

Business process digitalisation in improvement of industrial enterprise performance

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ORIGINAL ARTICLE

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Abstract. The article examines the impact of digitalisation of key business processes of an industrial enterprise on production, financial efficiency, and the indicators determining its competitiveness. The purpose of the research is to develop an integrated approach to improve the activities of an industrial enterprise based on the digitalisation of business processes and assess its impact on regional and international competitiveness. The methodological framework includes systematic and process approaches, investment analysis methods (NPV, IRR, ROI, payback period), and a comparative analysis of indicators influencing on the introduction of digital solutions. The empirical basis is the data of OOO Novakhim, Ivanovo, Russia, specialising in the production of industrial chemicals. The introduction of an integrated ERP system, MES module, digital logistics, and management analytics provides a reduction in the production cycle, reduces losses and downtime, increases productivity, and improves working capital turnover with positive NPV values and an acceptable payback period for the project. The proposed approach to digitalisation and assessment of the effectiveness can be used by industrial enterprises to justify investments in digital transformation aimed at strengthening their regional and international competitiveness. It ensures the practical significance of the research.

Keywords: digitalisation; industrial enterprise; business processes; digital transformation; regional competitiveness; international competitiveness

JEL codes: O33, L60, M11, D24

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Introduction

The digital economy, globalisation, the competitiveness of an industrial enterprise is determined by the volume of production and product quality, the level of its digital maturity, adaptability to changes in the external environment, and the speed of innovation. The development of the Industry 4.0, cyber-physical systems, industrial Internet of Things, big data, and cloud services transformed traditional production and management models. Therefore, the digitalisation of business processes is becoming a strategic factor in the sustainable development of enterprises and strengthening their positions in regional and international markets [1; 2; 3].

According to Industry 4.0, issues of digitalisation and automation of production processes are becoming extremely relevant today. This stage of the industrial revolution is characterised by the integration of cyber-physical systems, cloud computing, and Internet of Things technologies. They enable real-time interaction between physical and computing components. These technologies help to optimise business processes. However, their implementation concerns cyber-attacks and unemployment [5; 6].

The development of Industry 4.0 forms the technological basis of digitalisation. The modern economic conditions (i.e. sanctions) increase the importance of these processes for Russian enterprises.

The global economic instability and uncertainty caused by unprecedented sanctions pressure provide new challenges and opportunities for the development of Russian enterprises technological potential. One of

the key tasks is to achieve technological sovereignty. It implies the priority development of import-substituting industries and the active introduction of innovative developments to enhance the efficiency of enterprises [7].

The logical continuation of the development of Industry 4.0 is the transition to Industry 5.0. It is determined by deeper consideration of the human factor in production systems. Its main goal is to establish human-centred production models involving the interaction between humans and automated systems. Industry 5.0 focuses on the individualisation of production processes, environmental sustainability, and business social responsibility [14].

This study provides a retrospective analysis of Russia's achievements in the field of Industry 4.0 and assesses the trends for transition to Industry 5.0. There is an increase in internal costs for the development of the digital economy, the dynamics of technologies introduction, cloud services, and big data. The research concerns the factors contributing to the transition to Industry 5.0, including the flexible and custom production, the increasing pace of technological progress, environmental sustainability, and human capital.

Therefore, it is necessary to develop a digital infrastructure, staff training system, and integrate the advanced technologies. The application of Industry 5.0 principles could improve sustainable development, competitiveness, and efficiency of the Russian economy.

Therefore, the transition to Industry 5.0 is a multi-pronged process that requires an integrated approach and integration of government, business, and educational institutions.

The modern industrial enterprises operate in a turbulent external environment characterised by unstable demand, rising costs, increased competition, stricter requirements for quality and delivery time, international standards, etc. The traditional management approaches based on fragmented automation of individual functions do not provide the required level of efficiency and transparency. It ensures the transition to a comprehensive digital transformation involving the integration of production, logistics, financial, and management processes into a single information system [8].

