Technical And Technological Support for Personnel Management: Digital Transformation of Enterprise Competitiveness Through Artificial Intelligence

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Abstract

The main purpose of the article is to determine optimal updates for technical and technological support for personnel management. The object of the study is the personnel management system of a modern rural enterprise. The scientific task involves determining which innovative updates need to be carried out first to improve the technical and technological support of personnel management. The research methodology involves the use of the hierarchical evaluation method, the even comparison method, the expert ranking method, and the abstract-logical method. As a result of the study, three levels of technical and technological support for personnel management were identified. The main innovative updates for technical and technological support for personnel management are presented. It has been determined that the most optimal tactical solution for a modern rural enterprise is the use of artificial intelligence and a digital database. A model of using certain innovative updates in the system of technical and technological support for personnel management has been constructed

Keywords: *Personnel, Management, Information, Innovations, Technical Support, Artificial Intelligence, Rural Enterprise, Digital Transformation, Motivation*

INTRODUCTION

Technical and technological support is a critical aspect of the rural enterprise management system because it determines the efficiency of processes, labor productivity, and the overall quality of production. In today's dynamic business environment, where responsiveness and flexibility are key to success, technical capabilities, and advanced technology have become a necessity to maintain a competitive position. In addition, technical and technological support plays an important role in motivating staff. Modern equipment and technology not only simplify and optimize the work process but also increase employee satisfaction because they feel that the company is investing in their workplace and professional development. This, in turn, leads to increased productivity and employee engagement. Last but not least, technical and technological support helps to increase the competitiveness of an rural enterprise. Innovative technologies and highly efficient equipment allow us to optimize production processes, reduce costs, and improve product quality. This, in turn, allows the company to be competitive in the market by offering the best products and services at competitive prices. The use of advanced technologies also facilitates innovation and the development of new products and services, which is a key factor for continued success in the long term.

Thus, technical and technological support is an important element of the strategy of any rural enterprise, since it has a direct impact on management efficiency, employee motivation, and overall competitiveness in the market (Ali et al., 2020).

Digital transformation and innovation in technology have had a significant impact on competition in markets, changing traditional approaches to doing business. In this new digital environment, companies that quickly adapt to new technologies gain significant competitive advantages. This means that organizations that invest in innovations such as artificial intelligence, big data, automation, and cloud technologies can offer better products and services, streamline their processes, increase efficiency, and reduce costs.

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One of the key aspects of digital transformation is the digitalization of personnel management systems. Businesses are actively adopting digital HR tools and platforms to automate routine tasks such as time tracking, leave management, and productivity tracking. This not only improves the efficiency of internal processes but also promotes a better understanding of employee needs, which is important for attracting and retaining talent. Modern HR systems also provide data analytics that help in making informed decisions, particularly in workforce planning, workforce development, and training (Dabić et al., 2020).

Overall, digital transformation is reforming the business environment, forcing businesses to rethink their strategies and practices. Those who integrate new technologies into their business models benefit from competition because they can respond more quickly to market changes and consumer needs. Digitalization of personnel management not only improves the efficiency of internal processes but contributes to the creation of a culture of innovation and continuous learning in the organization. Thus, digital transformation is becoming a key factor for success in today's markets (Fisher et al., 2020).

Thus, proving the relevance of the chosen topic, we set out to determine optimal innovative updates for the technical and technological support of personnel management. In this case, the object of study is the personnel management system of a modern rural enterprise.

The structure of the article provides a review of the literature on the research topic, a description of the methods used by the authors, a presentation of the main results and their discussion, conclusions, and prospects for further research.

LITERATURE REVIEW

We focused on the analysis of existing studies that highlight various aspects of digital transformation and the use of artificial intelligence in business processes. The work of Sylkin et al. (2018) focused on assessing the financial security of engineering rural enterprises, which is an important prerequisite for the application of anti-crisis management. It shows the importance of a stable financial condition for the successful implementation of innovative changes. The work of Saleh et al. (2020) examines the legal aspects of cryptocurrency asset management, which helps to understand the legal challenges of digital transformation. Al Azzam (2019) examines international cooperation in the fight against cybercrime, emphasizing the need to modernize this area, which is important in the context of data protection in the digital environment.

