Transformation of the Personnel Management System in the Conditions of Digitalization of HR Processes

SERGII KHOLOD[1], VALENTYNA PAVLOVA[2], ANHELINA SPITSYNA[3], YULIIA MAISTRENKO[4], OKSANA ANUFRIEVA[5], VADYM LUKIANYKHIN[6]

[1]Department of Innovative Management and Financial Analytics, ALFRED NOBEL UNIVERSITY, UKRAINE,
E-mail: sergii.kholod@ukr.net
[2]Department of International Trade and Entrepreneurship, ALFRED NOBEL UNIVERSITY, UKRAINE
[3]Department of Economics, NATIONAL TRANSPORT UNIVERSITY, UKRAINE
[4]Department of Fashion and Show Business, KYIV NATIONAL UNIVERSITY OF CULTURE AND ARTS, UKRAINE
[5]Department of Economics Entrepreneurship and Management Educational and Research, UNIVERSITY OF EDUCATIONAL MANAGEMENT, UKRAINE
[6]Department of Management, SUMY STATE UNIVERSITY, SUMY, UKRAINE

ABSTRACT

Human capital is the driving force behind the digital economy. The use of digital technology has a significant impact on the entire life cycle of personnel in an organization, including hiring, onboarding, and firing. The authors examined the essence of the personnel management system, various models for building a personnel management system in an organization, and studied applying a particular model for a specific organization. The authors studied and visually presented the features of objects, subjects and goals of the personnel management system. The authors also examined the impact of digitalization on the personnel management system, what requirements are imposed on personnel's professional competencies, and new and already used trends in HR automation and recruiting that will help to work better and more efficiently. Generalization of theoretical and empirical experience, cognitive technologies based on the use of artificial intelligence and digital data in HR management allowed the authors to highlight innovative solutions and propose an algorithm for transforming the personnel management system in the context of digitalization of HR processes. Besides, the authors proposed criteria and a scale for assessing the effectiveness of the transformation of the personnel management system in the context of the digitalization of HR processes. Thanks to this, as well as the use of such elements in the framework of personnel management as cloud technology, the ability to work remotely, big data, social media and artificial intelligence, companies, can increase their lead over competitors.

Keywords: Digitalization; HR processes; Personnel; Personnel management.

JEL Classification: J01, J24, J30

Transformación del Sistema de Gestión de Personal en las Condiciones de la Digitalización de los Procesos de RRHH

SERGII KHOLOD[1*], VALENTYNA PAVLOVA[2], ANHELINA SPITSYNA[3], YULIIA MAISTRENKO[4], OKSANA ANUFRIEVA[5], VADYM LUKIANYKHIN[6]

[1]Department of Innovative Management and Financial Analytics, ALFRED NOBEL UNIVERSITY, UKRAINE, E-mail: sergii.kholod@ukr.net

[2]Department of International Trade and Entrepreneurship, ALFRED NOBEL UNIVERSITY, UKRAINE

[3]Department of Economics, NATIONAL TRANSPORT UNIVERSITY, UKRAINE

[4]Department of Fashion and Show Business, KYIV NATIONAL UNIVERSITY OF CULTURE AND ARTS, UKRAINE

[5]Department of Economics Entrepreneurship and Management Educational and Research, UNIVERSITY OF EDUCATIONAL MANAGEMENT, UKRAINE

[6]Department of Management, SUMY STATE UNIVERSITY, SUMY, UKRAINE

RESUMEN

El capital humano es el motor de la economía digital. El uso de la tecnología digital tiene un impacto significativo en todo el ciclo de vida del personal en una organización, incluyendo la contratación, la incorporación y el despido. Los autores examinaron la esencia del sistema de gestión de personal, varios modelos para construir un sistema de gestión de personal en una organización, y estudiaron la aplicación de un modelo concreto para una organización específica. Los autores estudiaron y presentaron visualmente las características de los objetos, sujetos y objetivos del sistema de gestión de personal. Los autores también examinaron el impacto de la digitalización en el sistema de gestión de personal, qué requisitos se imponen a las competencias profesionales del personal, y las tendencias nuevas y ya utilizadas en la automatización de los RRHH y el reclutamiento que ayudarán a trabajar mejor y más eficientemente. La generalización de la experiencia teórica y empírica, las tecnologías cognitivas basadas en el uso de la inteligencia artificial y los datos digitales en la gestión de RRHH permitieron a los autores destacar soluciones innovadoras y proponer un algoritmo para transformar el sistema de gestión de personal en el contexto de la digitalización de los procesos de RRHH. Además, los autores propusieron criterios y una escala para evaluar la eficacia de la transformación del sistema de gestión de personal en el contexto de la digitalización de los procesos de RRHH. Gracias a esto, así como al uso de elementos en el marco de la gestión de personal como la tecnología en la nube, la capacidad de trabajar a distancia, el big data, los medios sociales y la inteligencia artificial, las empresas, pueden aumentar su ventaja sobre los competidores.