Digitalisation of business processes involves the implementation of individual software solutions, process reengineering, the formation of end-to-end information flows, and the use of analytical tools to support management decisions. This transformation increases operational transparency, reduces time and resource costs, minimises production risks and increases the flexibility of the enterprise. Indeed, it is a key source of increasing regional competitiveness and expanding their presence in foreign markets for regional industrial enterprises facing limited investment resources and dependence on local conditions.

Moreover, the analysis of the impact of digitalisation of business processes on indicators directly related to competitiveness: the level of costs, the production cycle, labour productivity, financial stability, and consumer demands, etc. In the scientific literature, the issues of digital transformation are actively studied in the context of strategic management, innovative development, and productivity improvement. However, literature mainly focuses on the macroeconomic level or analyses individual technologies without a comprehensive assessment of their impact on the activities of a particular enterprise and its competitive position¹.

Digitalisation in the Russian Federation is particularly specific in terms of modern international politics and sanctions. To increase technological independence and modernise industrial processes, the Russian government actively supports software import substitution initiatives. Approved in 2017, the Digital Economy of the Russian Federation program is the basis for the implementation of measures aimed at developing digital infrastructure and establishing conditions for IT sector grow. As part of this program, the government supports domestic developers of various technologies, including production process management systems and automation solutions².

The government support for digital transformation includes both financial and non-financial instruments. For instance, starting in 2021, tax incentives and grants for the implementation of digitalisation projects have been introduced for companies implementing innovative solutions. In 2022, investments in the development

¹ Organisation for Economic Co-operation and Development. (2023). *OECD digital economy outlook 2023*. OECD

² European Commission. (2022). *A report on the digital economy and society*. <https://doi.org/10.2759/51177>

of digital infrastructure in Russia amounted to approximately RUB 3 trln; it is 8% more than in 2021³. These funds finance AI, cloud computing, and big data analytics to improve the efficiency of production processes.

However, there are a lot of challenges. The shortage of qualified IT personnel, limited access to advanced foreign developments due to the sanctions imposed are significant obstacles to digital transformation. According to the Center for Strategic Research, training the in IT is one of the key tasks for a successful transition to new technological standards.

Therefore, digitalisation in Russia is a multidimensional process that requires an integrated approach and active cooperation between governments, businesses, and educational institutions. Import substitution strategies and government support for the formation of the digital economy are crucial for ensuring the long-term competitiveness of Russian enterprises worldwide. It involves R&D investments attraction, addressing issues of ecosystem interaction between various participants of the process.

In the scientific literature, the issues of industrial digitalisation and business process transformation are considered within the framework of various research areas: the theory of digital economy, the concepts of Industry 4.0 and 5.0, strategic management, innovative development, and increasing the competitiveness of enterprises. A significant contribution to the formation of digital transformation theoretical foundations was made by Vial, P. Verhoef, A. Bharadwaj, E. Brynjolfsson, and E. McAfee. They consider digitalisation as a complex process of changing business models, organisational structure, and management decision-making mechanisms [1; 2; 3; 11].

The research on Industry 4.0 focuses on the integration of cyber-physical systems, the industrial Internet of Things, cloud technologies, and big data analytics into production processes. According to the works of H. Kagermann, A. Frank, S. Xu, and V. Kritzinger, the introduction of digital technologies contributes to productivity growth, reduction of production losses, and increased flexibility of enterprises [5; 6; 7; 10]. The development of Industry 5.0, presented in the studies of the European Commission and K. Schwab, focused on the formation of human-centered and sustainable production systems combining automation and the development of human capital [8; 14].

A special area of research is related to the analysis of the impact of digitalisation on the competitiveness and sustainability of enterprises. For example, M. Porter considers digital technologies as a factor of long-term competitive advantages formation [13]. Indeed, D. Teece studies digital transformation with the development of the dynamic abilities of the organisation [4]. In the works of D. Ivanov and A. Dolgui the role of digital supply chains in ensuring the sustainability of industrial production and adaptation to external shocks is being investigated [9].

