

# Digitalisation as a new vector of domestic enterprises development

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**Abstract.** The article explores the role of digitalisation as a key vector in the development of domestic industrial enterprises within the framework of the modern economy and the transition to Industry 4.0. It analyses the impact of digital technologies on production efficiency, competitiveness, and the structural transformation of manufacturing processes. Particular attention is paid to the implementation of digital tools such as artificial intelligence, big data, cloud platforms, and cyber-physical systems, as well as their influence on business performance. The paper also addresses major institutional and economic challenges faced by Russian enterprises, including insufficient R&D funding, outdated equipment, lack of qualified personnel, and cybersecurity risks. The research highlights the best domestic practices in digital transformation, using leading metallurgical companies as case studies (e.g. Severstal, NLMK, MMK), and assesses their technological strategies and investments in IT infrastructure. The importance of coordinated efforts between state policy and corporate strategy is emphasised, especially in the context of geopolitical constraints and technological sanctions. Ultimately, the study substantiates the necessity of a systematic approach to industrial digitalisation as a means of increasing productivity, reducing production costs, and enhancing long-term sustainability. The practical significance lies in the identification of mechanisms to support digital transition across industrial sectors of the Russian economy.

**Keywords:** digitalisation; digital development; production efficiency; digital transformation; R&D investment

**JEL codes:** O33, L60, J24

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## Introduction

Industry 4.0, characterised by the integration of digital technologies, the Internet of Things (IoT), big data, and artificial intelligence, is a significant stage in the development of industry. This process transforms production and provides new opportunities to increase the competitiveness of domestic industry worldwide.

The term 'Industry 4.0' means the fourth industrial revolution or the transition to total automated digital production. Moreover, the processes are controlled by intelligent systems in real time and in constant interaction with the external environment with the prospect of integration into a global industrial network of things and services<sup>1</sup>. Therefore, the global industrial networks, the Internet of Things, the transition to renewable energy sources, neural networks, 3D printers, biotechnology, artificial intelligence, etc. are being actively introduced.

Industry 4.0 is the result of the consistent development of technology and production followed by the previous industrial revolutions. It is necessary to consider the main stages of Industry 4.0 implementing.

- The 1st Industrial Revolution – Industry 1.0 (late 18th century – early 19th century): the transition from an agrarian economy to the industrial production, the development of transport. These changes resulted in a factory production and urbanisation, which became the basis for further technological changes.

- The 2nd Industrial Revolution – Industry 2.0 (the second half of the 19th century – the beginning of the 20th century): mass-line production, electrification, railways, differentiation of labour. These changes have contributed to formation of new industries and increased production.

- The 3rd industrial revolution – Industry 3.0 (the end of the 20th century, 1970 – current period): the

<sup>1</sup> Russian oil and gas technologies. A study by Rockwell Automation and IDC identified industrial digitalisation trends in the EMEA region. Source: <https://www.rogtecmagazine.com/%D0%B8%D1%81%D1%81%D0%BB%D0%B5%D0%B4%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5-rockwell-automation-%D0%B8-idc-%D0%B2%D1%8B%D1%8F%D0%B2%D0%B8%D0%BB-%D0%BE-%D1%82%D1%80%D0%B5%D0%BD%D0%B4%D1%8B-%D1%86%D0%B8/?lang=ru> (accessed on 15.10.2024).

development of electronics, automation, robotics, the use of information and communication technologies (ICT). These achievements caused the significant changes in production management and logistics.

Therefore, Industry 4.0 is a logical continuation of previous revolutions, combining their achievements and adapting them to the digital economy. It provides the new opportunities for increasing the efficiency, flexibility, and sustainability of production.

Nowadays, there are many scientific publications on digitalisation and digital technologies. Indeed, a lot of scientific papers concern with the analysis and assessment of the readiness of industrial enterprises for digital transformation. They are as follows: S.A. Bannikova, E.D. Vaisman, M.P. Galimova, A.Yu. Lamentova, D.A. Lyubimenko, V. Mitina, K.A. Spiridonova, O.P. Shevchenko, etc. In their works, scientists focus on methods for assessing the level of digitalisation of enterprises and offer practical tools for diagnosing their readiness for change. Additionally, they analyse the impact of human capital and corporate culture on the process of digital transformation, emphasising the importance of personnel training and the innovative environment, examines the risks associated with the transition to digital technologies, etc. Indeed, many foreign researchers consider the industrial digitalisation as it is the international trend. They are as follows: Abdalla S., Barney J. B, I. Borreca, S. Di Lauro, etc. In their works, foreign authors dwell on the impact of market conditions on the process of digital transformation, the implementation of production management systems based on big data and the Internet of Things (IoT), emphasising the importance of data analytics to improve the efficiency and competitiveness of enterprises, etc. In general, their works provide a comprehensive approach to availability of the industrial enterprises for digital transformation, and serve as the basis for further researches.