Palabras clave: Digitalización; Procesos de RRHH; Personal; Gestión de personal.

Clasificación JEL: J01, J24, J30

## 1. Introduction

The digital economy's driving force is human capital – knowledge, talents, skills, abilities, experience, intelligence [1]. The rapid spread of digital technologies makes digital competencies of citizens key, among other skills [2]. The spread of digital technologies inevitably causes significant changes in the structure of employment and the requirements for personnel qualifications [3-4]. Artificial intelligence, virtual reality, big data and the digital economy are transforming the face of employment and its nature in today's world too quickly [5-6]. There is a great need for both own IT specialists, programmers, and qualified users who can work in a digital environment. Also, there is already an apparent shortage of so-called "digital leaders" and digital entrepreneurs – that is, top-level leaders who understand how to transform business processes digitally. As digital governance practices and flexible organizational structures become central to business, HR professionals focus on people, work, and digital platforms. The use of digital technology has a significant impact on the entire life cycle of personnel in an organization, including hiring, onboarding, and firing [7-8]. In this area, apart from a few points, the HR function in most organizations continues to rely on traditional management practices that completely ignore the quality of employee experience and employment. The critical tasks of digital transformation facing personnel management are effective recruiting, training, and attracting motivated employees who can generate innovations and achieve target performance.

The issues of adaptation of society are still relevant worldwide, where each country is looking for its own ways of solving it (Fig. 1). 90% of surveyed executives from around the world (10,000 people in 140 countries) believe their company is facing disruptive digital-driven change. 70% say their organization lacks adaptation skills.

Figure 1. Result of a survey of leaders from around the world
(from 10 thousand people in 140 countries)
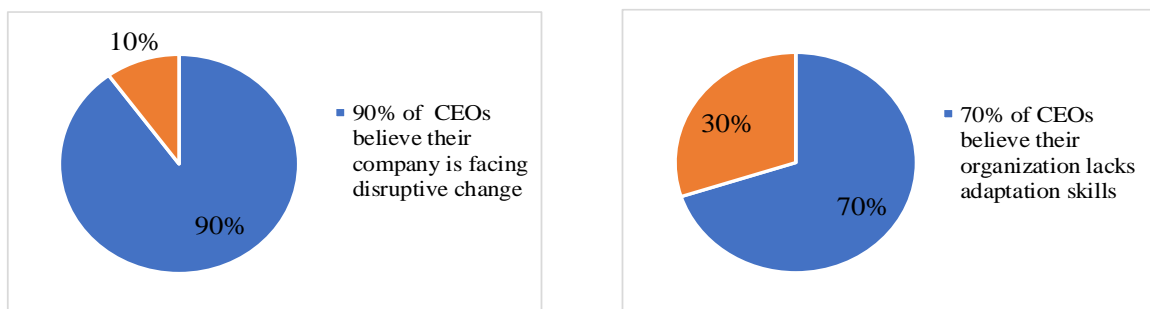
This confirms the relevance of the study.

2. Materials and methods

Every year, the digital world undergoes changes that affect not only society's life but also business management. With the help of digital technologies, the organization of business processes has been transformed. This problem is relevant because the accelerated pace of life makes new demands on companies; for example, they need to continually follow modern trends to be competitive in the market [9-10]. This article examines how the field of personnel management is developing in the framework of digital technologies.

2.1 The personnel management system

The personnel management system is a set of techniques, methods, technologies for organizing work with personnel [11-13].

