income.

It is considered that the transformation from intellectual potential to the intellectual capital of an enterprise implies a transition from expenditures on the formation of human capital to profits from its utilization by transferring the value of accumulated knowledge, capabilities, and practical skills into the final result achieved by enterprise employees (Fig. 1).

*Table 1* – Generalized presentation of authors’ scientific views on the interpretation of the term “intellectual potential”

*Таблиця 1* – Узагальнене подання наукових поглядів авторів щодо трактування терміну «інтелектуальний потенціал»

| Author(s)                     | Definition   |
|-------------------------------|--|
| Vovkanych S.I.                | The intellectual potential of an enterprise is the ability to accumulate and apply new knowledge, information, skills, ideas, and projects that may become the intellectual  |
| Lavrentiev V.A., Sharina A.V. | Intellectual potential is a combination of employees’ individual characteristics, their theoretical knowledge, and practical experience, which they use to create innovations at various industrial and commercial enterprises.                                |
| Moisenko I.P.                 | Intellectual potential refers to capabilities that may be revealed—or often remain unrevealed—but that truly exist for performing specific actions.  |
| Reka H.V.                     | The intellectual potential of an enterprise is the set of human abilities and capabilities in general, independent of their application in any particular production process.  |
| Kendiukhov O.V.               | Intellectual potential represents present and future capabilities that are used to achieve specific objectives.  |
| Pererva P.H., Hliznutsa M.Yu. | The intellectual potential of an enterprise is a system of knowledge that shapes an innovative economy and a new highly developed society, ensuring socio-economic development.  |
| Petrenko V.P.                 | The forecasted integral ability of an individual or a group of individuals (enterprise personnel, population of a territorial community, region, country, nation, or humanity) to create new spiritual and material values.                                    |
| Sytnyk I.S.                   | Intellectual potential is the latent knowledge and skills of an economic system for carrying out intellectual, organizational, technical, scientific, and social activities, which can be realized as intellectual capital on a market basis.                  |
| Dyba L.M.                     | A subsystem of the overall creative potential of employees—an organic unity of individual intellectual abilities for reproducing accumulated knowledge and applying it, as well as the realized and unrealized creative capabilities of individual intellects. |

It should be noted that the definition of “intellectual capital” is based on the concept of “human capital.” It is closely related to such categories as: “intellectual labor,” “intellectual resources,” “intellectual assets,” and “intellectual property.” Human capital is the foundation for the formation of intellectual capital [1].

Human capital can be studied as a specific competence, knowledge, professional abilities, and skills of managerial staff, through whose activities both assets and income are formed. Recently, enterprises have paid significant attention to it. A distinctive feature of human capital is that over time its value does not decrease, as happens with physical capital, but on the contrary — it increases. This is due to the continuous accumulation by employees of production experience, knowledge, abilities, and acquisition of new labor skills, etc. [1].

A meaningful definition of a company’s intellectual potential, in our view, is offered by Y. S. Sytnyk: “Intellectual potential of an enterprise is the latent relative abilities, strengths, and knowledge of individuals and the socio-economic system for carrying out organizational-managerial, economic, technological, informational-exchange, scientific-innovative, socio-cultural, and other intellectual-productive activities,

which can be realized in the form of the company's intellectual capital on market and individual-motivational bases" [23].



**Figure 1** – Transformation of intellectual potential into the intellectual capital of the enterprise  
**Рисунок 1** – Трансформація інтелектуального потенціалу в інтелектуальний капітал підприємства

In modern conditions of structural economic transformation and the creation of new socio-economic institutions, the significance of human potential has undergone significant changes. The development of human potential is now the main indicator of the formation of the intellectual potential of society. At the same time, the transformational changes taking place in the economy and social life, along with their positive consequences, have led to a number of problems, most notably in the social sphere.

In the field of human potential development, the most important thing for a person is the opportunity to live a long and healthy life, acquire knowledge (education), and have the material resources to ensure a decent standard of living. At the same time, the standard of living, education, and health are not only the main parameters characterizing the level of human potential development but also the most important factors contributing to the formation of the intellectual potential of society [8].

