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FINANCING THE IMPLEMENTATION OF HR ENGINEERING IN MANUFACTURING ENTERPRISES IN THE CONTEXT OF THE COUNTRY'S DIGITAL ECONOMY FORMATION

ABSTRACT

The article is devoted to the study of possible prospects for financing the implementation of HR engineering at manufacturing enterprises in the conditions of the formation of a digital economy. In the process of research, the authors considered the possibilities of implementing HR engineering at production enterprises and focused attention on the main directions of implementation. The principles of financing enterprises that implement changes and transform are revealed. Approaches and strategies aimed at optimizing human capital management in the company are proposed. The authors noted the following main tools of HR engineering for the development and improvement of HR processes, which are key to building effective human capital management strategies in the organization and require funding: organizational management structure, strategic maps, creation of a portrait of personnel competencies, modelling of the human resources management process resources, development of a goal tree, increased flexibility of HR management processes, implementation of a balanced system of indicators. The authors' comprehensive analysis of the implementation of digital HR solutions by manufacturing enterprises in previous years made it possible to identify the most important obstacles to the successful implementation and financing of innovations and digital solutions, the main of which are: insufficient financial resources for the implementation of innovative projects; lack of sufficient financial assistance and stimulation from the state; large financial costs associated with changes in the infrastructure and introduction of new technologies; low interest of investors, which may limit access to external sources of financing; some innovations may require a long payback period, which becomes a challenge for companies; high interest rates on loans can make it difficult to finance innovative projects. Considering these financial factors, it is important to develop comprehensive strategies and tools to overcome obstacles and stimulate the innovative and digital development of manufacturing enterprises.

Keywords: digitalization, financing, HR-engineering, industry, innovations, infrastructure, partner-ship for the goals

JEL Classification: L86

INTRODUCTION

Digital technologies have rapidly entered the lives of people, enterprises and the state, which prompts everyone to react by taking a course towards development and growth, for further survival in a competitive business environment. New value systems appear, in which the status of a person and society begins to be characterized not by the amount of accumulated material goods, but by the level of mental development of the individual, culture, education, readiness to develop, learn and self-improve; the status of the enterprise is determined not only by the number of products produced and sold, services provided, and customers involved, but also by the level of digital and engineering development, the number and quality of digital implementations at all levels of the enterprise's work.

Since human resources today can be considered the most valuable strategic resource in the work of any enterprise, personnel management is one of the key areas of development of the modern enterprise management system. Therefore, personnel management can be considered the main business process that ensures the operation and development of the enterprise.

The coronavirus and the war became the impetus for revising the strategy of enterprises that wanted to continue to work and develop, in the direction of digitization, transformation, and engineering. HR engineering became one of the tools, the implementation of which gave tangible advantages to the company in the market. Therefore, the transformation of HR processes and the search for financial resources allowed enterprises to quickly and mobile adapt to changes in the business environment.

LITERATURE REVIEW

HR engineering is a complex and integrated system that includes various aspects, levels, and tools. Research in this field is essential for understanding and optimizing personnel management under current conditions. The approach to HR engineering (Kyfyak, Zapuhlyak, 2021) defines it as a comprehensive managerial task aimed at building or improving an effective personnel management system. This system encompasses a wide range of procedures and actions, including workforce planning, job analysis and evaluation, candidate selection, management of new employee adaptation, employee motivation, training and professional development management, as well as performance appraisal and compensation.

Researchers (Bej, Sereda, 2019) have thoroughly analyzed the role of digital transformation as a key tool in the field of human resource management (HR). They highlighted the main technological trends and identified the drivers of HR management development. These studies provide a better understanding of how the use of digital tools can contribute to the optimization and improvement of personnel management under contemporary conditions.

Further research (Thomas, 2020) focuses on identifying problems and barriers that may arise during the digitalization of the HR field in enterprises. This helps to eliminate potential obstacles and ensure a more successful implementation of digital technologies in personnel management.

The research conducted by scientists (Safaâ, Mohamed, 2020) focuses on the description of tools for implementing information systems in HR processes. This is an important step towards developing specific practical recommendations and strategies for enterprises aiming to integrate digital technologies into their operations. All these studies together contribute to a deeper understanding and effective use of digital tools in human resource management, which in turn enhances productivity and efficiency in enterprises.

The scientific community (Vodianka, Kharovska, 2022), in their research, examines the evolution of engineering through the lens of historical development, identifying three main stages. The first stage - the practice of administrative-planned management - is characterized by the use of a centralized management system where plans and tasks are set top-down, without significant attention to individual needs or employee initiative.