An analysis of the work of Al-Tit (2020), which examines the impact of e-commerce on customer loyalty, provides valuable data on the importance of digital tools in business. Kolisnychenko (2023) focuses on the development of an algorithm for the implementation of an Internet marketing strategy in the EU hotel and restaurant business sector, which demonstrates the practical application of digital innovation. The work of Fátima et al. (2021) highlights the adaptation of information technology in digital marketing, emphasizing the importance of technological change for modern business.

Raisch and Krakowski (2021) explore the paradox of automation and augmentation through artificial intelligence in management, which is key to understanding the impact of AI on work processes. Li (2020) investigates the application of artificial intelligence to prevent financial crises, which is important for strategic planning in companies. The work of Alazzam et al. (2023) focuses on the development of an information model for e-commerce platforms, which emphasizes the role of digitization in modern socio-economic systems. The importance of innovation in the financial sector, especially in the context of the introduction of service robots with artificial intelligence, is explored in the work of Bataev et al., (2020) which emphasizes the transformation in management and customer service.

Malyarenko (2020) proposes an algebraic method for pricing financial instruments in the post-crisis market, which reflects the complexity of the challenges associated with financial innovations and their impact on market strategies.

A comprehensive analysis of these studies reflects the diversity and depth of approaches to digital transformation and the use of artificial intelligence in various aspects of personnel management and business strategies. This demonstrates both the wide range of opportunities and challenges facing modern rural

enterprises in the context of innovative development and implementation of technological solutions. However, there are several gaps in the scientific and practical literature today (Table 1).

Table 1: Key gaps in the scientific and practical literature on the research topic

№	Gap	Essence
1	Actuality and modern trends	Constant dynamism shows that the proposed directions have become outdated over time
2	Methods in the literature	Lack of combination of modern modeling methods
3	Choice of rural enterprises	The gaps lie in the lack of emphasis on specifically selected rural enterprises. Specifics are not taken into account

Source: own analysis

Thus, based on the review of scientific and practical literature, we have formed a scientific task, which involves determining what innovative updates need to be carried out first to improve the technical and technological support of personnel management.

METHODOLOGY

The research methodology, which includes the use of the hierarchical evaluation method, the paired comparison method, the expert ranking method with the auxiliary use of the Delphi Method and the abstract-logical method, is an integrated approach to the study and improvement of technical and technological support for personnel management and motivation (Figure 1). The method of expert ranking (to reveal the opinion of experts regarding how innovative innovations should be selected from a large number of existing
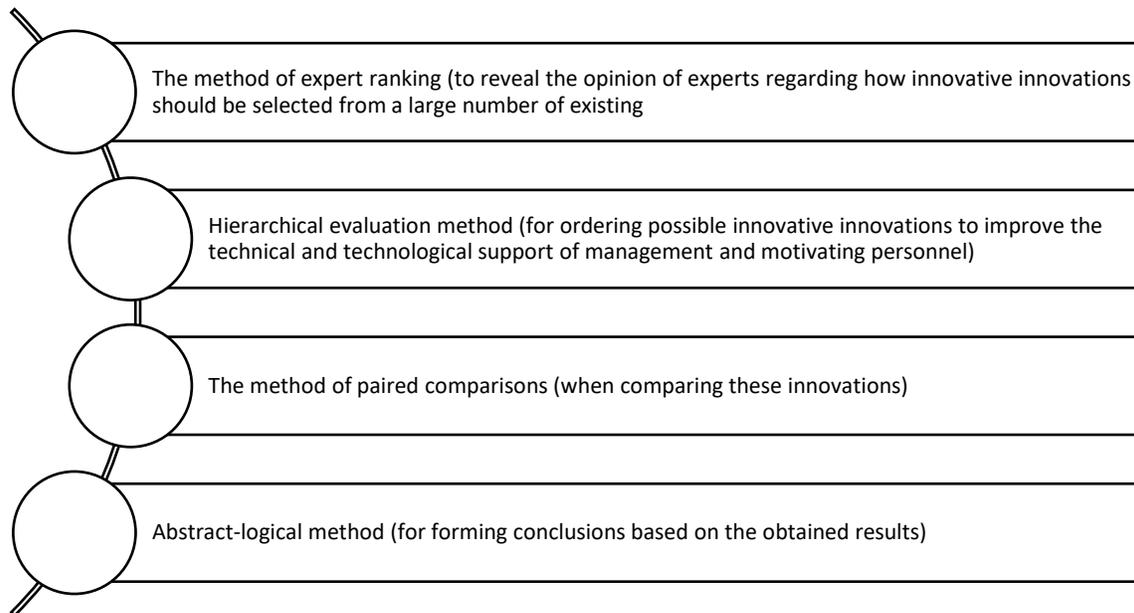