Within the shift of paradigms in economic sciences, the idea is gaining ground that the main resource of any society is its human potential, and the main criterion of socio-economic progress is the effective use of intellectual capabilities for the development of society. The development of human potential under modern conditions becomes a priority strategic task for societal development. The level of human development determines the level of a country's development. Therefore, the issue of forming, preserving, and developing human potential is one of the most important priorities of the state's socio-economic policy and involves the development of programs to manage the process of forming a person as a professional and civic individual, as well as developing and realizing their potential.

At the same time, under conditions of decentralization of the economic, political, and social life of society, the consideration of aspects of improving the process of managing human development and determining its impact on the intellectual potential of society is becoming increasingly relevant.

Human resources are special and the most important among all types of enterprise resources; they are

the most complex object of management within an organization and, unlike material factors of production, are living, capable of making decisions, acting, and critically evaluating the requirements addressed to them, and they have subjective interests, etc. [15].

A generalized presentation of the authors' scientific views on the interpretation of the term "human resources" is given in Table 2.

**Table 2** – Generalized presentation of authors' scientific views on the interpretation of the term "human resources"

**Таблиця 2** – Узагальнене подання наукових поглядів авторів щодо трактування терміну «людські ресурси»

| Authors  | Definition of the Concept  |
|--|--|
| Brych V.,<br>Borysiak O.,<br>Bilous L.,<br>Halysh N. | Human resources are the totality of actual and potential knowledge, skills, and abilities of employees, their physical capacity for work, and their emotional and psychological state. Through the direct interaction of such resources with other resources, new (corporate) knowledge is formed, which serves as a source for creating a unique corporate product    |
| Levytska O. O.                                       | Human resources are the totality of quantitative and qualitative parameters (including human potential, health status, education level, abilities and culture, professional knowledge, motivation, and other personal qualities) of an organization's staff, workforce, or labor resources of an industry, territory, region, or country as a whole.                   |
| Pochynok N. V.                                       | Human resources are a special asset of an enterprise, which is a component of the production resources of the enterprise; their formation and development require investments to obtain economic benefits.   |
| Balabanova L. V.                                     | Human resources are the combination of social, psychological, and cultural qualities of employees as the most important components of their personalities.   |
| Soroka O.,<br>Salo Ya.                               | Human resources are one type of flows within enterprises characterized by high mobility, long-term usage, and the possibility of development during usage. The improvement of employees' skills and abilities through training during their work activity is an important feature of human resources that distinguishes them from other types of enterprise resources. |

Having examined and analyzed scholars' views, human resources can be defined as a strategic resource encompassing the totality of necessary knowledge, professional skills, experience, and abilities used to achieve the economic and strategic goals of an enterprise. Human resources are considered not merely as a workforce but as a resource that requires investment for effective functioning.

This resource is dynamic and self-renewing, as it undergoes development and improvement. Effective human resource management ensures increased productivity, competitiveness, and innovative development of the enterprise [20].

In the context of ensuring enterprise competitiveness, the key characteristics of human resources are:

- Value of human resources (highly skilled employees demonstrate more effective performance outcomes);
- Individuality of human resources (each employee is an individual with unique abilities, professional skills, and talent for specific activities);
- Imitability impossibility (to replicate a competitor's employee, one must train and develop their own, which requires additional costs);
- Talent and motivation of human **resources** (talented and motivated employees hold leadership positions, creativity, and innovativeness, enabling more effective performance and enterprise competitiveness) [15].