The second, transitional stage, is marked by a shift from centralized planning to more flexible and decentralized management systems. At this stage, new methods and approaches to organizing work processes begin to develop, taking greater account of employee individuality and initiative.

The third stage, associated with market-based economic conditions, is characterized by even greater flexibility and adaptability in management. Market competitiveness requires enterprises to respond quickly to changes and actively implement innovations. HR engineering at this stage becomes a key tool for achieving competitive advantage and ensuring success in the conditions of a market and digital economy.

Examining the historical aspects of engineering development (Vodianka, Kharovska, 2022), the author emphasizes not only the changes in management methods but also the broad impact of these changes on the efficiency and competitiveness of enterprises under different economic conditions.

Organizing the implementation of HR engineering in the operations of a manufacturing enterprise requires a targeted strategy that includes several key aspects.

Firstly, it involves analyzing existing processes and identifying areas that need optimization or modernization within the manufacturing enterprise. Methods such as system analysis and SWOT analysis can be used to perform this analysis.

Next, it is important to form a team of specialists from various fields who will be responsible for implementing HR engineering solutions in the context of the country's digital economy formation. This team should have a sufficient level of expertise and knowledge to effectively analyze, plan, and implement new processes.

Additionally, it is crucial to consider the importance of engaging and gaining the support of top management. Only with active support from leadership can sufficient resources be secured to ensure the successful implementation of HR engineering.

Effective implementation of HR engineering requires systematic monitoring and evaluation of results. This allows for the timely identification of issues and adjustment of the implementation strategy to achieve the best outcomes at the manufacturing enterprise (Karcheva, Ohorodnia, 2017).

Thus, organizing the implementation of HR engineering in the operations of a manufacturing enterprise is a complex and multifaceted process that requires careful planning, coordination, and support from all management levels.

In the modern world, where technologies are constantly evolving and business processes continuously adapt to new conditions, HR engineering becomes even more crucial. Continuous adjustments in personnel management systems require deep analysis and a systematic approach to studying HR engineering methodologies in the context of their implementation into core business processes.

The paradigm shift in HR engineering is occurring against the backdrop of rapid technological development and the introduction of new approaches to personnel management. This demands that researchers pay attention to a wide range of aspects, including not only technological solutions but also the human factor, organizational culture, strategic planning, and other significant components.

A comprehensive analysis of methodological approaches to HR engineering needs to consider the individual characteristics of each enterprise, its industry, and the competitive environment in the market. This means that researchers should consider different contexts and situations in which HR engineering is used and develop recommendations that are optimal for specific market conditions and individual manufacturing enterprises.

Such an approach will not only help understand which technologies can be used to improve personnel management but also determine the optimal strategies for implementing these technologies that meet the needs and characteristics of each enterprise.

Equally important is the issue of financing the implementation of HR engineering in enterprises. Financing the implementation of HR engineering is a key aspect of successfully realizing this process, as costs can vary depending on the size of the enterprise, the scale of changes, and the chosen technologies and methodologies.

AIMS AND OBJECTIVES

The aim of this work is to explore the potential prospects for financing the implementation of HR engineering in manufacturing enterprises within the context of the digital economy formation.

The research objectives to be achieved are:

- examine the possibilities of implementing HR engineering in manufacturing enterprises and highlight the main directions of implementation;
- uncover the principles of financing enterprises that are undergoing changes and transformations;
- consider HR engineering tools for the development and improvement of HR processes in manufacturing enterprises;
- explore the financing options for the implementation of HR engineering in manufacturing enterprises;
- propose aspects that should be considered when planning the financing of HR engineering in manufacturing enterprises.

METHODS

In the process of researching the topic of financing the implementation of HR engineering in the context of digitalization, various approaches to analysis were applied. These include the following:

1. Expert Evaluation: Engaging experts from different business fields provided additional insights and recommendations regarding the innovative development of enterprises amid the digital transformation of HR processes.

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2. Scenario Modeling: Developing various scenarios for financing HR engineering in manufacturing enterprises allowed for the analysis of possible outcomes and results of each scenario in the context of digital transformation.
3. System Analysis: Considering the interrelationships between different aspects of innovative development in manufacturing enterprises under digitalization and their impact on the organizational economy as a whole. This approach enabled a deeper understanding of the complex interconnections and the impact of digital changes on various business aspects.

The use of these methods expanded the methodological base and provided a deeper examination of the possibilities and prospects for strategic management of the innovative development of manufacturing enterprises in the context of the digital transformation of HR processes.