The purpose of the work is to determine the impact of digital transformation on the domestic industry, identify the best domestic practices in the use of digital technologies for providing business efficiency and the prospects for digitalisation of Russian industrial enterprises in terms of ensuring their production efficiency.

### **Main part**

Indeed, the new challenges require the maximum efficiency and global competitiveness of the enterprises. For many years, Russia has adhered to an export-based economic model. However, to ensure national sustainable development, it is necessary to form a digital economy. The following documents have been developed:

- Decree of the Government of the Russian Federation on July 28, 2017 No. 1632-r "On Approval of the Digital Economy of the Russian Federation Program"<sup>2</sup>;
- National Program "Digital Economy of the Russian Federation" (approved by the Presidium of the Council under the President of the Russian Federation for Strategic Development and National Projects Protocol No. 16 on December 24, 2018)<sup>3</sup>;
- Decree of the Government of the Russian Federation on 02.03.2019 No. 234 "On the Management System for the Implementation of the national program "Digital Economy of the Russian Federation"<sup>4</sup>;
- Decree of the President of the Russian Federation on 07.05.2018 No. 204 "On National Goals and Strategic Objectives for the Development of the Russian Federation for the period up to 2024"<sup>5</sup>.

Moreover, digitalisation is one of the key trends in the development of domestic enterprises. Industrial digitalisation is the process of an enterprise's transition to automated digital production, controlled by smart systems. It requires transferring the data into an accessible digital environment.

The digitalisation of industry or Industry 4.0 will ensure an increase of production efficiency indicators,

<sup>2</sup> Decree of the Government of the Russian Federation on July 28, 2017 No. 1632-r "On Approval of the Digital Economy of the Russian Federation Program". Source: <https://www.garant.ru/products/ipo/prime/doc/71634878/> (accessed on 10.03.2025);

<sup>3</sup> The National Program "Digital Economy of the Russian Federation" (approved by the Presidium of the Council under the President of the Russian Federation for Strategic Development and National Projects, Protocol No. 16 on December 24, 2018). Source: <https://base.garant.ru/72190282/>. (accessed on 10.03.2025).

<sup>4</sup> Decree of the Government of the Russian Federation on 02.03.2019 No. 234 "On the Management System for the Implementation of the national program "Digital Economy of the Russian Federation". Source: <https://base.garant.ru/72190034/> (accessed on 10.03.2025).

<sup>5</sup> Decree of the President of the Russian Federation on 07.05.2018 No. 204 "On National Goals and Strategic Objectives for the Development of the Russian Federation for the period up to 2024". Source: <https://base.garant.ru/71937200/> (accessed on 10.03.2025).

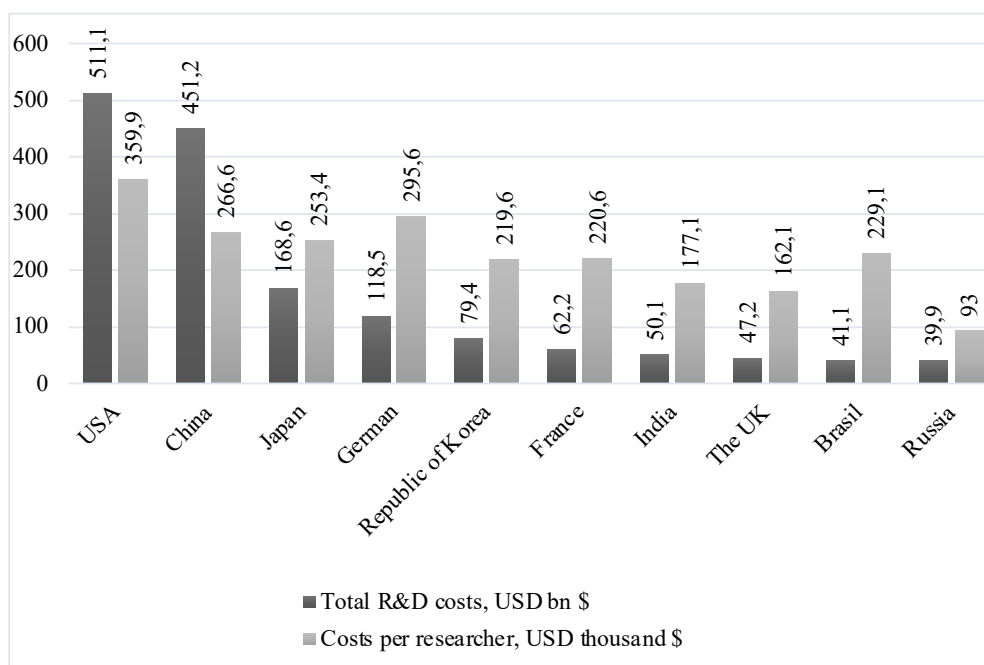
production of new types of products, the quality of design and manufacturing, a reduction in production costs, etc.