**Table 3** – Characteristics of the qualities of human resources in enterprises of the transport industry  
**Таблиця 3** – Характеристика якостей людських ресурсів підприємств транспортної галузі

| Category               | Key Qualities                    | Characteristics for Transport Enterprises  |
|------------------------|----------------------------------|--|
| Personal Qualities     | Responsibility                   | Performing duties in accordance with technological regulations                           |
|                        | Self-organization                | Ability to plan working time   |
|                        | Stress resistance                | Maintaining work efficiency under high workload and crisis conditions                    |
|                        | Communication skills             | Ability to interact with colleagues, passengers, and service consumers                   |
|                        | Loyalty                          | Commitment to the company, focus on achieving corporate goals                            |
| Business Qualities     | Teamwork                         | Cooperation among employees (mechanics, drivers, electricians, etc.)                     |
|                        | Initiative                       | Proposing new ideas to optimize production processes                                     |
|                        | Organization                     | Ability to effectively allocate tasks  |
|                        | Decision-making skills           | Independent selection of optimal solutions in non-standard situations                    |
|                        | Quality orientation              | Adherence to quality standards, attention to detail                                      |
| Professional Qualities | Professional knowledge           | Understanding the technological production process                                       |
|                        | Technical skills                 | Working with transport means and production equipment                                    |
|                        | Work experience                  | Practical skills accumulated during the execution of production tasks                    |
|                        | Specialized competencies         | Material calculation, raw material cost control, knowledge of service delivery specifics |
|                        | Compliance with safety standards | Following occupational safety requirements, environmental standards, and driving rules   |

Considering human resources from this perspective allows a transport enterprise to take a systematic approach to personnel development, to identify key areas for training and professional development, and to adapt management approaches to the actual needs of the enterprise. As a result, this contributes not only to increased labor productivity but also to ensuring the long-term competitiveness of the enterprise in the market.

Such an approach enables the creation of detailed evaluation profiles for employees of various categories, such as line operators, drivers, machinists, technologists, engineers, shift supervisors, quality control specialists, administrative staff, and others. This promotes not only effective management of human resource development but also optimization of recruitment processes, helping to accurately determine the required qualifications and skills for each employee role.

Moreover, this approach allows the creation of personalized training and professional development programs, supporting employees' career growth, potential development, and job satisfaction. It also enables adaptation of human resource development strategies to the specific needs of the enterprise, enhancing overall efficiency and labor productivity.

Intellectualization of human resource potential is the process of developing, improving, and effectively utilizing employees' intellectual abilities to achieve the strategic goals of the organization or society at large. This concept includes the following key aspects:

- Increasing the role of knowledge, skills, creativity, innovative thinking, and the capacity for self-learning in labor activities.
- The totality of knowledge, skills, experience, competencies, motivation, and capacity for development possessed by an individual employee or team.
- The goal of intellectualization is to enhance enterprise competitiveness through strengthening innovation potential; building an adaptive, flexible workforce; and transitioning to a knowledge economy.
- Intellectualization tools include education and lifelong learning; professional training and qualification improvement; implementation of innovative technologies in work processes; creation of environments for creative self-realization; and development of a corporate culture that values knowledge.

- The significance of intellectualization for society and the economy includes reorienting from physical labor to intellectual work; emergence of new professions in IT, science, and analytics; creation of innovative products and services; and growth in labor productivity and quality.

The implementation of digital innovations in human resource management ensures the intellectual development level of enterprise personnel and allows optimization of processes, increasing employee productivity, attracting and retaining talent, as well as adapting to market uncertainty and volatility [18].

Research on the features of human resource development in the digital environment is within the scientific interests of many scholars. In particular, Hrishnova O. and Kopylov D. [4] argue that labor digitalization creates, on the one hand, opportunities for employment organization, and on the other, new forms and methods of employee engagement and human resource management processes. Semykina M., Sikora V., Sikora I. [21] emphasize the importance of applying digital technologies in the employment sphere in the context of post-war recovery and Ukraine's European orientation. Boyarinova K. and Melnychuk V. [17] underline the importance of legislative regulation of digital transformational changes in human capital to strengthen the country's competitiveness. Moroz O. highlights the need to establish investment in labor potential development due to significant changes in approaches to human resource management under digitalization conditions [18].

Specific issues of digital technology influence on modern personnel management practices and digitalization impact on HR are discussed by Dlugopolska I., Huk Yu. [7], as well as in analytical reports by Deloitte, European Commission [6], and World Economic Forum [10].