RESULTS

The development mechanism of HR engineering technology at an enterprise is a complex and multidimensional process that involves not only the internal organization of interaction with the enterprise's workforce but also active collaboration with the external business environment. In implementing this process, it is essential to consider the specifics of production processes and the requirements for the quality and efficiency of the final product.

Management technologies are an integral part of modern management, helping to choose optimal strategies and management processes that enhance the productivity and competitiveness of the enterprise. They represent scientifically grounded methods and techniques aimed at ensuring the effective functioning of the organization (Karcheva, Ohorodnia, Openko, 2017; Lozova, Oliinyk, 2019).

One of the main tasks of implementing HR engineering in manufacturing enterprises in the current digital economy is not only the systematization and generalization of the experience of domestic and foreign researchers but also the development of specific strategies and tools aimed at introducing innovative personnel management technologies. This will enhance the competitiveness and resilience of the enterprise in the face of constant market changes and technological progress.

In modern business, there is a trend where managers focus on their personal views and intuition instead of using innovative human resource management technologies. This is often due to limited time and financial resources, which complicates the detailed analysis and selection of the most promising candidates for the job.

However, research results indicate that the optimal approach to personnel management is the application of differentiated innovative methods and management styles that consider the individual characteristics of each employee. Each person is unique, and their needs and motivations may differ from others. Therefore, it is essential to ensure a personalized management approach that maximizes each employee's potential.

Ultimately, the success of personnel management lies in the company's ability to recognize and consider the diversity and individuality of its personnel, creating a favorable working atmosphere and ensuring effective team performance (Spasiteleva, Buryachok, 2018).

The conclusions drawn from the research underscore the importance of implementing innovative technologies for managing professional development of personnel, considering the current realities of the industrial-manufacturing sector. Ensuring maximum productivity of employees in the relevant segment of production activity is a key aspect of this process (Friedlmaier, Tumasjan, Welpe, 2018; Nikonenko, 2022).

The research indicates the need for developing well-founded scientific and methodological approaches to evaluating the professional qualifications of employees. This includes not only determining the current level of qualification but also analyzing the dynamics of its changes over time. Additionally, it is important to determine the maximum workload for each employee and to develop models that motivate professional self-improvement.

Such an approach will optimize the process of managing the professional development of personnel, enhancing its effectiveness and maintaining high work productivity. Considering modern aspects of manufacturing enterprises' operations will help adapt management strategies to current market demands and ensure the enterprise's competitive advantage.

When analyzing personnel competitiveness over a certain period, it is important to use methods that allow for an objective and comprehensive assessment of the impact of various factors on this indicator. One such method is taxonomic analysis, which allows for the systematization and classification of different aspects of personnel competitiveness.

In analyzing personnel competitiveness, it is crucial to consider the fundamental principles of HR engineering, which determine the effectiveness and productivity of human resource management. Understanding these principles helps enhance business efficiency and ensure the success of the company's strategic goals (Dudnik, Kuzmych, Trush, Domkiv, Leshchenko, 2020).

One of the key principles of HR engineering is the individualization of the approach to each employee. This involves adapting personnel management strategies to the specific needs, skills, and motivations of each employee. An individualized approach allows for more effective utilization of employees' potential and stimulates them to achieve high results.

Another important principle is the continuous learning and development of personnel. Providing opportunities for learning and professional growth increases employees' qualifications, adapts them to changes in the business environment, and boosts their motivation to succeed. Additionally, creating a favourable organizational climate and corporate culture that attracts and retains talented employees is crucial. This includes creating an open and trusting environment, fostering communication and cooperation among employees, and supporting the company's values and goals.

Applying these principles enhances personnel competitiveness and ensures business success in the face of constant changes and challenges.

The principles of HR engineering describe approaches and strategies aimed at optimizing human capital management in manufacturing enterprises. Let’s examine each of these principles along with their advantages, disadvantages, and application possibilities during the transformation of manufacturing enterprises:

Table 1. Advantages, Disadvantages, and Application Possibilities of HR Engineering Principles. *(Source: Haponenko, Vasylenko, 2020; Latysheva, 2020)*