The method of expert ranking (to reveal the opinion of experts regarding how innovative innovations should be selected from a large number of existing

Hierarchical evaluation method (for ordering possible innovative innovations to improve the technical and technological support of management and motivating personnel)

The method of paired comparisons (when comparing these innovations)

Abstract-logical method (for forming conclusions based on the obtained results)

Figure 1: Structure of research methodology

Source: own analysis

The hierarchical evaluation method is used to structure possible innovative innovations. This method allows you to decompose a complex multi-level problem into simpler subtasks, arranging them in the form of a hierarchy. Each level of the hierarchy represents a specific aspect of the problem, thus simplifying the process of analyzing and evaluating innovative solutions (Mabad et al., 2021).

The paired comparison method is used to evaluate and compare these innovative innovations. This method allows you to compare each innovation with others according to certain criteria, thus forming a ranking from the most preferable. This helps ensure a more objective and balanced assessment of various innovative solutions.

The expert ranking method, which uses the opinion of experts, is important for determining which innovative innovations should be selected among a large number of existing ones. Experts, based on experience and knowledge, evaluate innovations and determine their priority. Used as an auxiliary method, Delphi allows you to group and summarize the opinions of experts, reducing the risk of subjectivity and facilitating the achievement of consensus among them. This method involves a series of rounds of surveys where experts independently express their opinions, after which the results are aggregated and presented to participants for further evaluation, helping to clarify and harmonize their views.

The abstract logical method is used to form conclusions based on the results obtained. This method is based on logical analysis and synthesis of information obtained using other methods. It allows you to systematize the data obtained, find connections between different elements of the study, and form reasonable, logically consistent conclusions.

Such an integrated methodological approach provides a deep and multifaceted understanding of innovative updates in the technical and technological support of personnel management, allowing us to take into account different perspectives and aspects of this issue.

RESULTS AND DISCUSSION

Technical and technological support for personnel management at an engineering rural enterprise includes the use of various tools, methods, and systems aimed at the effective management of resources and personnel. Let's consider three levels of support (Gonzalez et al., 2019):

1. High level. This includes advanced technologies such as artificial intelligence and machine learning for analyzing HR data, forecasting trends, and automating many HR processes. Leverage advanced analytics to provide insight into workforce performance, talent management, and workforce optimization.

2. Medium level. This may include HRM systems that automate core processes such as time tracking, personnel records and leave management. The use of online courses and platforms for staff training allows for a flexible training schedule.

3. Low level. Basic records are maintained manually or using simple spreadsheets. For example, internal seminars and trainings that are conducted without the use of advanced technologies.

Through experts, we identified key possible innovative updates to the technical and technological support for rural enterprise engineering management:

1. Artificial intelligence (AI). Using AI to analyze data, automate decision-making processes, improve forecasting accuracy, and streamline workflows. AI can also help develop innovative engineering solutions.

2. Internet of Things (IoT). Integration of IoT devices for real-time data collection with equipment and systems. This allows you to better monitor the condition of your equipment and manage resources more efficiently.

3. Augmented Reality (AR) and Virtual Reality (VR). Using AR and VR for training, design, and testing. This can help engineers better visualize projects and processes.

4. Automated design and creation. Implementation of computer-aided design (CAD) and computer modeling systems for more efficient and more accurate product designs.

5. Efficient production and process automation. Integrate robots and automated systems to increase productivity and reduce production costs.

6. Digital database. Create a centralized, secure, and easily accessible digital database for storing all important engineering, design, and operational data.

7. Cloud Computing and Services: Using cloud computing to provide scalability, flexibility, and efficiency in data processing. It also allows for easy integration of different tools and platforms.

8. Blockchain for data security and supply chain management. The implementation of blockchain technology can ensure data security, transparency, and efficiency in supply chain management, as well as agreements between rural enterprises and partners.