There are various models for building a personnel management system in an organization. The application of a particular model to a specific organization depends on its organizational structure. The organizational structure determines the relationship (mutual subordination) between the

functions performed by the employees of the organization and also manifests itself in such forms as the division of labour, the creation of specialized units, the hierarchy of positions, etc.

The personnel management system's organizational structure is a set of interrelated subdivisions of this system and officials.

Subdivisions perform various functions; their totality constitutes the personnel management service (personnel department). The role and place of the personnel management service in the structure of the entire organization are determined by the role and place of each specialized unit of this service, as well as the organizational status of its immediate manager [14-15].

Features of the personnel management system's development, its role in the organizational system determine the characteristics of its main factors: object and subject, goals of the system, its functions and structure (Fig. 2).

**Figure 2.** Objects and subjects of the personnel management system
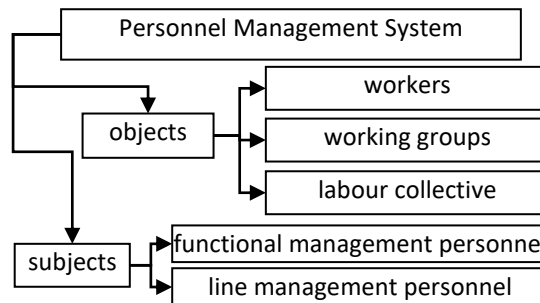
As a rule, organizations aimed at implementing the functions of personnel management include a subsystem of line management of the organization, as well as several functional subsystems of personnel management (for example, a recruitment subsystem, a training and development subsystem, etc.).

Within the framework of such a system, the relationship between individual aspects of personnel management is taken into account, which is expressed in the development of the ultimate goals of personnel management of the organization, in determining the ways to achieve them, as well as in the creation of an appropriate management mechanism that provides comprehensive planning and organization of personnel management in the organization.

The initial stage in the design and formation of an organization's personnel management system is the formulation of this system's goals. For different organizations, the personnel management system's goals vary depending on the nature of the organization's activities, production volumes, strategic objectives, etc. Generalization of foreign and domestic organizations' experience allows us to formulate the primary goal of the organization's personnel management system as providing the organization with personnel, their effective use, professional and social development [16-17]. Fig. 3 shows the structure of the goals of the organization's personnel management system.

Figure 3. Goals of the organization's personnel management system
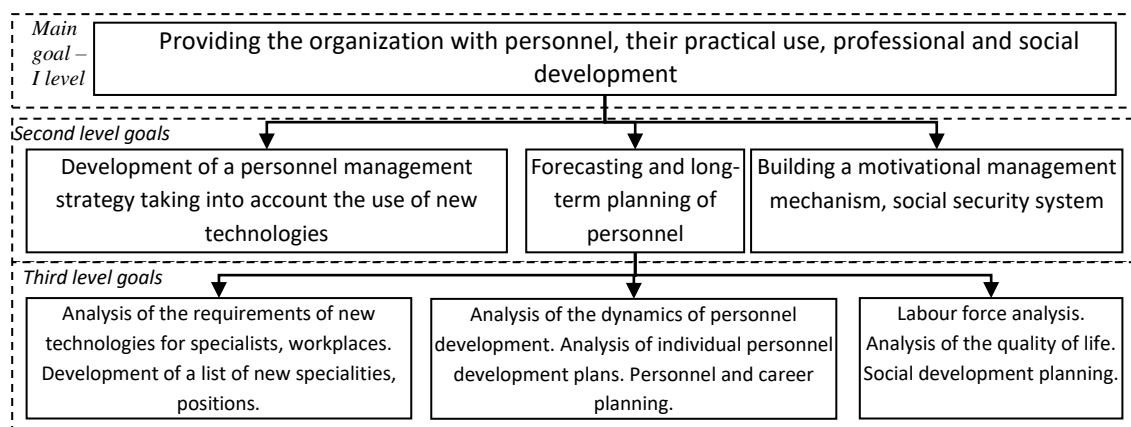
Considering the totality of organizational goals, we also distinguish the following categories of organizational goals: economic, scientific and technical, commercial and industrial and social.