Moreover, the special attention is paid to the issues of economic efficiency of digital transformation. The researches of A. Damodaran reveal approaches to assessment the investment attractiveness of digital projects and analysing their financial performance [15]. The reports of the OECD, the European Commission, and McKinsey examine global trends in industrial digitalisation, the impact of digital technologies on productivity, investment activity, and the development of national economies^{4,5}.

In the Russian scientific literature, the issues of digital transformation of industry are considered in the works of A.V. Babkin et al. They analyse the features of digitalisation of enterprises in terms of of import substitution, sanctions restrictions, and Russian technological sovereignty [16].

However, the issue of digitalisation impact comprehensive assessment on the competitiveness of a particular industrial enterprise remains understudied⁶.

The relevance of this research consists in the development of the applied approach to the digitalisation of business processes of an industrial enterprise and a comprehensive assessment of its impact on indicators of regional and international competitiveness. The purpose of the research is to develop an integrated

³ Organisation for Economic Co-operation and Development. (2022). *Digitalisation of industry and its impact on the economy*. OECD Publishing. <https://doi.org/10.1787/9789264305576>

⁴ McKinsey & Company. (2022). *Digital transformation: Global trends*. <https://doi.org/10.48550/arXiv.2201.00000>

⁵ Organisation for Economic Co-operation and Development. (2022). *Digitalisation of industry and its impact on the economy*. OECD Publishing. <https://doi.org/10.1787/9789264305576>

⁶ McKinsey & Company. (2022). *Digital transformation: Global trends*. <https://doi.org/10.48550/arXiv.2201.00000>

approach to improving the activities of an industrial enterprise through the digitalisation of key business processes, followed by an assessment of the impact of the changes on its competitiveness at the regional and international levels.

The research tasks are as follows: to analyse the theoretical foundations of the digital transformation of industry, identify priority areas of digitalisation at the enterprise level, develop and test a model for assessing the economic effectiveness of digitalisation in terms of competitiveness, assess production, financial, and organisational effects of digital transformation based on empirical data from OOO Novakhim, Ivanovo, Russia.

Methods

The methodological basis of the research was developed in terms of the interdisciplinary nature of digitalisation of industrial enterprise business processes. It based on a combination of general scientific and specialised analytical methods. Their choice was determined by comprehensive assessment of the organisational and economic consequences of digital transformation.

As a theoretical basis, a systematic approach was used. It allows use to consider an industrial enterprise as an open socio-economic system functioning in interaction with the external environment. This approach analyses the interrelationships between production, logistics, financial, and management processes through the introduction of digital technologies.

The approach was used to identify, structure, and optimise the company's key business processes. The company's activities were decomposed into main (production, procurement, sales), auxiliary (logistics, personnel management, IT support), and management processes. Process mapping and value stream mapping were used for the analysis. It revealed bottlenecks, duplicate functions, and redundant operations.

Methods of economic and mathematical modelling and investment analysis were used to substantiate the economic feasibility of digitalisation.

The effectiveness of digital solutions was assessed in terms of the following indicators:

- Net present value (NPV);
- Internal rate of return (IRR);
- Payback period;
- Return on investment (ROI).

The NPV was calculated by the formula:

$$NPV = \sum_{t=1}^t \frac{CF_t}{(1+r)^t} - I_0 \quad (1)$$

where CF_t is the projected cash flow in the period t ;

r is the discount rate,

I_0 is the initial investment cost.

The return on investment was determined as follows:

$$ROI = \frac{\Delta P}{I_0} \times 100 \quad (2)$$

where ΔP is the increase in profits as a result of the introduction of digital solutions;

I_0 is the amount of investment in digitalisation.

The indicators of labour productivity, return on assets, working capital turnover ratio, and production cycle duration were used to assess production efficiency. To quantify the changes, we made a comparative analysis of the introduction of digital tools effect [15].