Thus, digitalization of human resources is the process of implementing digital technologies in all aspects of personnel management to improve efficiency, automate routine processes, and enhance employee experience. The main areas of HR digitalization include:

- Process automation (electronic personnel recordkeeping; automatic time tracking; digital workflows for onboarding and offboarding).
- Digital recruiting (use of platforms such as LinkedIn, Djinni, Work.ua, etc.; automated candidate screening via ATS – Applicant Tracking Systems; use of artificial intelligence for resume pre-screening).
- HR analytics (People Analytics) — collecting and analyzing data on performance, satisfaction, staff turnover; forecasting risks of dismissals or burnout; data-driven management decision-making.
- Digital learning and development (LMS - Learning Management System) — online courses, video tutorials, interactive learning; personalized development paths; automatic tracking of employee progress.
- Communication and corporate culture (internal social networks, messengers, platforms such as Slack, Teams, Workplace; gamification, surveys, virtual events; feedback platforms).
- Self-service portals (employee access to personal information, certificates, applications; submission of leave or sick requests without HR involvement).

The advantages of HR digitalization include reduced workload for HR specialists; process transparency and control; increased employee satisfaction; faster data-driven decision-making; and scalability of HR functions for growing companies.

The development of the digital HR technology market in recent years can be characterized by the following trends: increasing demand for new HR technologies such as AI, machine learning, HR process automation; growing use of augmented and virtual reality in training and development programs; HR data and metrics analytics; intensified use of HR chatbots and virtual assistants; popularity of virtual reality, gamification, and AI in HR; integration with various services; 24/7 social media sourcing and recruiting; the importance of cloud technologies and security tools; automation of HR processes and transition to the metaverse [14].

Digitalization of personnel management is a necessary condition for business development, as it allows adapting to rapid changes and ensuring effective human resource management. Utilizing various digitalization methods enables effective implementation of innovative solutions in HR teams' activities and achieving better personnel management results. In our opinion, trends in the use of digital HR technologies should be expanded and supplemented with aspects such as automation and integration of HR processes, e-learning and development, use of HR analytics systems, focus on emotional well-being in digital environments, and development of mobile HR applications (see Fig. 2).

| <b>Trends in the use of digital HR technologies</b>   |   |
|---|---|
| Automation and integration of HR processes            | Organizations increasingly use digital solutions to automate routine HR tasks such as hiring, time tracking, leave request processing, and payroll. These solutions also integrate with other organizational systems, enhancing convenience and efficiency in HR.   |
| Use of artificial intelligence and analytics          | Artificial intelligence and analytics play an important role in HR business processes. They help collect and analyze large volumes of employee data, identify trends in productivity and engagement, predict turnover, and detect key skills needed for personnel development.                              |
| Electronic learning and development                   | Digital technologies enable organizations to implement effective e-learning systems (online courses, webinars, mobile learning apps, and other interactive tools). E-learning allows employees to study at convenient times, increases access to learning materials, and ensures continuous self-education. |
| Workforce analytics systems                           | The development of workforce analytics systems allows organizations to gain deep insights into employee interactions and measure productivity. This helps managers make informed decisions about organizing workflows, task distribution, and personnel development.  |
| Use of chatbots and virtual assistants                | Organizations increasingly deploy chatbots and virtual assistants to ensure fast communication with employees, answer their questions, provide information about company policies and procedures, and support HR management processes.  |
| Use of cloud technologies                             | Storing and processing personnel data in cloud services is becoming more popular. Cloud technologies provide quick access to data from any device and facilitate collaborative work on projects and documents.  |
| Focus on emotional well-being in digital environments | Digital technologies are also used to measure and improve employees' emotional well-being. Apps and platforms track stress levels, job satisfaction, and overall employee self-care, enabling organizations to respond to issues and implement support programs.  |
| Extended and virtual reality                          | The use of extended and virtual reality in training programs and workshops allows employees to gain practical experience and virtual simulations of real workplace situations.  |
| Mobile apps for personnel management                  | Mobile device applications enable employees and managers to perform essential HR functions such as submitting leave requests, tracking working hours, and accessing learning materials and communication with colleagues.   |

**Figure 2** – Trends in the Use of Digital HR Technologies  
**Рисунок 2** – Тенденції використання цифрових HR технологій

Such trends in the use of digital HR technologies contribute to automation, increased efficiency, and improved interaction between employees and the organization; they help make personnel management more effective by supporting the development and retention of talents in the modern digital environment [14].