2.2 Impact of digitalization on the personnel management system

Digitalization is a profound business transformation that involves using digital technologies to optimize business processes, increase company productivity and improve the customer experience. Most often, the goal of digitalization is to meet the needs of the consumer, which are changing along with the development of technology, namely, to create a more comfortable and efficient interaction between the client and the company. But she may have other goals as well, such as:

– improvement of the product (or service): its quality, attractiveness, usability, delivery, etc.;

– automation of production and other internal processes of the company;

– simplification of internal and external communications.

Most multinational companies require real-time data visualization, return on investment (ROI) insights from human resources to research learning and development to measure productivity. In this context, People-analytics (people analytics) as a digital technology solves the problems of processing big data in a global dimension and scale, combining methods of predictive development scenarios and data mining. The quality of the regulatory environment, low social mobility and tolerance, low development of technical and professional competencies, and the relative openness of the labour market are defined as problem areas in developing qualified personnel.

The system of analytical support for personnel management within the framework of enterprise management requires the formation of several professional competencies from managers:

– monitor the performance of employees, compared with established goals, plans, taking into account the company's strategy, identify trends;

– in conjunction with other departments to ensure the reliable operation of financial control systems for personnel information and security;

– to provide information and communication interaction between managers and personnel of different management levels in the external space, with partners and stakeholders.

At the same time, we emphasize that the development of digital competencies is one of the conditions for enhancing enterprises' competitiveness in the global market. The development of digital data is growing, not only in terms of the sheer amount of data but also in the way companies use analytics to make strategic decisions. In digital analytics, unlike other information, the data context is crucial, namely: customer habits, state, emotions, health, activity in social networks, history of services provided, hobbies.

2.3 Trends in HR automation and recruiting

Let's take a look at new and existing trends in HR automation and recruiting that will help you work better and more efficiently (Fig. 4).

So, experts consider three Digital aspects:

– digital workforce: the use of new management practices, a culture of innovation and synchronization of big data management;

– digital workplace;

– digital HR (advanced analytics), which helps organizations to learn how to use digital technologies in processes, on the one hand, and on the other, to form an appropriate cultural environment.

Figure 4. New and existing trends in HR digitalization

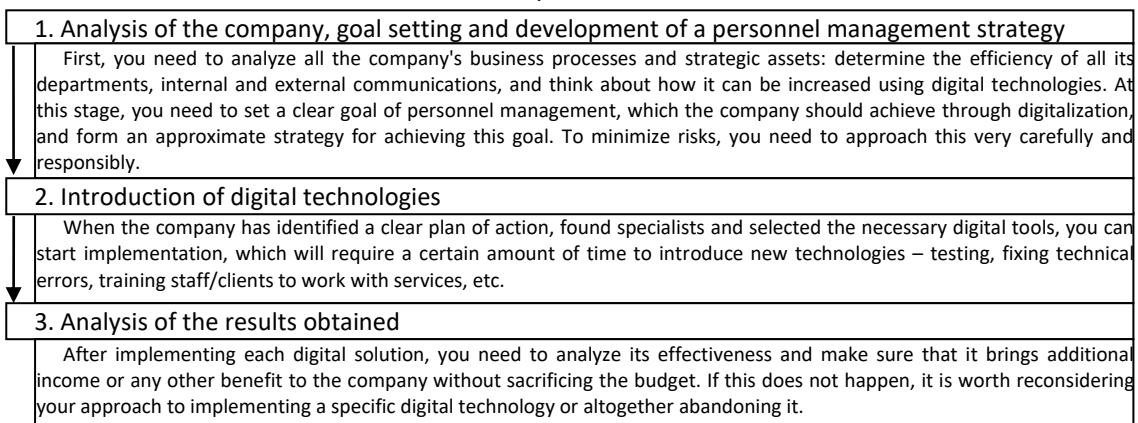| HP digitalization trends	
Big Data and data analysis	The term Big Data has been around for a long time. How can it be applied to recruiting? For example, Big Data can automatically collect and analyze data about a candidate's experience without a recruiter's direct involvement. You can also collect and analyze employees' successful behaviour (for example, sales managers) to draw a pattern of good behaviour in the future.
Recruitment	In the international arena, there are applications for job search (Switch, JobSnap, Jobr, etc.), where a recruiter and an applicant leaf through each other's vacancies and profiles, can like each other, and only after that, they can start communicating. Some of these applications allow to hide personal data and disclose them to the future employer only at will after the start of communication (in Ukraine, the Djinni service has such functionality).
Search for candidates through social networks	This trend is more established than the previous one. These are mainly social networks such as LinkedIn and Facebook. Recently, Telegram has also helped in recruiting with its chats, channels, and bots to find a job. All these tools for digitalization of candidate search will be in trend for a long time.
Automated recruitment process	Applicant Tracking System (ATS) - Applicant Tracking System allows full tracking of the applicant search process. The introduction of such a system allows to find out through which channels (company website, job search site, social networks, channels and chats) job seekers find the best company and, as a result, where it is better to invest resources.
HR analytics and forecasts	HR analytics is becoming a reasonably mundane process. Analytics can be used to assess employee turnover, employee search speed, and more. This allows you to build accurate forecasts for the future and notice which aspects of the company need to be addressed. Automating this process will save a lot of time: doing calculations and building charts by hand nowadays is about the same as using an abacus instead of a calculator.
Monitoring mood	A fairly new trend in the automation environment. HR professionals have known for a long time that employee mood directly affects their productivity. Digitalization of this process greatly facilitates an HR specialist's routine and allows a global assessment of the team's spirit and involvement.
Absence management	It's about automating requests for vacation, work from home, extra weekends and sick leaves. It is much more convenient for employees and HR-am to do this through an automated system than, for example, through calls and written statements.
Digitalization of interviews	Both calls in Skype and other applications and preliminary correspondence with the candidate, are used. Thanks to digitalization, you significantly save time even at the selection stage. Without meeting with the candidate in person, you can send him a test task, ask questions of interest, and conduct a full-fledged interview via audio or video communication.
Permanent communication	It is essential to be online anytime, anywhere. Trends in HR-digital lead to the fact that the automation system should be cross-platform and provide the ability to access from any gadget and any operating system.
Training	Digitization could not but touch upon the field of education. This applies to both the staff and the recruiter / HR itself. There are more and more online platforms and training courses for HR professionals. This area is also changing, and long courses are being replaced by a short video format of 3-5 minutes, where experienced experts share real case studies also.