To assess the long-term financial viability of a business process transformation, NPV, ROI, and the internal rate of return (IRR) were used. Indeed, IRR was defined as the discount rate at which the total present value of cash flows is zero.

$$\sum_{t=1}^n \frac{CF_t}{(1+IRR)^t} - I_0 = 0 \quad (3)$$

A discounted payback period (DPP) was also calculated. It allows the time value of money to be taken into account when making a return on investment. The discount rate of 13% adopted in the researchs based on

a cumulative calculation method including a risk-free government bond yield rate, an inflationary premium, and a specific risk of introducing innovative IT solutions in the industrial sector.

The empirical basis of the research was the data of OOO Novakhim, Ivanovo, Russia: financial statements, management accounting data, production statistics, and internal regulations of business processes. Additionally, interviews with experts and managers were used to clarify the organisational aspects of digital transformation.

For data processing, methods of horizontal and vertical analysis of financial statements, correlation analysis of the relationship between the level of digitalisation and performance indicators, scenario analysis were used. It provides an assessment of an investment project sensitivity to changes in key parameters (discount rate, investment volume, profit growth rate, etc.).

The reliability of the results obtained is ensured by using the company's official financial statements, proven investment analysis methods, and comparing calculated indicators with actual data from similar digitalisation projects in the industrial sector.

Therefore, the selected set of methods ensures a comprehensive assessment of business processes digitalisation impact on the efficiency of an industrial enterprise and development the practical recommendations.

Results

We consider the effects of business processes digitalisation theoretically, economically, and empirically. On the one hand, digital transformation is a systemic factor to change the logic of an enterprise's work, affecting innovation activity, the structure of competition, demand generation mechanisms, and investment attractiveness. On the other hand, these changes directly correlate with the dynamics of the company's production and financial indicators [10].

In this regard, the analysis of OOO Novakhim, Ivanovo, Russia results is based on a combination of the theoretical provisions of modern economics on digital transformation and empirical data reflecting the consequences of the introduction of digital solutions in a real production system. This approach allows us to capture the quantitative effects achieved, explain them in terms of the perspective of changes in the internal mechanisms of the enterprise's functioning and its interaction with the external environment.

In the context of the analysis of an enterprise's innovation activity, digitalisation of key business processes is a mechanism for formation a stable internal environment for generating and implementing innovations. The introduction of integrated information systems, such as ERP and MES, ensures the accumulation and structuring of significant amounts of production and management data. It establishes the basis for making informed management decisions and selecting priority areas for technological development [9].

Moreover, digital transformation is a continuous improvement process based on data analysis and feedback. It allows the company to shorten the time for the implementation of new solutions, reduce the level of uncertainty during their implementation, etc. As a result, digitalisation accelerates the commercialisation of innovations and increase the efficiency of investments in research activities.

The results of an empirical study demonstrate the following: digital transformation accelerates the commercialisation of innovations, increases the share of R&D costs in total investments, and promotes faster market launch of new digital services and improved production techniques. Totally, these enhance enterprise flexibility.

Moreover, the integrated digital platform provides increased transparency and reliability of management reporting data. It reduces the risk of information distortion and promotes more predictable market behaviour. In a competitive environment, the requirements for transparency of prices and delivery times, digitalisation is a powerful factor of pressure on competitiveness both within the region and at the level of international supply chains. For instance, cost reduction, acceleration of working capital turnover, and reduction of supply cycle time form the flexible competitive conditions, forcing competitors to reconsider their pricing and management strategies, inventory management, and time of response to changes in demand. Therefore, digital transformation is a system tool for increasing transparency and competitive strength of an enterprise

in a dynamically developing market. It is extremely relevant for enterprises operating in industry segments with a high degree of technological involvement and integration of production processes [4].