Digitalisation is one of the main trends of modern development and competitiveness. Nevertheless, the implementation and application of digital technologies in the Russian economy are extremely heterogeneous. It is due to the specifics of the industrial sector, concerning with the high cost of digital solutions, insufficient financing and development of automated process control systems, depreciation of fixed assets, high technological complexity of production, a shortage of qualified personnel, etc.

However, the significant share of the public sector, competition, sanctions complicates its rapid development [2].

Moreover, it contains several key problems [3]:

1) The industrial sector is not sufficiently motivated to participate in innovative development. The domestic scientific and technical innovations are also limited. Figure 1 shows a comparison of the top 10 world countries in terms of domestic costs on R&D, purchasing power parity. Source: compiled by the author according to the data of the National Research University "Higher School of Economics"<sup>6</sup>.



**Figure 1.** Research and development costs, countries

Source: *Ranking of the World's Leading Countries by R&D Expenditures*<sup>7</sup>

Russia ranked 10th in terms of R&D costs; compared to foreign, the domestic manufacturers investments are significantly lower. Despite the correspondence of the vector of development of Russian industrial enterprises with the corresponding trends of developed countries, the Russian industry lags industrially and financially [4]. Russian R&D costs are RUB 39.9 bn, which is approximately 2% of the country's GDP. Indeed, Russia has the lowest cost per researcher among the leading countries in terms of R&D costs. It might cause outflow of scientists to other countries with higher level of this particular cost. It is due to the specifics of the industrial sector, concerning with the high cost of digital solutions, insufficient financing and development of automated process control systems, depreciation of fixed assets, high technological complexity of production, a shortage of qualified personnel, etc<sup>8</sup>. The digitalisation requires significant financial investments in technology, software, and personnel training. Sometimes, it is unachievable for small and medium-sized

<sup>6</sup> Institute for Statistical Research and Economics of Knowledge of the National Research University of HSE. *Ranking of the World's Leading Countries by R&D Expenditures*. Source: <https://issek.hse.ru/news/221864403.html> (accessed on 15.10.2024).

<sup>7</sup> Institute for Statistical Research and Economics of Knowledge of the National Research University of HSE. *Ranking of the World's Leading Countries by R&D Expenditures*. Source: <https://issek.hse.ru/news/221864403.html> (accessed on 15.10.2024).

<sup>8</sup> Mitin, V. *Digitalization of large enterprises: expectations, results, obstacles, impact of COVID-19*. Source: <https://www.itweek.ru/digitalization/article/detail.php?ID=216701> (accessed on 15.10.2024).

enterprises.

2) Regulatory barriers. The government plays a significant role in the industrial production markets. Today, the administrative resource is one of the most necessary innovations in the industry, capable of quickly and effectively improving the work of the enterprises. Moreover, the imperfect legislation provides obstacles to the introduction of innovative technologies and methods.

3) Cyber threats and data security. An increasing of digital technologies implementation caused higher risk of cyberattacks and data leakage. Indeed, the companies should invest in cybersecurity to protect their assets and information.

4) Absence of qualified personnel. Many enterprises have a shortage of specialists with the necessary knowledge and skills in data analytics, programming, cyber security, and project management.

5) Outdated equipment and infrastructure: many industrial enterprises use outdated equipment impossible to be upgraded to implement modern digital technologies. Indeed, upgrading of the equipment requires significant investments.