For the convenience of further calculations, we mathematically designate certain innovative updates as the set $O=\{O_1, O_2, O_3, O_4, O_5, O_6, O_7, O_8\}$. Let's build a model for implementing innovative renewal of technical and technological support for personnel management of an engineering rural enterprise (Figure 2).
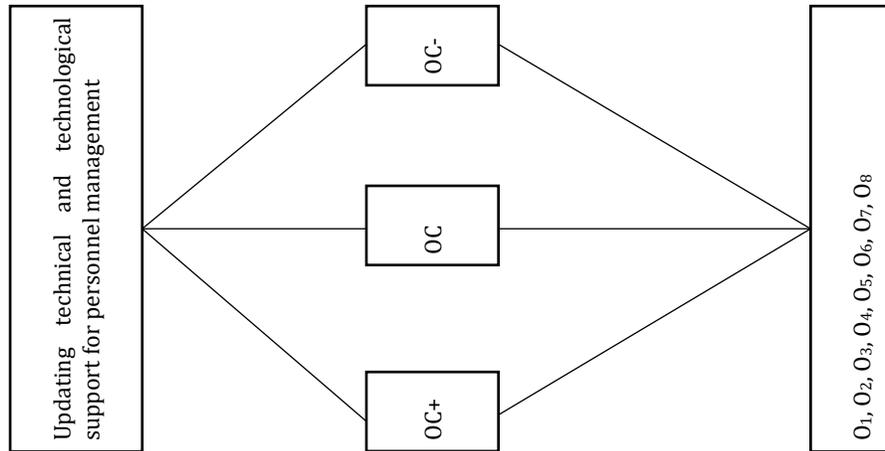

Figure 2: Model for implementing innovative updating of technical and technological support for personnel management of an engineering rural enterprise

Source: own analysis

Further, it should be understood that innovative updates do not stand still, and each of the specific ones can change, improve, or even worsen. In this case, we designate it as "OC+" for improvement, "OC-" for deterioration, and "OC" for no change.

According to a certain procedure, all possible change scenarios are compared, and equality (1) is satisfied:

$$n \times \frac{m(m-1)}{2} \qquad (1)$$

m – represents the number of possible alternatives of comparison options; n is the number of criteria at one of the levels.

Also, the value of the largest eigenvalue λmax, the consistency coefficient, CI, and the level of inconsistency, CR (2) are calculated:

$CI = \frac{\lambda max - n}{n-1}$

(2)

$CR = \frac{CI}{RI}$

To begin with, let us present a matrix of paired comparisons of innovative updates in technical and technological personnel management through a possible scenario for their improvement (Fig. 3).

OC	O₁	O₂	O₃	O₄	O₅	O₆	O₇	O₈
O₁	1	2	4	3	5	7	6	8
O₂	1/2	1	3	6	4	2	5	5
O₃	1/4	1/3	1	4	2	2	3	3
O₄	1/3	1/6	1/4	1	1/3	1/5	2	1
O₅	1/5	1/4	1/2	3	1	1/3	2	2
O₆	1/7	1/2	1/2	5	3	1	4	4
O₇	1/6	1/5	1/3	1/2	1/2	1/4	1	1
O₈	1/8	1/5	1/3	1	1/2	1/4	1	1
λmax=8,6		CI=0,08			CR=0,06			

Figure 3: Matrix of paired comparisons of innovative updates in technical and technological personnel management

Source: own analysis

The next step, according to the methodology we have chosen, will be the standardization of the above matrix (Figure 4).

OC	O₁	O₂	O₃	O₄	O₅	O₆	O₇	O₈
O₁	1	1	2	1	3	1/2	1	3
O₂	1	1	1	1	2	1/3	1/2	4
O₃	1/2	1	1	2	12	1/5	1	6
O₄	1	1	1/2	1	4	1/4	1/3	3
O₅	1/3	1/2	1	1/4	1	1/6	1/5	7
O₆	2	3	5	4	6	1	2	5
O₇	1	2	1	3	5	1/2	1	4
O₈	1/3	1/4	1/6	1/3	1/7	1/5	1/4	1
λmax=8.7		CI=0.11		CR=0.08				

Figure 4: Standardized matrix of paired comparisons of innovative updates in technical and technological personnel management

Source: own analysis

The third stage is determining priorities. The process of assessing the importance of a specific innovative update for technical and technological support of rural enterprise personnel management (prioritization) U_i is carried out following formula (3):

$$U_i = w_1 \times u_{ij} + w_2 \times u_{2j} + w_3 \times u_{3j} + w_4 \times u_{4j} + w_5 \times u_{5j} \qquad (3)$$

u is the sum of the elements of the columns of one or another of the three matrices; column sum when comparing different scenarios.

It should be noted that according to the results of calculations, the following values were found, presented in Table 2.