№	Principles of HR Engineering	Advantages	Disadvantages:	Application Possibilities
1	Flexibility in Designing HR Processes	Ability to quickly adapt to changes in the business environment, support for innovation and employee creativity	Need for meticulous attention to details during implementation, potential for process instability	+/-
2	Human-Centric Approach to Business Process Formation	Improved interaction between employees and the company, increased motivation and employee satisfaction	Possibility of delays in production processes due to increased focus on individual employee needs	+
3	Systematic Approach to Formulating a New HR Strategy Model	Comprehensive review of all aspects of personnel management, improved management efficiency	Requirement for significant resources for developing and implementing systemic changes	+
4	Multilevel and Multifaceted Implementation and Evaluation of HR Strategy	Adaptability of the strategy to different scenarios and conditions, ability to assess effectiveness at various levels	Complexity in managing multiple strategy variants and their impacts	+
5	Economic and Social Impact of HR Engineering Implementation	Increased productivity and employee satisfaction, enhancement of company reputation	Potential for high implementation costs, need for time to see specific results	+/-
6	Digitalization and Digitization of HR Processes	Automation and increased efficiency in personnel management, real-time data access	Requirement for substantial investment at the initial stage, potential for technical issues	+/-
7	Optimization of HR Processes through Integration, Minimization, and Digitalization	Reduction of unnecessary operations and costs, improvement in accuracy and speed of processes	Need for meticulous attention to details during optimization, potential loss of individualized approach	+/-
8	Principle of Decentralized Responsibility and Autonomous Management	Promotes leadership development and initiative among employees, quick response to changes	Need for clear communication and coordination between departments, potential for conflicts of interest	+
9	Implementation of Global Standards for Business Process Management in HR Processes	Standardization: Applying global standards allows the company to operate according to universally recognized methodologies and processes, enhancing efficiency and competitiveness. Quality improvement: Standards enable the establishment of high-quality standards in personnel management, contributing to overall company performance enhancement. International collaboration: Utilizing global management standards enables enterprises to facilitate easier collaboration and competition in the international market	Systemic implementation: Implementing global standards may require significant efforts to adapt them to specific needs and company peculiarities. Costs: Implementing standards can be costly both in terms of finances and resources	+/-
10	Principle of Public Disclosure of HR Engineering Goals and Methodologies	Increase of understanding: Publicly disclosing the purpose and methodology of HR engineering allows employees to gain a deeper understanding of transformation goals and their impact on the company. Employee engagement: When employees understand the goals and methods of transformation, they can actively support and participate in the process	Resistance risk: Public disclosure can provoke resistance among employees, especially if the changes are perceived as threatening or unclear. Confidentiality: Some aspects of the purpose and methodology of HR engineering may be confidential or sensitive, which can complicate their public disclosure	+

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The main tools of HR engineering for developing and improving HR processes and the need for funding the implementation of these tools are presented in Table 2. These tools are crucial for building effective human capital management strategies in a manufacturing enterprise.

Table 2. Key HR Engineering Tools for Developing and Enhancing HR Processes in a Manufacturing Enterprise. *(Source: Danylevich, Rudakova, Shchedinina, Kasyanenko, 2020; Demchyshak, Bilenka, 2018; Humeniuk, 2018)*

Main tools of HR engineering	Description	Application Possibilities	Need for financing
Organizational management structure	Considering the challenges of modern society, the process-oriented approach to business process management, including human resource management, is becoming increasingly popular and effective. This is linked to the need to address new social issues, as well as the requirements of the ISO 9001 quality management standard, which is based on global experience in rational management. Within the framework of implementing this approach, emphasis is placed on processes and the documentary formalization of regulations. This not only allows for the creation of a systematic and efficient management model but also ensures stability and reliability in the organization's activities	+	Partially (if the company cannot independently, with existing resources, make changes to the organizational management structure)
Strategic maps	The multi-variant development tool for business processes and its implementation across all aspects of enterprise planning and operations plays a critical role in ensuring flexibility and adaptability in a changing business environment. This tool involves creating and implementing various strategies and action plans, allowing the enterprise to prepare for different scenarios of development. It means that the company can consider diverse conditions, circumstances, and execution options for its strategies and actions, ensuring alignment with current needs and external conditions	+/-	Yes
Development of personnel competency profiles	Using architectural methodology helps identify function duplications, enabling efficient optimization of relationships between different departments and processes. This method allows for a thorough analysis of the organization's structure and identifies opportunities for resource sharing and process optimization. Employing architectural methodology in an organization enables the creation of a structure that optimally reflects business needs and objectives, ensuring maximum efficiency in management and resource utilization. This approach contributes to enhancing the company's competitiveness and developing its business processes in accordance with modern technological and social requirements	+	No
Modelling of human resources management processes	Within the framework of HR engineering, it is important to develop two business models: "AS IS" (current state) and "TO BE" (future state). The first model, "AS IS," is formulated by a detailed description of current HR-related business processes and visualizing their relationships. This allows an understanding of how HR processes currently function within the organization. After creating the "AS IS" model, a deep analysis of HR processes and their relationships is conducted. This helps identify opportunities for optimization and pinpoint problematic aspects that require improvement	+	Partially (if the company cannot independently, with existing resources, model the human resources management process)
Development of goal trees	The development of a goal tree is a planning method that helps systematize and hierarchically structure the goals of an organization or project. The primary purpose of a goal tree is to reveal the relationships between main goals and sub-goals, elucidate the connections among them, and ensure that all efforts are directed towards achieving the defined objectives	+/-	Yes
Enhancement of flexibility in HR management processes	By developing flexibility matrices for functional units, it is possible to systematize and determine the level of interchangeability and the possibility of simultaneous execution of business processes. This approach allows for the optimization of workflow processes through the effective allocation of tasks and functions among different functional units. Flexibility matrices of functional units contribute to the creation of a flexible and adaptive organizational structure capable of efficiently responding to changes in the external environment and market demands. This approach enables enterprises to ensure competitiveness and the ability to innovate effectively	+/-	Yes
Implementation of a balanced scorecard	The development of a Balanced Scorecard (BSC) reflects various aspects of an organization's activities according to strategic maps, enabling management to gain a comprehensive view of processes across all areas of operation. The Balanced Scorecard includes indicators in four main categories: financial, customer, internal processes, and learning and growth. These categories complement each other and provide a comprehensive reflection of the organization's strategic development direction	+	Yes