Based on these trends, the concept of digitalization of personnel management can be defined as a strategic approach to the implementation of digital technologies and tools aimed at improving efficiency, automating, and optimizing human resource management within an organization. This approach relies on the use of a wide range of digital solutions, such as automated personnel management systems, artificial intelligence, data analytics, e-learning, and other innovative technologies widely implemented in the transport industry.

The field of transport logistics is considered one of the priorities for the implementation of solutions based on Internet of Things (IoT) technology, which involves the interaction of physical objects, devices, and systems with each other and the environment using various communication technologies. IoT connectivity is built on other technologies such as Wi-Fi, RFID, Bluetooth, and LTE. Cloud technologies and Big Data are used to store and process the collected data.

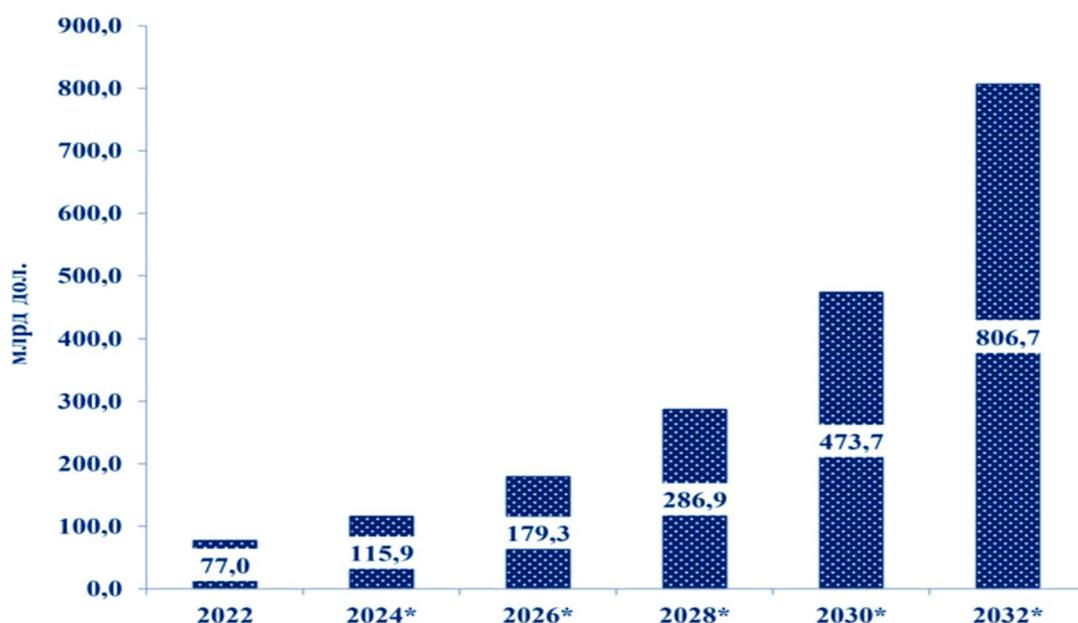
The implementation of IoT technology will provide the following advantages [13]:

- reduction of freight transportation costs and delays;
- increased transparency of logistics operations (particularly through RFID tags);
- minimization of human factor influence;
- optimization of vehicle maintenance and repair.

The global application volume of IoT in the transport market was estimated at USD 85.21 billion in 2022 and is expected to reach about USD 498.47 billion by 2032, growing at a compound annual growth rate (CAGR) of 21.69% during the forecast period from 2023 to 2032 (Fig. 3).