Table 2: Key similarities and differences between our results compared to others

U_1	U_2	U_3	U_4	U_5	U_6	U_7	U_8
0,22	0,15	0,122	0,06	0,08	0,21	0,11	0,02

Source: own analysis

Thus, it was found that the most significant are innovative updates related to the implementation of artificial intelligence and digital databases. It is for them that a new modern model should be built (Figure 5).
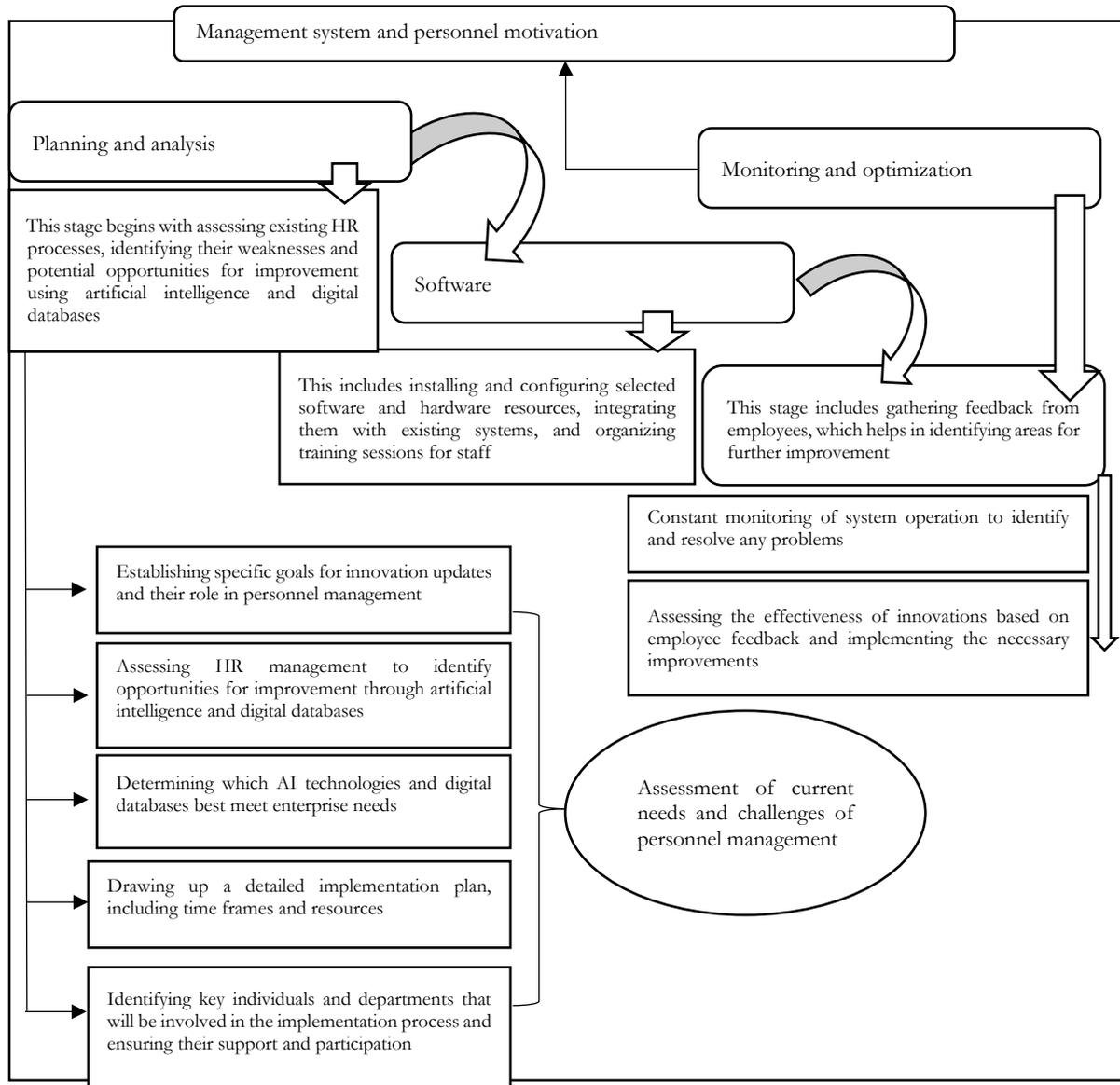
Figure 5: Model of innovative updates of technical and technological support for personnel management engineering rural enterprise through artificial intelligence and digital databases

Source: own analysis

To summarize, the process of introducing innovative updates to the technical and technological support of personnel management at an engineering rural enterprise through artificial intelligence and digital databases is complex and multi-stage. It begins with careful planning and analysis, where the emphasis is on understanding the needs of the rural enterprise and identifying appropriate technology solutions. In the second stage of implementation and integration, the selected plan is implemented with an emphasis on technical configuration, personnel training, and integration of new systems with existing processes. The final stage, monitoring and optimization, focuses on assessing the effectiveness of implemented changes, collecting user feedback, and adapting the system to ensure maximum performance.