However, successful transition to digitalisation in the domestic industry requires an integrated approach in terms of the participation of both business and the state. Therefore, the high technological and financial risks are associated with the digitalisation of industry. Nevertheless, the industrial managers consider digital technologies mostly as the opportunities than the threats. According to a study by Rockwell Automation in collaboration with IDC<sup>9</sup>, 75% of Russian industrial enterprises plan to develop comprehensive digital transformation roadmaps by 2023. Moreover, increase state support for the digitalisation of industrial enterprises is planned. It involves the introduction of promising digital technologies.

Despite these challenges, the government plan to spend RUB 451.8 bn on digitalisation within the framework of the national Digital Economy project. The introduction of digital technologies will increase the production efficiency of enterprises by 45-55%, and reduce the time of market product enter by 20-50%. According to the McKinsey Global Institute, the government investments in digital technologies in the manufacturing sector will result in an annual increase 1.3 – 4.1 trln. RUB in the GDP<sup>10</sup>.

The main trends of digital development in the Russian industry are: the cloud platforms for data systematisation and storage; robotisation of standard operations; introduction of artificial intelligence to improve the efficiency of enterprises; cyber security networks to ensure the secure of corporate information; hyperautomation; the use of digital twins – virtual models that allow ones to do test runs and identify defects before production itself, etc. [1].

Digital technologies are diverse. Nevertheless, their maximum effect is achieved with their integrated application, which ultimately will transform the enterprises. Therefore, digitalisation is an opportunity to increase the competitiveness of an enterprise, in particular, by increasing the level of production efficiency. Digitalisation increases the speed of decision-making, minimises the human impact, and makes the production operations flexible<sup>11</sup>. It helps to predict the results, and improve the quality of products. It provides a higher competitiveness and increased profits of the enterprise.

Digitalization of production addresses the following challenges:

- increase in production efficiency;
- rational use of resources;
- reducing the cost of production.

Today, one of the most significant issues of domestic enterprises is increasing of production efficiency. As its growth is one of the key goals of the Decree of the President of the Russian Federation.

<sup>9</sup> Russian oil and gas technologies. A study by Rockwell Automation and IDC identified industrial digitalisation trends in the EMEA region. Source: <https://www.rogtecmagazine.com/%D0%B8%D1%81%D1%81%D0%BB%D0%B5%D0%B4%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5-rockwell-automation-%D0%B8-idc-%D0%B2%D1%8B%D1%8F%D0%B2%D0%B8%D0%BB-%D0%BE-%D1%82%D1%80%D0%B5%D0%BD%D0%B4%D1%8B-%D1%86%D0%B8/?lang=ru> (accessed on 15.10.2024).

<sup>10</sup> How Steel Went Digital: Metallurgists Map the Path to the Digital Transformation of the Economy. Source: <https://www.gosrf.ru/news/41011/> (accessed on 15.10.2024).

<sup>11</sup> Digitalization of industry: challenges, advantages of implementation. Savings Business Software. Source: <https://sberbs.ru/announcements/cifrovizaciya-promyshlennosti-zadachi-preimushstva-vnedreniya> (accessed on 15.10.2024).