The size of the global automated parking systems market exceeded USD 1.67 billion in 2022 and is forecasted to reach USD 6.78 billion by 2032, growing at a CAGR of 15.1% from 2023 to 2032. The global vehicle tracking systems market exceeded USD 21.16 billion in 2022 and is estimated to reach approximately USD 80.17 billion by 2032, growing at a CAGR of 14.30% from 2023 to 2032 [6].

Digitalization affects not only individual transport and logistics companies but also serves as a topic of dialogue between the state and business.



**Figure 3** – The Impact of IoT Digital Technology on the Growth Prospects of the Transport Services Market (USD billion)

**Рисунок 3** – Вплив цифрової технології IoT на перспективи зростання ринку транспортних послуг (млрд дол. США)

There is a need to create a unified digital platform for the country’s transport complex, which will enable:

- improving the safety, quality, and accessibility of transportation;
- reducing costs;
- ensuring maximum utilization of infrastructure;

- expanding the country's export and transit capabilities;
- opening new growth opportunities for the transport sector.

In the context of digitalization, a modern employee in the transport industry must possess a set of key skills that enable effective work in new technological conditions and support their professional development. The World Economic Forum highlighted the main skills in *The Future of Jobs Report*, based on research into the impact of digital transformation on the future of jobs and management practices in HR:

- Digital literacy - knowledge and understanding of basic digital tools and technologies, ability to use email, social media, messengers, office software, and other digital tools;
- Analytical skills - ability to analyze and interpret data using analytical tools and platforms to make informed decisions;
- Communication skills - ability to communicate effectively in an online environment, write clearly and concisely in emails and documents, using various communication channels;
- Self-organization and time management - ability to plan work, set priorities, and use calendar planning and task management tools;
- Multitasking skills- ability to efficiently perform multiple tasks simultaneously in an online environment, managing different projects and assignments without losing productivity;
- Creativity and innovation - ability to think creatively, propose new ideas, and adapt to rapid changes and technological innovations;
- Teamwork skills - ability to collaborate with colleagues worldwide using virtual communication tools for effective interaction and joint work;
- Self-learning skills - ability to independently learn new technologies and tools, updating knowledge and skills according to changes in the work environment.

These skills allow modern employees to successfully integrate into the digital work environment, develop professionally, and effectively perform their duties amid changes in the technological paradigm.

The introduction of advanced approaches to human resource management enables enterprises to effectively compete in the labor market, attract and retain highly qualified employees, which is key to the successful functioning and development of the organization [28].

**Conclusions**  
Intellectualization is a purposeful, continuous, constant, and dynamic process, the results of which manifest in all spheres of social and individual life—from the individual to global systems. The intellectualization of socio-economic processes and relations is characterized by the expansion of the scale and enhancement of the efficiency of knowledge and intellectual use, which is reflected in new qualities of socio-economic systems of all types and levels (economy, transport, industry, business and trade, education, enterprise, production, management, labor, etc.). The main resources of an intellectualized economy are the knowledge of human resources and information, which have their own specific characteristics of formation and use (virtual form of existence; inexhaustibility with active use, etc.).

**Conclusions.** Intellectualization is a purposeful, continuous, constant, and dynamic process, the results of which manifest in all spheres of social and individual life—from the individual to global systems. The intellectualization of socio-economic processes and relations is characterized by the expansion of the scale and enhancement of the efficiency of knowledge and intellectual use, which is reflected in new qualities of socio-economic systems of all types and levels (economy, transport, industry, business and trade, education, enterprise, production, management, labor, etc.). The main resources of an intellectualized economy are the knowledge of human resources and information, which have their own specific characteristics of formation and use (virtual form of existence; inexhaustibility with active use, etc.).

The intellectualization of labor acts as an intensifier of the development processes of socio-economic systems at various levels, occurring on the basis of activating the intellectual labor of human resources and its most optimal use, ensuring the penetration of such intellectualization results into various spheres of life and economic activity (management, production, science, education, etc.).