The shift to marketing, demand analysis, and consumer behaviour shows that digitalisation reduces transaction costs, and enriches a set of tools for more accurate customer base analysis, market segmentation, and demand forecasting. The development of management analytics panels and digital channels for customer interaction provides real-time data acquisition on consumer preferences, demand dynamics, and sales channel effectiveness. It ensures adaptive channel strategies, adjusts the assortment, supply conditions, and service support depending on changes in consumer preferences. Moreover, digital supply chain management tools contribute to lower inventory and shorter lead times. It directly affects customer satisfaction and loyalty. Therefore, OOO Novakhim, Ivanovo, Russia can respond more quickly to fluctuations in demand in the industrial chemicals market, improve the accuracy of demand forecasting, and adapt production planning to consumer requirements. In the long run it has a positive effect on the company's market share and reputation.

According to the results, digitalisation as an investment initiative demonstrates an acceptable risk profile and limited uncertainty in terms of the long-term sustainability of the project, capital market analysis, risk, profitability, and project selection. The calculated indicators of profit, internal rate of return, payback, and discounted payback period confirm the economic feasibility of the digital transformation project: a positive net present value within a five-year horizon, an internal rate of return higher than the accepted discount rate, and the payback of the project within a reasonable time. This combination of financial indicators makes digitalisation a long-term investment capable to generate stable cash flows and increase the cost of an enterprise's capital. However, sensitivity analysis shows the project viability at a significant decrease in the projected economic effect. Indeed, the project is resistant to external fluctuations in market conditions and changing financing conditions. According to the results, digitalisation of business processes is a strategic direction to improve financial stability, reduce operational risks, and form the long-term competitive advantages [13].

Hence, implemented digital solutions strengthen the company's innovation base through structured data use and management decision support, improve its competitive position on a regional and international scale by reducing costs, speed up production and supply cycles and increasing business flexibility, and enable a more accurate analysis of demand and consumer behaviour. It optimises sales channels and customer satisfaction, attracts investors and shareholders. As a result, digitalisation is a key factor in the formation of a sustainable competitive advantage integrated into the company's development strategy and investment policy at the regional and global levels.

In our further research, we plan to consider expanding the methodology for assessing the economic effectiveness of digitalisation, including industry models of digital maturity, comparing effects in different regions, and analyse the long-term impact of digital transformation on export potential and integration into global value chains. We will summarise empirical data on various industrial sectors and expand the applicability of the methodology for assessing the economic effectiveness of digitalisation. Practically, business digitalisation is a systemic factor in strengthening regional and international competitiveness. It costs reduction and shortening the production cycle, decreases price and time competitiveness in the regional market. Indeed, product growth and management transparency form conditions for participation in international supply chains, contractual obligations, and increased customer and partners loyalty. The prospects for further research include the development of industry models of digital maturity, a comparative analysis of digitalisation effects in different regions, and an assessment of the long-term impact of digital transformation on export potential and the degree of integration of enterprises into global value chains. It will provide the implementation of effective management strategies and methods of financing digital projects adapted to the specifics of the industry and regional conditions [11; 12].

The theoretical effects of digitalisation resulted in the implementation of digital solutions in a specific industrial enterprise. To assess the applied aspect of digital transformation, empirical research was conducted on OOO Novakhim, Ivanovo, Russia to quantify the impact of digitalisation on key performance and competitiveness indicators.

The company operates in a highly competitive domestic market and depends on fluctuations in raw material prices. It requires increased operational efficiency and lower costs. OOO Novakhim, Ivanovo, Russia is a limited liability company engaged in the production of industrial chemicals and chemical components for enterprises in the petrochemical, paint, and construction industries. The main activities of the company are the production of chemical reagents, the production of specialised technological mixtures, supply of chemical products to industrial consumers in regional and interregional markets.

The company involved into a high competition from large domestic chemical manufacturers and regional suppliers focused on the B2B segment. The competitive environment is highly depended on fluctuations in commodity prices, increasing demands on product quality, and delivery deadlines. Therefore, production efficiency, order processing speed, stability of logistics chains, and digitalisation of management processes are key factors of the company's competitiveness.

The structure of the company includes production, logistics, supply, commercial, financial, and IT departments. The number of employees in the analysed period was about 240 people; more than 60% are directly involved in the production process.