Implementing HR engineering tools in manufacturing enterprises can have a significant positive impact on their operations and performance. Let's consider several additional aspects that underscore the importance and usefulness of these tools:

1. Adaptation to Changes: In today's business environment, the pace of change is rapid. Applying HR engineering enables enterprises to be flexible and adaptive to new labour market demands and trends.
2. Enhanced Workforce Efficiency: Optimization of HR processes rationalizes workflows, resulting in reduced time and resource expenditures on tasks.
3. Improved Decision-Making Quality: A balanced scorecard system provides management with objective insights into workforce performance, identifying areas for further improvement.
4. Development of Competitive Strategies: Strategic maps and goal tree development help enterprises define strategic objectives and devise action plans to achieve them.
5. Increased Employee Satisfaction: A focus on a people-centric approach and the development of employee-centric business processes enhance motivation and satisfaction, positively impacting overall labour productivity.

Thus, the discussed HR engineering tools not only aid in optimizing and refining HR processes but also contribute to the competitiveness, stability, and development of manufacturing enterprises in the modern business environment.

When implementing changes in personnel management in manufacturing enterprises using HR engineering technologies, it is crucial to follow a specific sequence of steps. Starting from defining the implementation strategy and the functioning of HR engineering, the enterprise needs to understand how these changes will affect its operations and what goals they aim to achieve.

Let's consider the funding opportunities for implementing HR engineering in manufacturing enterprises in the conditions of the digital economy. Figure 1 shows the dynamics of implementation of new technological and digital solutions by industrial enterprises over the past decade.