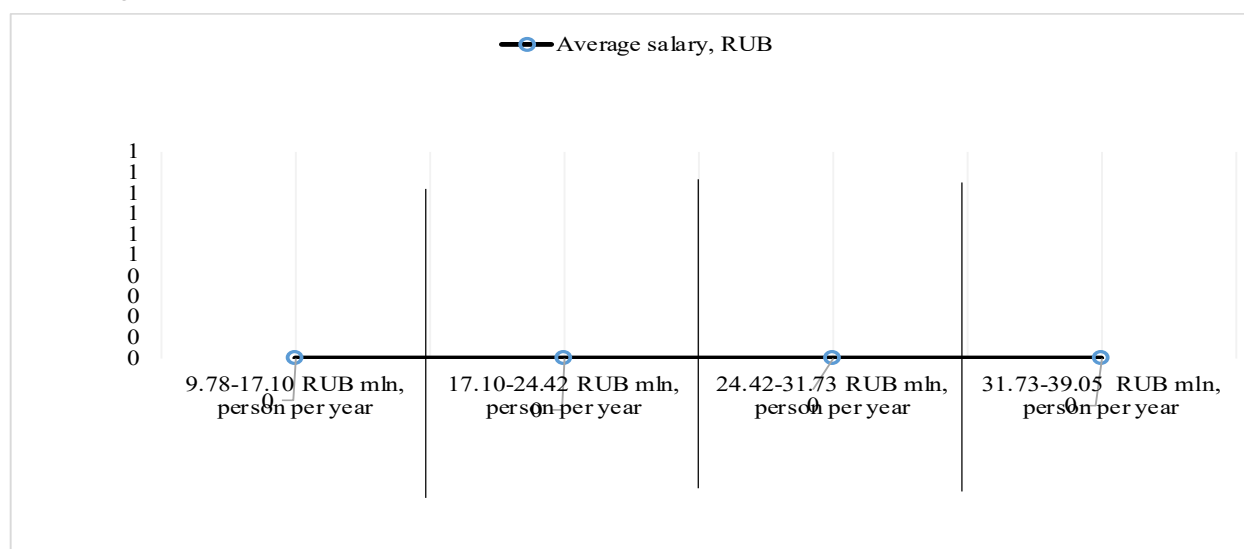


By 2024, production efficiency in medium-sized and large enterprises of the basic non-primary industries (BNO) was expected to increase by at least 5% per year. However, since 2022, the social, financial, and economic sanctions have been imposed on the Russian economy. It complicates the improvement of territorial and structural efficiency in the medium and long term. Production efficiency in Russia has been changing recently under the sanctions and COVID-19. In 2020 it decreases by 0.4%; in 2021 it increased by 3.7%; in 2022, according to Rosstat, it decreased by 3.6% compared to 2021, in 2023 it recovered by 1.7%. In Russia, a huge personnel shortage forces businesses to implement new measures to attract and retain staff.

Therefore, improving production efficiency is of crucial importance due to staff shortages and rising salaries, increased production costs, and the unavailability of Western technologies and industrial equipment. To stable production efficiency increase, it is necessary to attract investments, introduce various innovations, and improve the quality of human capital through the development of the education system and the formation of a scientific environment [6].

Moreover, it is necessary to study the methods of modernisation of production processes, control their formation, improve, and regulate all changes in the enterprise. Today, the most effective tool for attracting, retaining, and motivating employees is employee compensation package. It allows the employee to avoid the risk of inflation, and increase the level of employee efficiency<sup>12</sup>.

The metallurgical industry has a significant impact on the development of the national economy. The innovations and IT are key components of increasing the efficiency of enterprises and affecting the transformation of production and business<sup>13</sup>. To determine a correlation between the level of efficiency and the level of wages, it is necessary to analyse data of the Mining and Metallurgical Trade Union of Russia<sup>14</sup>. The analytical grouping of metallurgical enterprises by the level of production efficiency and average salary is shown in Figure 2.



**Figure 2.** Dependence of production efficiency of metallurgical enterprises on the level of average wages

Source: Author

However, it is ineffective to increase salaries by 10% or 20% annually as it reduces the profitability of the business. According to the chart, the average wage does not directly correlates with the growth of production efficiency. Indeed, production efficiency is influenced by the employee's salary level, an individual approach

<sup>12</sup> Institute for Statistical Research and Economics of Knowledge of the National Research University of HSE. Ranking of the World's Leading Countries by R&D Expenditures. Source: <https://issek.hse.ru/news/221864403.html> (accessed on 15.10.2024).

<sup>13</sup> Russian oil and gas technologies. A study by Rockwell Automation and IDC identified industrial digitalisation trends in the EMEA region. Source: <https://www.rogtecmagazine.com/%D0%B8%D1%81%D1%81%D0%BB%D0%B5%D0%B4%D0%BE%D0%B2%D0%B0%D0%BD%D0%B8%D0%B5-rockwell-automation-%D0%B8-idc-%D0%B2%D1%8B%D1%8F%D0%B2%D0%B8%D0%BB%D0%BE-%D1%82%D1%80%D0%B5%D0%BD%D0%B4%D1%8B-%D1%86%D0%B8/?lang=ru> (accessed on 15.10.2024).

<sup>14</sup> The Mining and Metallurgical Trade Union of Russia. Source: <https://www.gmpr74.ru/news/zarplata-metallurgov-i-gornyakov-razbor-s-pristrastiem> (accessed on 15.10.2024).

to enterprise development, innovative production, the effective team work, new technologies and equipment, etc.

Therefore, it is necessary to introduce new factors to increase production efficiency. The introduction of digital technologies will improve the efficiency of Russian companies in various industries. And digitalisation is an opportunity to increase the competitiveness of an enterprise, in particular, by increasing the level of production efficiency.