DISCUSSION

When discussing our results, it should be noted that the focus should be on comparing our results with similar ones. Some consistency and discrepancies can be noted. For example, a study by Uthayakumar et al. (2020) focuses on the prediction of financial crises using optimization ants, which indicates the importance of using advanced technologies in the analysis and prediction of complex economic trends, which can also be applied in the context of personnel management. The work of Kopytko et al. (2023) analyzes personnel management in the field of safety of engineering rural enterprises in the conditions of Industry 4.0, which reflects the need to adapt personnel management methods to the latest technological standards. This is consistent with our conclusion about the importance of digital technologies and artificial intelligence.

Chlivickas et al. and Šarupičiūtė and Stankevičienė (2014) consider the strategic aspects of human resource management, which emphasizes the importance of effective organization and a strategic approach in this area, which is also important in the context of our study.

A study by Todoshchuk et al. (2023) focuses on the modeling of information systems for personnel management, which coincides with our findings on the importance of implementing digital innovations in this area. Sylkin et al. (2019) and Alazzam et al. (2020) investigate aspects of anti-crisis management and legal challenges of electronic commerce, which emphasizes the need for an integrated approach to risk management and legislative regulation in the field of digital technologies.

Chowdhury et al. (2022) and Rushchyshyn et al. (2021) focus on issues of cyber security and regulation in the field of financial security of the state, which emphasizes the importance of ensuring data security and comprehensive regulation in the context of digital transformation.

Let's highlight the key similarities and differences of the results we obtained in comparison with others (Table 3).

Table 3: Key similarities and differences between our results compared to others

№	Similarities	Differences
1	A common opinion about the importance of artificial intelligence in improving management at the rural enterprise	Combination of different modeling methods
2	Adoption of considerations about the connection between the technical and technical part and management at the rural enterprise.	Formation of a new approach to determining optimal innovative updates for technical and technological support of personnel management
3	Emphasis on personnel in terms of competitiveness and innovation	Construction of a model of the use of specified innovative updates in the system of technical and technological support of personnel management

Source: own analysis

Overall, a comparison of our results with other similar studies confirms the importance of integrating artificial intelligence and digital technologies into human resource management processes, as well as the need to adapt management methods to modern technological and economic conditions. It also highlights the importance of

an integrated approach, including strategic planning, risk management, regulation, and cybersecurity in HR management in the context of digital transformation.

CONCLUSION AND RECOMMENDATION

The study, based on the integrated application of the hierarchical evaluation method, the paired comparison method, the expert ranking method, and the abstract-logical method, provided valuable information on the development of technical and technological support for personnel management. Determining the three levels of technical and technological support for personnel management is a key aspect that helps to understand the structural components and hierarchy of needs in this area.

Based on the results obtained, the conclusion that the use of artificial intelligence and digital databases is the most optimal tactical solution for a modern rural enterprise opens up new prospects for the development of personnel management. Artificial intelligence can significantly improve the accuracy and efficiency of management decision-making, optimizing the processes of recruitment, assessment, development, and maintenance of personnel. At the same time, the integration of digital databases makes it possible to effectively collect, analyze, and use large volumes of information necessary for informed personnel management.

The constructed model of using innovative updates in the system of technical and technological support for personnel management indicates a deep understanding of the need to adapt to changing conditions of the labor market and technological progress. Importantly, this model not only takes into account the current needs of rural enterprises but also predicts future trends, allowing rural enterprises to be one step ahead in planning and implementing HR strategies.

A key aspect is the integration of artificial intelligence and digital technologies into decision-making processes, which can play a decisive role in the formation of flexible, adaptive, and innovation-oriented HR systems. This approach allows rural enterprises not only to increase the efficiency of internal processes but also to create competitive advantages in the market, focusing on continuous improvement and innovation. Given these results, we can conclude that the further development and implementation of artificial intelligence and digital technologies in human resource management systems opens up significant opportunities for increasing the flexibility, productivity, and innovation of modern rural enterprises.