3. Results

Thus, the generalization of empirical experience, cognitive technologies based on the use of artificial intelligence and digital data in HR management make it possible to highlight such innovative solutions as:

1) smart office management (Intelligent buildings) – built-in voice systems that perform typical actions of employees in process management (social communications, emergency assistance);

2) digital learning and research-based on game brainstorming;

3) gamification of curriculum content, including online learning;

4) integrated analytics tools for personnel selection, use of referral attraction programs;

5) digital survey – big data analytics in real space and time, deeper digitization of interview content with applicants, and HR processes administration.

Further development of digital HR technologies forms a competitive advantage for the enterprise, providing greater influence in reducing costs and eliminating existing personnel management obstacles. It should be noted that the development of artificial intelligence and machine learning requires a corresponding transformation of personnel management processes and training, which are the constraining factors of digital development.

In general, the transformation of the personnel management system in the context of the digitalization of HR processes in 3 stages (Fig. 5).

Figure 5. Algorithm for the transformation of the personnel management system in the context of digitalization of HR processes

1. Analysis of the company, goal setting and development of a personnel management strategy
First, you need to analyze all the company's business processes and strategic assets: determine the efficiency of all its departments, internal and external communications, and think about how it can be increased using digital technologies. At this stage, you need to set a clear goal of personnel management, which the company should achieve through digitalization, and form an approximate strategy for achieving this goal. To minimize risks, you need to approach this very carefully and responsibly.
2. Introduction of digital technologies
When the company has identified a clear plan of action, found specialists and selected the necessary digital tools, you can start implementation, which will require a certain amount of time to introduce new technologies – testing, fixing technical errors, training staff/clients to work with services, etc.
3. Analysis of the results obtained
After implementing each digital solution, you need to analyze its effectiveness and make sure that it brings additional income or any other benefit to the company without sacrificing the budget. If this does not happen, it is worth reconsidering your approach to implementing a specific digital technology or altogether abandoning it.

Today, successful HR professionals in an organization use a digital thinking model to achieve results using essential qualities:

– providing individual experience throughout the entire life cycle of personnel, based on access to information on demand, closer cooperation;

– moving from integrated to unified talent management platforms based on one technology, one user experience and one data model focused on tracking staff progress;

Rewarding and providing the tools necessary to achieve success and adopt an analytical lifestyle, goes beyond simply measuring things and comparing them with past data, to gain great intellectual opportunities not only for achieving business results but also for their functioning.