Currently, many enterprises have already completed the first stage of digitalisation – automation of technological processes. The next step is to implement smart solutions in all stages of the production. Therefore, AI and robotics are becoming the main factor of the digital transformation.

The digital reform should provide significant support to metallurgical enterprises, help to rationalise the production and use of resources, both natural and human ones. However, the introduction of digital technologies into a metallurgical industry is quite complicated. According to experts, the automation and robotisation in metallurgical industry will increase. It will optimise transportation, automation of production management and financial flows, inventory, etc. These innovations are quite difficult to implement, but they will ensure the digitalisation of the metallurgical production. Moreover, the metallurgical enterprises have already launched the process. Those IT projects are as follows:

1) PAO Severstal, Cherepovets, the Vologda region, Russia

It is one of the first metallurgical enterprises starting its transition to digitalisation. In 2024, Severstal spent RUB 10 bn for the implementation of IT projects. Subsequently, the company's investments in IT have doubled in five years<sup>15</sup>. The company has already held the following events:

- the company was the first in the Russian metallurgy to implement an SAP-based logistics management system, which reduced road transportation by 15%;
- transition to electronic document exchange;
- the computer modelling services for customers;
- the run an online store allows the enterprise to sell almost 2.5 mln tons of steel, which is approximately one third of the total sales;
- implementation of end-to-end metal traceability systems;
- the enterprise established a separate division – Severstal Ventures – to develop venture capital projects in terms of new production technologies and materials. Those became a partner of Severstal, SBERBANK Accelerator and 500 Startups;
- modernisation of Yakovlevsky GOK, Yakovlevsky district, the Belgorod region, Russia includes establishing of Digital Mine. The existing low-precision positioning system has been replaced by the modern Strata system. In the future, it will provide the opportunity to control the employees and equipment in the mine, communicate via digital voice telephony and launch unmanned loading and delivery vehicles.

2) Magnitogorsk Iron and Steel Works PJSC, Magnitogorsk, the Chelyabinsk region, Russia

The enterprise is one of the industry leaders in terms of the implementation of digital technologies and IT projects:

- transfer of Magnitogorsk Iron and Steel Works CIS to Oracle E-Business Suite R12 platform;
- development and implementation of an automated production planning system at Magnitogorsk Iron and Steel Works PJSC;
- implementation of the Energy management platform project;
- implementation of a mathematical model to improve the procurement of raw materials;
- the use of software robots in routine production processes;
- supplying frames for transporting metal products with RFID tags to automatically track their transition and transportation.

3) NLMK Group, Lipetsk, the Lipetsk region, Russia

The digital transformation of production is a key aspect for developing the implementation of the

<sup>15</sup> Severstal Doubled Its IT Investments Over Five Years. Source: <https://severstal.com/rus/media/archive/severstal-udvoila-obem-investitsiy-v-it-za-5-let/> (accessed on 15.10.2024).

company's strategy, which can make the company the most efficient one. Digital technologies help to offer customers unique products, reduce injuries and environmental footprint, etc.:

- IT strategy has been developed;
  - implementation of artificial intelligence systems;
  - the start of the innovation laboratory to analyse the technologies of the virtual and physical world;
  - introduction of modern computer technologies such as Big Data, machine learning and artificial intelligence (AI);
  - implementation of a 3D employee positioning system in complex production facilities.
- 4) Metalloinvest Management Company LLC, Moscow, Russia:
- In 2018, the enterprise spent RUB 3 bn in projects related to the implementation of an integrated management system;
  - SAP S4/HANA software product development;
  - Megafon software for online workflow monitoring;
  - Application of computer technologies for mining engineering and geological modelling.
- 5) Mechel PJSC, Moscow, Russia:
- the formation of the Mechel-Infotech IT team for the development and implementation of digital projects;
  - implementation of the 1C:ERP software.
- 6) Evraz PLC, Moscow, Russia:
- the use of an automated monitoring system for mining equipment in the quarries of EVRAZ;
  - organisation of surveying of EVRAZ coal mines using drones;
  - implementation of a system for optimising the technological process of iron smelting at blast furnace No. 7, EVRAZ;
  - automation of the steel purging process in EVRAZ converters;
  - development of a system for mathematical modelling of production processes at EVRAZ enterprises in Siberia.