The study is limited by taking into account the characteristics of the activities of only rural enterprises in the engineering sector of the economy. The engineering sector has unique challenges and needs, especially in the context of people management and innovation. Thus, the conclusions and recommendations derived from this study may not be fully transferrable to companies in other industries that have different organizational structures, cultures, and business processes.

Key areas that could be further explored include how artificial intelligence is transforming traditional HR approaches, including recruiting and assessing employees, developing talent, and improving productivity and efficiency. Particular attention may be paid to studying the integration of artificial intelligence into strategic rural enterprise resource planning, in particular in the aspects of forecasting personnel needs, change management, and development of organizational culture. It will also be interesting to study the influence of artificial intelligence on the formation of competitive advantages for companies. You can consider how innovative technologies in personnel management help improve the efficiency of internal processes, optimize costs, and attract highly qualified specialists. In addition, it is important to examine the ethics and privacy issues associated with the use of artificial intelligence in human resources management, as well as an analysis of the risks and challenges that arise when integrating such systems.

REFERENCES

Al Azzam, F.A.F. (2019). The adequacy of the international cooperation means for combating cybercrime and ways to modernize it. JANUS. NET e-journal of International Relations, 10, 64-81. https://doi.org/10.26619/1647-7251.10.1.5

Alazzam, F.A., Aldrou, K.K., Salih, A.J. (2020). Legal Problems and Challenges Facing Electronic Commerce Con-tracts and Ways to overcome them in the Jordanian and Comparative Legislatures. International Journal of Innovation, Creativity and Change, 12(9), 323–338. https://www.ijicc.net/images/vol12/iss9/12931_Aldrou_2020_E_R.pdf

Alazzam, F.A.F., Shakhatreh, H.J.M., Gharaibeh, Z.I.Y., Didiuk, I., Sylkin, O. (2023). Developing an information model for E-Commerce platforms: A study on modern socio-economic systems in the context of global digitalization and legal compliance. Ingénierie des Systèmes d'Information, 28(4), 969-974. https://doi.org/10.18280/isi.280417

Ali, O., Ally, M., Clutterbuck, P., & Dwivedi, Y. (2020). The state of play of blockchain technology in financial services sector: A systematic review. International Journal of Information Management, 54, 102199. https://doi.org/10.1016/j.ijinfomgt.2020.102199

Al-Tit, A. A. (2020). E-Commerce drivers and barriers and their impact on e-customer loyalty in small and medium-sized rural enterprises (SMES). Business: Theory and Practice, 21(1), 146-157. https://doi.org/10.3846/btp.2020.11612

Bataev, A.V., Dedyukhina, N., Nasrutdinov, M.N. (2020). Innovations in the financial sphere: Performance evaluation of introducing service robots with artificial intelligence. ICITM 2020 - 2020 9th International Conference on Industrial Technology and Management, IEEE, Oxford, United Kingdom, 256-260. https://doi.org/10.1109/ICITM48982.2020.9080379

Chlivickas, E., Papšienė, P., Papšys, A. (2010). Human resources: Strategic management aspects. Business, Management and Economics Engineering, 8(1), 51-65. https://doi.org/10.3846/bme.2010.04

Chowdhury, N., Nystad, E., Reegård, K., Gkioulos, V. (2022). Cybersecurity training in Norwegian critical infrastructure companies. International Journal of Safety and Security Engineering, 12(3), 299-310. https://doi.org/10.18280/ijsse.120304

Dabić, M., Vlačić, B., Paul, J., Dana, L. P., Sahasranamam, S., & Glinka, B. (2020). Immigrant entrepreneurship: A review and research agenda. Journal of Business Research, 11(3), 25–38. https://doi.org/10.1016/j.jbusres.2020.03.013

Fátima, F., Gonçalves, A., Sandrina, T. (2021). Information technology adoption on digital marketing: A literature review. Informatics. 8(4), 74. https://doi.org/10.3390/informatics8040074

Fisher, R., McPhail, R., You, E., Ash, M., Michael Harvey, D., & Timothy Kiessling, D. (2014). Using social media to recruit global supply chain managers. International Journal of Offshore and Polar Engineering, 44(8/9), 635–645. https://doi.org/10.1108/IJPDLM-07-2013-0179

Gonzalez, M. F., Capman, J. F., Oswald, F. L., Theys, E. R., & Tomczak, D. L. (2019). "Where's the IO?" Artificial intelligence and machine learning in talent management systems. International Journal of Offshore and Polar Engineering, 5(3), 5. https://doi.org/10.25035/pad.2019.03.005

Jam, F. A., Mehmood, S., & Ahmad, Z. (2013). Time series model to forecast area of mangoes from Pakistan: An application of univariate ARIMA model. Acad. Contemp. Res, 2, 10-15.