In summary, due to the impact of digitalization, informatization, and virtualization, the role of human resources is changing, raising further questions about the development of human capital in Ukraine. At the

same time, it cannot be said that this process is happening rapidly, since retraining, the creation of new professions in the education sector, and the development of the legislative framework are reactive, following global trends and challenges of the digital economy and society. For the digitalization of human resources, it is necessary to implement appropriate legislative regulators that will simplify and enable transport enterprises and employees to transition to training and retraining, adapting to the new realities of digitalization and, subsequently, virtualization of society. The creation of digitalization strategies for human capital development and enterprises as a whole will allow for further effective decisions and increased productivity.

The main methods of digitalizing HR processes include the use of social networks, artificial intelligence, communication bots, HRM systems, cloud technologies, Big Data, gamification, and virtual reality. The concept of HR digitalization involves a strategic approach to implementing digital technologies and tools to improve efficiency, automate, and optimize human resource management. The key principles of this concept are process automation, the use of artificial intelligence and analytics, e-learning, workforce analytics, ensuring effective remote work, and data security. Digitalization of personnel management enables increased efficiency of HR processes, attraction and development of talented employees, improvement of communication and collaboration, as well as adaptation to rapidly changing market demands. The introduction of digital tools and technologies into human resource management becomes a key success factor for organizations in the modern business environment.

The digitalization of transport systems aims to create a unified IT environment for interdependent complexes and technologies related to traffic organization and management of a unified technological process, integrating all types of transport and market participants. Digital transformation involves transitioning to electronic document management, implementing intelligent transport systems and vehicles, realizing the "single window" mechanism, and digital logistics. Innovative developments in modeling transport systems and regulating transport flows should provide end consumers with greater informativeness and safety, as well as qualitatively improve the level of interaction among all participants.

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### ІНТЕЛЕКТУАЛІЗАЦІЯ ПОТЕНЦІАЛУ ЛЮДСЬКИХ РЕСУРСІВ ПІДПРИЄМСТВ ТРАНСПОРТНОЇ ГАЛУЗІ В УМОВАХ ЦИФРОВІЗАЦІЇ

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**Анотація.** У статті розглянуто питання розвитку інтелектуального потенціалу в умовах цифрової трансформації суб'єктів господарювання, висвітлено еволюцію підходів до управління людськими ресурсами, що демонструють перехід від механістичного сприйняття працівників до інтеграції концепцій людського капіталу та стратегічного HR-менеджменту. Досліджено, що інтелектуалізація праці є інтенсифікатором процесів розвитку соціально-економічних систем різних рівнів, що відбувається на засадах активізації інтелектуальної праці людських ресурсів та її найоптимальнішому використанні, забезпечуючи проникнення результатів такої інтелектуалізації у різні сфери життя та господарювання підприємств транспортної галузі. Визначено, що стратегічним ресурсом для формування інтелектуального капіталу є людські ресурси, які формуються в умовах цифрової трансформації суб'єктів господарювання і є джерелом інновацій на транспортному підприємстві.

Цифровізація безупинно впливає на всі сфери економіки, в тому числі й на транспорту сферу, котра відповідно до глобальних запитів змушена перебудувати свою діяльність (військові дії, пандемія). У статті зазначено, що розвиток цифрових систем необхідний транспорту для того, щоб зробити галузь зручнішою для людей та розвитку бізнесу. Людські ресурси генерують конкурентну перевагу суб'єкта господарювання, яка вважається специфічним фактором і відрізняє одне підприємство від іншого.

Висновки дослідження підкреслюють, що успішне управління потенціалом людських ресурсів в сучасному динамічному та складному бізнес-середовищі вимагає комплексного підходу, який враховує як традиційні аспекти, так і сучасні виклики. Глибоке розуміння та ефективне управління людськими ресурсами є вирішальним для забезпечення конкурентоспроможності, інноваційного розвитку та сталого успіху підприємств транспортної галузі.

**Ключові слова:** інтелектуалізація, потенціал, людські ресурси, еволюція, розвиток, управління, підприємства, транспорт, галузь, цифровізація, концептуальні підходи

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