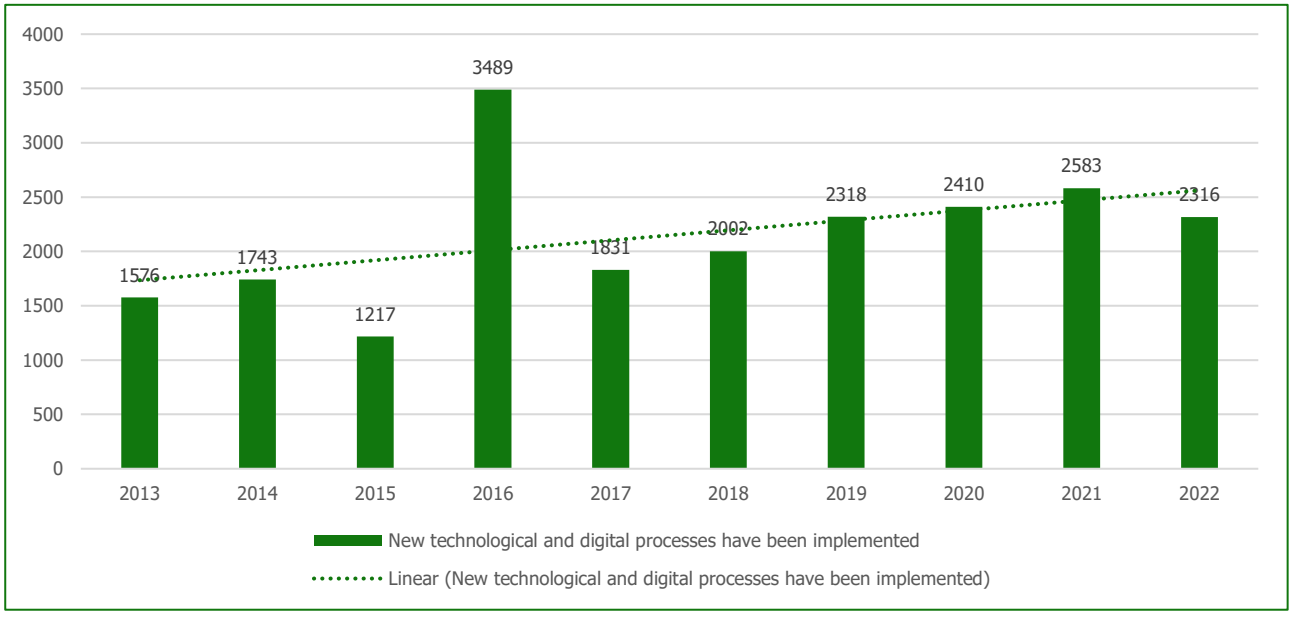

Figure 1. Dynamics of implementation of new technological and digital solutions by industrial enterprises over the past decade. *(Source: Kovalko, Eutukhova, Novoseltsev, 2022; Mia, Rizwan, Zayed, 2022)*

Analysis of expenditures on innovation and digital activities over the past decade demonstrates dynamic development in this area. Maximum expenditures were recorded in 2016, reaching UAH 23,229.5 million. However, in 2017, there was a significant reduction, with expenditures decreasing by 39% compared to the previous year (Figure 2).

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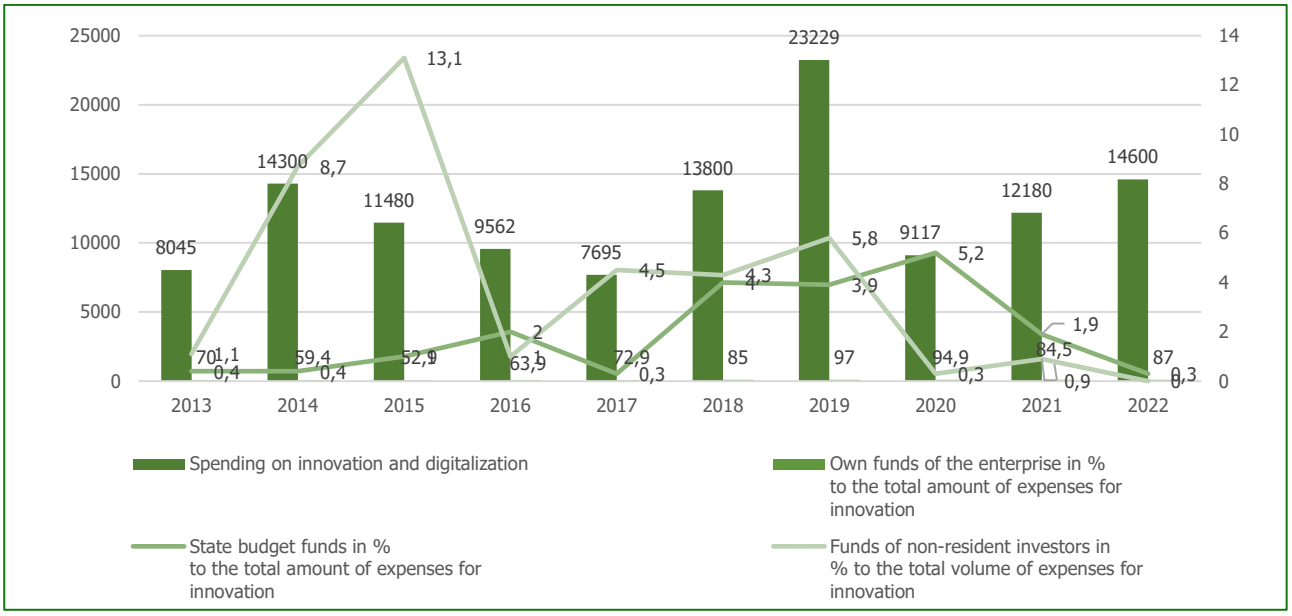

Figure 2. Dynamics of Implementation of New Technological and Digital Solutions by Industrial Enterprises Over the Last Decade.
(Source: Lelyk, 2022; Mishchuk, 2022; Stijn Claessens, 2017)

The decrease in expenditures in 2017 may be attributed to several factors such as reevaluation of spending strategies, project reorganization, or adjustment of financial plans. It is important to note that from this point onward, expenditures on innovation and digital activities began to steadily increase, reaching UAH 14,406.7 million in 2022. This positive trend underscores the growing importance of digital innovations for enterprises. Reflecting a strategic understanding of the significance of digital transformation, companies are actively investing in these technologies to ensure competitiveness and sustainable development.