When drawing up a strategy, it is necessary to remember that new technologies should not completely change the business; their main goal is to simplify business processes, incl. for personnel management.

4. Discussion

Globalization and digital technologies are changing the approach to enterprise personnel management. HR departments have a strategic role in implementing innovative digital solutions and providing training for all departments serving big data.

The research has shown that in the modern world, the digitalization of personnel processes is a necessary condition for the functioning of an organization. However, like any improvement, digitalization needs to be assessed and, depending on the result, change or not the further strategy or particular steps.

We offer the following indicators for assessment:

Time Reduction Ratio (K1) = time spent on process after digitalization / time spent on process before digitalization.

Stability ratio (K2) = (Average number of employees – Number of dismissed employees) / (Average number of employees)

Health ratio (K3) = (Planned working time fund * Average number of employees – Number of days off due to illness) / (Planned working time fund * Average number of employees)

Professional growth rate (K4) = (Number of employees who have improved their skills) / (Average number of employees)

Education ratio (K5) = Number of employees with education by the requirements of the position / Average number of employees.

The analysis of the obtained data in the final form compares the calculated indicators with the reference and normative indicators (Table 1).

Table 1. Reference and regulatory indicators of the analysis of the state of human capital of the enterprise

Status type	K1	K2	K3	K4	K5
Optimal	0,4-0,5	0,95-1	0,9-1	0,5-1	1
Steady state	0,6-0,7	0,9-0,95	0,8-0,9	0,3-0,5	0,9-1
Unstable condition	0,8-0,9	0,7-0,9	0,5-0,8	0,1-0,3	0,7-0,9
Crisis condition	>1,0	<0,7	<0,5	<0,1	<0,7

According to the results of the analysis of the state of the human capital of the enterprise, it is possible to make the subsequent management decisions:

– if at least one of the ratios is in a crisis zone, it is necessary to decide on an immediate in-depth analysis of human capital of the enterprise;

– the unstable situation involves consideration of the case in the area, the indicator of which gives deviations, and develop measures to improve these indicators;

– the response to a steady-state depends on management. If this state is considered the norm for the company, it may not be necessary to make any decisions, but it requires a constant analysis of the dynamics of indicators. The dynamics' negative nature should signal that human capital is deteriorating and action needs to be taken in an unstable state.

– optimal condition. Individual indicators, depending on the period of human capital analysis, may coincide with the reference (for example, the turnover ratio), but it isn't easy to achieve benchmarks for all characteristics. If all the actual indicators are in the optimal zone, you can not make any management decisions in this situation. The method of analysis of human capital of the enterprise can be supplemented by other indicators and characteristics of human capital depending on such analysis for a particular enterprise.

5. Conclusion.

Hundreds of changes take place in the world every year, the transformation of economic ideas and changes in the requirements of digital policy. Nevertheless, human resources have always been

and will be the main foundations for any development. Therefore, employees develop along with the emergence of new technologies and contribute to the rapid growth of HR-Digital.

In the current conditions of the digital economy development, an HR specialist must have a clear understanding of the personnel service's digitalization. This requires the formation of a holistic view of the needs for opportunities, which are changing, in the links between the process of nurturing talent and experience. This must be clearly linked to the overall business goals and must be supported by a business case for technology investments. Suppose it is impossible to implement a "digital HR management system quickly". In that case, there is a danger that the organization will be deprived of the opportunity to participate in attracting and retaining talented employees. The use of digital technologies will make it possible to quickly adapt to the real economy and find ways to overcome the crisis.

The main task of HR-Digital is to combine HR processes with processes taking place in the digital sphere. So, with the advent of new technologies, HR employees are focusing on optimizing employee engagement, productivity and career growth. Now, in addition to developing management systems, HR employees need to understand IT technologies to create applications and programs for employee software. Today, an individual approach to each employee is required, and digital technologies will also help optimize and adjust the development plan for an individual employee. HR begins to speak the same language with the business since hr analytics allows you to confirm intuitive decisions, justify them with profit growth, or other business indicators, and find ultimately new relationships between indicators. Therefore, through the use of such elements in personnel management framework as cloud technologies, the ability to work remotely, big data, social networks and artificial intelligence, companies can increase their lead over competitors.