1. Analysis of the current state of business processes

As part of the process analysis, the company's activities were divided into primary and secondary processes. The key problem areas identified at the diagnostic stage included the following:

- fragmentary automation of individual functions without integration into a single management system;
- long production cycles (average 28 calendar days);
- excess stocks of raw materials and finished products;
- low transparency of production indicators in real time;
- a significant proportion of manual operations in the preparation of management reports.

The turnover ratio of working capital was 3.1 turnover per year; the coefficient of production losses was 4.8% of the output; the equipment downtime reached 9% of the calendar time.

2. Development and implementation of digital solutions

Based on the analysis, a comprehensive digitalisation program was proposed. It includes the following:

- implementation of an integrated ERP system for combining financial, production, and warehouse accounting;
- implementation of the MES module for operational management of production and monitoring of machinery;
- automation of warehouse logistics through a barcode system and digital inventory accounting;
- design a management analytics dashboard to monitor key performance indicators (KPIs) in real time.

The total investment in digitalisation is RUB 32 mln, including software costs, server infrastructure upgrades, staff training, and consulting support.

3. Assessment of economic efficiency

The investment efficiency calculations include a 5-year planned horizon at a discount rate of 13%; it corresponds to the weighted average cost of the company's capital.

The introduction of digital solutions shows the following quantitative indicators:

- reduction of production cycle time from 28 to 23 days (-17.9%);
- reduction of production losses from 4.8% to 3.2%;
- reduced equipment downtime from 9% to 5.5%;
- increase of labour productivity by 14.6%;
- increase of the turnover ratio of working capital from 3.1 to 3.8 per year.

The total annual economic benefit (due to lower costs, reduced inventories, and increased production) amounted to RUB 9.4 mln.

According to the calculation results:

- the net present value (NPV) of the digitalisation project over 5 years is RUB 11.2 mln;
- internal rate of return (IRR) – 21%;
- payback period – 3.4 years;

- the return on investment (ROI) is 29.4%.

The positive NPV and IRR values exceed the discount rate. It demonstrates the economic feasibility of the digitalisation.

4. Organisational and managerial effects

Additionally, the qualitative changes were recorded. They are as follows:

- increasing the transparency of management reporting and reducing the time required to compile it from 5 to 1 business day;
- reducing the number of management errors related to data inconsistencies;
- increasing discipline in the performance of production tasks;
- development of digital competencies among the staff.

The integration of information flows provides the transition from a reactive management model to a proactive one based on data analysis and forecasting of production indicators.

5. Scenario analysis of project sustainability

According to the scenario analysis, 20% reduction in the projected annual economic effect, the project remains viable: the net present value (NPV) remains positive (RUB 3.6 mln), the payback period increases to 4.2 years. It demonstrates sufficient financial stability to make an investment decision.

These changes form a number of sustainable competitive advantages for OOO Novakhim, Ivanovo, Russia. They are as follows: reducing the cost of production and the production cycle, increasing price and time competitiveness in the regional market. The increased productivity and managerial transparency expand the potential for participation in international supply chains and meeting stricter contractual requirements for quality and delivery time.

Therefore, OOO Novakhim, Ivanovo, Russia integrated digitalisation significantly increases production and financial efficiency, reduces operational risks, and forms sustainable competitive advantages. The data obtained demonstrate the practical applicability of the developed assessment methodology and its adaptability to enterprises in other industries.

Conclusions

The implemented digital transformation of OOO Novakhim, Ivanovo, Russia provides a systematic strengthening of competitiveness at the regional and international levels due to the synergy of operational efficiency, innovative dynamics, and financial stability. According to the analysis of innovation and industry, digitalisation of key business processes is a set of technological measures. Moreover, it is a systemic process ensuring a stable innovation base of an enterprise, structured data, the ability to select and prioritise promising projects, accelerating commercialisation processes and increasing flexibility in responding to changes in demand and technological shifts. According to the research results, digital transformation contributes to an increase in the share of investments in R&D within the overall investment portfolio, accelerates the launch of new digital services, and improved production techniques to the market. Totally, it enhances the sustainability and competitiveness of the enterprise in a volatile market environment.