The financing of innovation and digital activities in manufacturing enterprises is predominantly carried out using internal resources. Over recent years, there has been a trend where the largest share of funding in this area comes from internal sources of enterprises. This indicates a high level of independence and readiness of enterprises to invest their own resources into innovative projects. Such independence and interest in implementing cutting-edge technologies underscore their internal determination and resolve.

In terms of funding volume, funds from other sources including diverse partnership agreements, financing, and other forms of external funding occupy the second position. Nevertheless, the contribution of the state budget to innovation funding remains smaller compared to other sources.

One of the most significant challenges restraining the innovation and digital transformation of manufacturing enterprises is a complex of factors limiting their capacity to adopt modern technologies.

Among the most significant barriers to successful implementation of innovations and digital solutions in manufacturing enterprises, the following factors can be identified: insufficient financial resources for implementing innovative projects significantly hinder the adoption of modern technologies; lack of adequate financial support and incentives from the government can complicate enterprises' innovative initiatives; substantial financial expenditures associated with infrastructure changes and implementation of new technologies can pose a serious challenge for companies; low level of employee qualifications can create difficulties in the process of integrating and managing new technologies; implementation of innovations often involves significant economic risks, especially during transitional periods; lack of clear and adapted legal norms for innovations can complicate the implementation of new developments; low investor interest can limit access to external sources of funding; some innovations may require a long payback period, which becomes a challenge for companies; high interest rates on loans can complicate financing of innovative projects; lack of sufficient demand for innovative goods or services can reduce motivation for implementing innovations; lack of adequate information can complicate strategic planning and development of new products or services; resistance within the company and underestimation of the importance of innovations can create additional obstacles. Considering these factors, it is important to develop comprehensive strategies and tools to overcome barriers and stimulate innovation and digital development in manufacturing enterprises.

Given the above, here are several key aspects to consider when planning financing for HR engineering in manufacturing enterprises (Table 3).

Table 3. Aspects to Consider When Planning Financing for HR Engineering in Manufacturing Enterprises. *(Source: Akimov, Karpa, Parkhomenko-Kutsevil, Kupriichuk, Omarov, 2021; Sumets, 2022; Novak, 2022)*

№	Aspects	Process Details	Description
1	Needs Analysis and Planning	HR Process Audit	Before implementing engineering, it is worth conducting an audit of existing HR processes to identify weak points and determine priorities
		Strategy Development	Includes defining project goals, resources, timelines, and budget
2	Technological Investments	HRM Systems	Procurement and implementation of human resource management (HRM) systems
		Automation	Investments in the automation of HR processes such as recruiting, onboarding, talent management, etc
3	Staff Training	Skills Enhancement	Training of HR specialists in new methods and technologies
		Employee Training	Conducting training for all personnel on new processes and systems
4	Monitoring and Evaluation	Consulting Services	Hiring external consultants to help implement and configure HR engineering
		Monitoring Systems	Investments in systems for monitoring and evaluating the effectiveness of implemented changes
		Performance Evaluation	Regular evaluation of the results and correction of the strategy if necessary
5	Sources of Funding	Company's own funds	Using internal resources to cover implementation costs
		Loans and investments	Attracting bank loans or investments from venture capital funds
		Government grants and programs	Use of state programs to support innovation and digitization
6	Examples of Successful Implementation	Corporations	Large companies such as Google or Microsoft actively invest in HR engineering, which allows them to manage talent more effectively and remain competitive
		Small and medium enterprises	Many medium-sized companies are using flexible and less expensive approaches such as cloud-based HRM systems

Thus, financing HR engineering is a multifaceted process that requires careful planning and consideration of various factors. It is important not only to find sources of funding but also to allocate resources correctly to achieve maximum implementation efficiency.

DISCUSSION

We agree with the opinions of scientists who study the problems of implementing HR engineering. In particular, the components of production (industrial) engineering, which are defined in works (Danylevich, Rudakova, Shchedinina, Kasyanenko, 2020), should be defined. The components considered by scientists form the basis for the effective implementation of engineering approaches in production and industrial enterprises. However, in our opinion, for the successful implementation of these components, it is also necessary to properly consider the organization of the process of implementation and financing of HR engineering.