References

1. Miśkiewicz, R. (2018). The Importance of Knowledge Transfer on the Energy Market. *Polityka Energetyczna*, 21(2), 49-62. http://dx.doi.org/10.24425%2F122774

2. Kasych A., Yakovenko Y., and Tarasenko I. (2019). Optimization of business processes with the use of industrial digitalization. *Proceedings of the International Conference on Modern Electrical and Energy Systems, MEES 2019*, pp. 522-525 https://ieeexplore.ieee.org/document/8896531

3. Kaufman, N., and Gluschenko, M. (2019). Transformation of Personnel Management System in Transition to Digital Economy. *Scientific Research and Development Economics*, 8(2), pp. 37-41. DOI: 10.12737/2587-9111-2019-37-41

4. Erokhin, D., Vestimaia, L., and Trutnev, O. (2020). Economic and psychological features of using digital technologies in business processes and personnel management. *Ergodesign*, 2020(1), pp. 25-31. DOI: 10.30987/2658-4026-2020-1-25-31

5. KozhukhovaJ., N. V., Veselova, V., and Chekuldova, S. V. (2021). Application of IT Technologies in Personnel Management in the Era of Digitalization. In book: *Digital Economy and the New Labor Market: Jobs, Competences and Innovative HR Technologies*. DOI: 10.1007/978-3-030-60926-9_25

6. Krykavskyy, Y., and Falovych, V. (2016). The principle of the extended responsibility in the formation of multimodal transportation attractiveness. *Economic Annals-XXI*, 159(5-6), pp. 67-70.

7. Karpenko, A., Karpenko, N., and Shudrik, O. (2020). Development and implementation of a strategic personnel management system according to goals based on key performance indicators. *Management and Entrepreneurship Trends of Development*, 2(12), pp. 22-35. DOI: 10.26661/2522-1566/2020-2/12-02

8. Nikitenko, K. (2020). Improvement of assessment of the personnel management system at the agricultural enterprise. *Economic Analysis*, 30(1(2)), pp. 100-107. DOI: 10.35774/econa2020.01.02.100

9. Haider, J., and Sundin, O. (2020). The fragmentation of facts and infrastructural meaning-making: new demands on information literacy. *Information Research*, 24(4), pp. 1-13.

10. Chesley, N. (2010). Technology Use and Employee Assessments of Work Effectiveness, Workload, and Pace of Life. *Information Communication and Society Communication & Society*, 4, pp. 485-514. DOI: 10.1080/13691180903473806

11. Ahammad, T. (2017). Personnel Management to Human Resource Management (HRM): How HRM Functions? *Journal of Modern Accounting and Auditing*, 13(9), pp. 412-420. DOI: 10.17265/1548-6583/2017.09.004

12. Merkevičius, J., Davidavičienė, V., Raudeliuniene, and J. Buleca, J. (2015). Virtual organization: Specifics of creation of personnel management system. *Ekonomie a Management*, 18(4), pp. 200-211. DOI: 10.15240/tul/001/2015-4-014

13. Shapoval, O. (2020). The concept of personnel management in the personnel management system. *Herald UNU International Economic Relations and World Economy*, 31, pp. 146-149. DOI: 10.32782/2413-9971/2020-31-22

14. Stankevich, A. (2020). Change of functions of human service in conditions of strategic personnel management. *National Association of Scientists*, 52, pp. 52-58. DOI: 10.31618/nas.2413-5291.2020.1.52.138

15. Yakymova, O., Lemish, K., and Tokarenko, O. (2020). Improvement of the personnel management system of service enterprises. *Pryazovskyi Economic Herald*, 6(23), pp. 166-170. DOI: 10.32840/2522-4263/2020-6-29

16. Parshina, V. (2016). Development and implementation of personnel management system elements for reaching an organization's goals. *Herald of the Ural State University of Railway Transport*, 4 (32), pp. 112-120. DOI: 10.20291/2079-0392-2016-4-112-120

17. Bobyleva, M. (2019). The role of intracorporate communications in the personnel management system of the organization. *Interactive Science*, 4 (38), pp. 34-35. DOI: 10.21661/r-486286