In terms of competition and antitrust regulation, the implemented digital platform provides increased transparency and reliability of management data. It reduces the risk of information distortion and promotes more predictable market behaviour. The competitive pressure and transparency of prices and delivery dates make digitalisation a factor in increasing efficiency and speed of reaction to market changes both within the region and in global supply chains. Lower costs, faster working capital turnover, and shorter supply cycle times form flexible competitive conditions and force market participants to reconsider their pricing, inventory management, and supply strategies. Therefore, digital transformation becomes a systemic tool for increasing transparency and competitive strength of an enterprise in a rapidly developing market. It is extremely relevant for industries with a high degree of technological involvement and deep integration of production processes.

In terms of marketing, demand analysis, and consumer behaviour, the transition to digitalisation provides an accurate analysis of the customer base, market segmentation, and demand forecasting. The development of management analytics panels and digital channels for customer interaction provides real-

time data acquisition on consumer preferences, demand dynamics, and sales channel effectiveness. It ensures adaptive channel strategies, adjusts the assortment, supply conditions, and service support depending on changes in consumer preferences. Moreover, digital supply chain management tools contribute to lower inventory and shorter lead times. It directly affects customer satisfaction and loyalty. It allows OOO Novakhim, Ivanovo, Russia to quickly respond to fluctuations in demand, improve forecasting accuracy, and adapt production plans to meet customer requirements. Indeed, in the long run, it enhances the company's market share and reputation.

Furthermore, the results show an acceptable risk profile and the project's resilience to external fluctuations in market conditions in terms of the capital market issues, risk, profitability, and project selection. The estimated profit, payback, and discounting indicators confirm the economic feasibility of the digitalisation project: positive cost, exceeding IRR thresholds, and acceptable payback periods. This combination of financial indicators makes digitalisation a long-term investment capable to generate stable cash flows and increase the cost of an enterprise's capital. The sensitivity analysis demonstrates the resilience of the project to significant reductions in the projected economic impact. It supports the continuing investments in digitalisation in terms of strategic direction and tools of reducing operational risks.

Indeed, the implemented digital solutions strengthen the company's innovation base through structured data use and management decision support, improve its competitive position at the regional and international levels by reducing costs, speeding up production and supply cycles, and increasing business flexibility. It provides an accurate analysis of demand and consumer behaviour, helps to optimise sales channels, increases customer satisfaction and partner trust. An important part is to form an attractive financial profile of the project in terms of investors and shareholders. It helps to increase confidence in the implementation of digital transformation as a systemic direction of the company's development.

The prospects for further research expand the methodology for assessing the economic effectiveness of digitalisation. It involves the development of digital maturity industry models, compares the effects in different regions, and analyses the long-term impact of digital transformation on export potential and integration into global value chains. It summarises the empirical data on various industrial sectors and expands the applicability of the methodology for assessing the economic effectiveness of digitalisation. The proposed approach to digitalisation and assessment of the effectiveness can be used by industrial enterprises to justify investments in digital transformation aimed at strengthening their regional and international competitiveness. It ensures the practical significance of the research. According to the research results, digitalisation a systemic factor in strengthening market positions thorough cost reduction, shortening of the production cycle, and improvement of price and time competitiveness in the regional market. Moreover, increased productivity and managerial transparency establish prerequisites for increased participation in international supply chains and contractual requirements [16].

Therefore, the research provides a deeper understanding of business processes in terms of digitalisation, affects the indicators determining regional and international competitiveness, and demonstrates the practical applicability of an approach to a comprehensive assessment of the economic effectiveness of digitalisation for enterprises in a modern economic environment.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

Marina B. Abramova – writing – original draft.

Polina S. Volkova – data curation, formal analysis, validation.

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