CONCLUSIONS

The application of HR engineering to business processes in manufacturing enterprises can have significant positive outcomes, enhancing efficiency and competitiveness. Firstly, optimizing the overall organizational structure and reducing management levels allows the manufacturing enterprise to become more agile and respond to market changes more swiftly. Increased managerial control helps ensure greater accountability and discipline among staff.

The principles of HR engineering describe approaches and strategies aimed at optimizing human capital management within a company. Key HR engineering tools for developing and refining HR processes, essential for building effective human capital management strategies in an organization and requiring funding, include organizational management structure, strategic maps, creation of personnel competency profiles, human resource management process modelling, goal tree development, enhancing flexibility of HR management processes, and implementing a balanced scorecard system.

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Analysis of digital solutions implementation in manufacturing enterprises in previous years has identified major barriers to the successful adoption of innovations and digital solutions. Key obstacles include insufficient financial resources for implementing innovative projects, lack of adequate financial support and incentives from the government, significant financial costs associated with infrastructure changes and technology implementation, low investor interest limiting access to external sources of funding, some innovations requiring a lengthy payback period posing challenges for companies, and high interest rates on loans complicating financing of innovative projects. Considering these financial factors, it is important to develop comprehensive strategies and tools to overcome obstacles and stimulate innovation-driven digital development in manufacturing enterprises.

Therefore, HR engineering aims to achieve high performance through optimization, digitalization, and enhancement of all aspects of manufacturing enterprise operations. It contributes to creating a more efficient and competitive business environment.

Our further research will be aimed at 1) analysis of the results of the implementation of HR-engineering tools at enterprises that have embarked on the path of digital transformation and have begun to transform business processes at manufacturing enterprises; 2) study of the payback period of the introduction of HR innovations at production enterprises; possibilities of attracting credit funds from banking institutions and investors for financing innovative projects at production enterprises.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

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CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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Бумане І., Звіргздіна Р., Гура Н., Метелиця В., Отенко І., Бялошицький М.

ФІНАНСУВАННЯ ВПРОВАДЖЕННЯ HR-ІНЖИНІРИНГУ НА ВИРОБНИЧИХ ПІДПРИЄМСТВАХ В УМОВАХ ФОРМУВАННЯ ЦИФРОВОЇ ЕКОНОМІКИ КРАЇНИ

Стаття присвячена дослідженню можливих перспектив фінансування впровадження HR-інжинірингу на виробничих підприємствах в умовах формування цифрової економіки. У процесі дослідження автори розглянули можливості впровадження HR-інжинірингу на виробничих підприємствах і закцентували увагу на основних напрямах упровадження. Розкрито принципи фінансування підприємств, які впроваджують зміни й трансформуються. Запропоновано підходи й стратегії, спрямовані на оптимізацію управління людським капіталом у компанії. Автори відзначили

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такі основні інструменти HR-інжинірингу для розробки й удосконалення HR-процесів, які є ключовими для побудови ефективних стратегій управління людським капіталом в організації та потребують фінансування: організаційна структура управління, стратегічні карти, створення портрета компетенцій персоналу, моделювання процесу управління людськими ресурсами, розробка дерева цілей, підвищення гнучкості процесів HR-управління, упровадження збалансованої системи показників. Проведений авторами комплексний аналіз упровадження цифрових HR-рішень виробничих підприємств за попередні роки дав можливість виявити найважливіші перешкоди для успішного впровадження та фінансування інновацій і цифрових рішень, основні з яких полягають у: недостатності фінансових ресурсів для реалізації інноваційних проєктів; відсутності достатньої фінансової допомоги та стимулювання з боку держави; великих фінансових витратах, пов'язаних зі змінами в інфраструктурі та впровадженням нових технологій; низькій зацікавленості інвесторів, що може обмежувати доступ до зовнішніх джерел фінансування; деякі інновації можуть вимагати тривалого періоду окупності, що стає викликом для компаній; високі відсоткові ставки на кредити можуть ускладнювати фінансування інноваційних проєктів. Зважаючи на ці фінансові чинники, важливо розробляти комплексні стратегії та інструменти для подолання перешкод і стимулювання інноваційно-цифрового розвитку виробничих підприємств.

Ключові слова: цифровізація, фінансування, HR-інжиніринг, промисловість, інновації, інфраструктура, партнерство для досягнення цілей

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