Indeed, all the leaders of the metallurgical industry are actively involved in the process of digital transformation of production. Severstal, Magnitogorsk Iron and Steel Works PJSC, and NLMK have achieved great success in digitalisation. These enterprises have the necessary infrastructure and software to implement and invest the digitalisation of production. Severstal PJSC is a leader in digital transformation and actively invests into development of production<sup>16</sup>.

Nowadays, there has been a growing interest in investing in major projects aimed at modernising production facilities and introducing new technologies. Nevertheless, to achieve sustainable growth, it is necessary to address a number of problems, such as a shortage of qualified personnel and low production efficiency. One of the main reasons for low production efficiency in the Russian metallurgy industry is the shortage of qualified specialists. According to research, a significant number of employees do not have the necessary knowledge and skills to work with modern equipment and technologies. It resulted in a decrease in the efficiency of production processes and an increase in costs. Low production efficiency is also associated with outdated management methods and insufficient automation of processes. Many enterprises continue to use traditional approaches, which does not allow them to compete effectively in the global market. Increasing production efficiency is becoming critical to ensure competitiveness at the rising costs for raw materials and energy resources.

One of the important consequences of digitalisation and robotisation of production is the reduction of employees replaced by machine labour to perform routine operations. There is an acute shortage of personnel in Russia. 85% of Russian companies have a shortage of employees. However, there is a program to attract high-qualified specialists from countries with a low living standards. The main advantage of robots is a higher speed and quality of operations, resulting in higher work efficiency.

<sup>16</sup> Severstal: the path to digitalization. Source: <https://vmeste.severstal.com/expert/severstal-put-k-tsifrovizatsii/> (accessed on 15.10.2024)

Digitalisation is a powerful tool for addressing these problems. The introduction of modern IT and automated control systems can significantly improve production efficiency. Moreover, digital solutions ready to optimise processes, improve resource planning and management, and reduce equipment downtime. Additionally, digitalisation ensures the professional development of employees through trainings based on modern technologies. The virtual simulators, online courses, and other educational platforms allow employees to get knowledge for working in a digital transformation environment.

Currently, the key research challenges of the industry are connected with the integration of generative AI into robotics.

- Perception. Development of algorithms and sensors (cameras, LIDAR, etc.) capable of accurate and reliable interpretation of the world and prediction of object behavior. Development of architectures providing reliable, energy-efficient recognition and predictive behaviour of large sets of objects, including in non-deterministic conditions.

- Interaction. Development of advanced control algorithms, grips, and other equipment for communication. Integrating advances in materials science to design for flexible and sensitive sensors and controllers.

- Mobility. The development of robots capable of moving quickly, safely, and efficiently everywhere. The ability to adapt to changing conditions and dynamic environment.

- Learning and adaptation. Development of advanced machine learning algorithms and equipment that can allow robots to learn from their experiences and make decisions based on this learning.

- Human-robot interaction. Development of advanced control algorithms and equipment that will allow robots to communicate with humans and respond to their behaviour.

Therefore, the introduction of robotics and digital technologies is changing business processes increases their efficiency. Moreover, using robots to perform routine and repetitive tasks allows people to perform more complicated and intelligent work. It is potentially will increase the production efficiency. Consequently, digitalisation of the economy ensures increasing of GDP, the regional competitiveness in the market of goods and services, improving the living standards, and formation of the global digital space.

### **Conclusion**

Indeed, the economic development in terms of digitalisation provides many threats and risks. To avoid them, it is necessary to introduce modern methods and tools of information protection, implement legal regulation, ensure information security, attract public financing of scientific and technological innovation, modernise the education system, and implement state and regional programs to support high-tech production.

However, the increasing of production efficiency is a quite complex task. The digitalisation of industry is extremely relevant. It includes many methods positively affecting the model of the enterprise work in long-term. The competent transformation to digitalisation and totally automated digital production allows us to ensure the sustainable development of the metallurgical industry.

We considered Industry 4.0 and the digitalisation of industry, identified the main risks, problems, and made recommendations for digital transformation of the enterprises, considered real cases of the use of digital technologies by domestic companies. The practical significance of the research concerns with the author's proposal to consider digital tools and technologies for increasing production efficiency. The research determined the impact of digital transformation on the domestic industry, identified the best domestic practices in terms of digital technologies. It will provide their higher business efficiency and the prospects for digitalisation of Russian industrial enterprises in terms of ensuring their production efficiency.

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### **CONFLICT OF INTEREST**

The author declares no conflict of interest.



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