Kolisnychenko, T., Sefikhanova, K., Kapral, O., Karpenko, V., Sylkin, O. (2023). Development of an algorithm for Internet marketing strategy implementation: A case study in the EU hotel and restaurant sector. Ingénierie des Systèmes d'Information, 28(6), 1549-1556. https://doi.org/10.18280/isi.280611

Kopytko, M., Liubokhynets, L., Kalinin, A., Sai, L., Bala, O. (2023). Personnel management in the system of ensuring safety and security of the engineering rural enterprise in the conditions of industry 4.0. International Journal of Safety and Security Engineering, 13(3), 547-554. https://doi.org/10.18280/ijsse.130317

Zandi, G., Rehan, R., Hye, Q. M. A., Mubeen, S., & Abbas, S. (2022). Do corruption, inflation and unemployment influence the income inequality of developing asian countries?.

Li, W.X. (2020). Financial crisis warning of financial robot based on artificial intelligence. Revue d'Intelligence Artificielle, 34(5), 553-561. https://doi.org/10.18280/ria.340504

Mabad, T., Ali, O., Ally, M. W., F, S., & Chan, K. C. (2021). Making investment decisions on RFID technology: An evaluation of key adoption factors in construction firms. IEEE Access, 9, 36937–36954. https://doi.org/10.1109/ACCESS.2021.3063301

Malyarenko, A., Nohrouzian, H., Silvestrov, S. (2020). An algebraic method for pricing financial instruments on post-crisis market. Springer Proceedings in Mathematics and Statistics, 317, 839-856. https://doi.org/10.1007/978-3-030-41850-2_35

Raisch, S., Krakowski, S. (2021). Artificial intelligence and management: The automation–augmentation paradox. Academy of Management Review, 46(1), 192-210. https://doi.org/10.5465/amr.2018.0072

Rushchyshyn, N., Medynska, T., Nikonenko, U., Kostak, Z., Ivanova, R. (2021). Regulatory and legal component in ensuring state's financial security. Business: Theory and Practice, 22(2), 232-240. https://doi.org/10.3846/btp.2021.13580

Saleh, A.J., Alazzam, F.A.F., Rabbo Aldrou, K.K.A., Zavalna, Z. (2020). Legal aspects of the management of cryptocurrency assets in the national security system. Journal of Security and Sustainability Issues, 10(1), 235-247. https://doi.org/10.9770/jssi.2020.10.1(17)

Šarupičiūtė, J., Stankevičienė, A. (2014). The place of human resource management department in private and public sector organisations in Lithuania. Business: Theory and Practice, 15(1), 93-102. https://doi.org/10.3846/btp.2014.09

Sylkin, O., Kryshtanovych, M., Zachepa, A., Bilous, S., Krasko, A. (2019). Modeling the process of applying anti-crisis management in the system of ensuring financial security of the rural enterprise. Business: Theory and Practice, 20, 446-455. https://doi.org/10.3846/btp.2019.41

Sylkin, O., Shtangret, A., Ogirko, O., Melnikov, A. (2018). Assessing the financial security of the engineering rural enterprises as preconditions of application of anti-crisis management: practical aspect. Business and Economic Horizons, 14(4), 926-940. https://doi.org/10.15208/beh.2018.63

Todoshchuk, A., Motorniuk, U., Skliaruk, T., Oliinyk, I., Kornieieva, T. (2023). Modelling information systems for personnel management: Navigating economic security in the transition to Industry 5.0. Ingénierie des Systèmes d'Information, 28(3), 595-601. https://doi.org/10.18280/isi.280307

Uthayakumar, J., Metawa, N., Shankar, K., Lakshmanaprabu, S.K. (2020). Financial crisis prediction model using ant colony optimization. International Journal of Information Management, 50, 538-556. https://doi.org/10.1016/j.ijinfomgt.2018.12.001