Analysis of industrial digital development in the Ivanovo region

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Abstract. The formation of the Russian Federation digital sovereignty for the successful implementation of all stages of domestic industries digital transformation and enhancement of national competitiveness is impossible without the development of a support system based on the domestic hardware. The developed and efficient system of domestic electronic computer components production is the foundation of the national digital assets productivity. On the basis of the Federal State Statistics Service public official data, paper studies and analyses the relationship between three main economic indicators of the production process: investment in fixed capital, industrial production, the volume of shipped goods, works and services, in terms of «Manufacture of computers, electronic and optical products» as a type of economic activity for Ivanovo region and the Russian Federation. The study analyses a time period 2015-1st half 2023. To obtain objective results of the industrial digital development analysis of the Ivanovo region, the article additionally conducts a comprehensive analysis of the companies performance in terms of «Manufacture of computers, electronic and optical products» based on indicators of enterprises profitability. According to the research results, we determined state and trends of the digital industry in the Ivanovo region. Therefore, the industrial capabilities for hardware base development of electronic computer components and devices in the Ivanovo region is the key points of sustainable industrial diversification of regional economic system.

Keywords: digital transformation, investment, development, strategy, innovative development, information technology, digital sovereignty.

JEL codes: R11, R58, L52

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Introduction

The formation of digital sovereignty system of the Russian Federation is impossible without digital transformation of the national economy sectors. Meanwhile, each constituent entity of the Russian Federation has its own special production profile. It provided by the historical specifics of regional industry, its geographical location, in terms of proximity to the Federal Centre or to foreign countries. The implementation of modern and innovative digital technologies directly affects enterprise labour productivity. It also provides the competitiveness in a free market. It has a strong positive impact on the growth of the country's gross domestic product and, as a result, the well-being of its residents.

The effective implementation of digital transformation as an important component of a developed economic system architecture, and the introduction of successful digital solutions request modern hardware base or electronic digital devices. It allows us to increase the national digital resources productivity, enhance business communications, improve labour efficiency, quality, and competitiveness of production. Therefore, the purpose of this research is to assess the state of the digital industry as one of the digital sovereignty system elements in the Russian Federation and in the Ivanovo region.

The term «Digital sovereignty» first appeared in the project «Long-term Development Plan for the Russian segment of the Information and Communication Network and related Industries» (hereinafter – Project). The Project was compiled by the Internet Development Institute at the direct request of the President of the Russian Federation Vladimir Putin on 29 September, 2015 (Efremov, 2017). The plan was compiled after the meeting of V.V. Putin and representatives of Russian IT community: search engines, domain providers, security companies, etc. Following this meeting, a concept of «Digital Sovereign» Russia was proposed. The concept implied both technological and economic independence of the country[1].

[1] *The Institute project Development Internet /Proposals for the formation of a long-term development program for the Russian part*

The term «Digital sovereignty» itself was defined as high level of self-sufficiency and technological independence and was most often used in the Project in terms of three areas of Internet policy: economic protectionism (import substitution of hardware, software, and support for domestic IT companies in the foreign markets); security of the Russian Internet infrastructure, and big data and data localization (Brokes, 2018).

Foreign researchers consider «technological sovereignty» as the basis of national digital independence. The content of this term is defined as «the development of digital technologies and the design of digital infrastructure using freely distributed software, server devices, and encryption technologies, both collectively and alone» (Kaloudis, 2021).

Many Russian researchers interpret the concept of «Digital sovereignty» differently; they also replace the essence of this term with «Information sovereignty», or the right of the state to control the information flows distributed on its territory[2]. However, most domestic authors on digital transformation of the national economy sectors pay attention to the introduction of digital resources such as the World Wide Web or specialized software; but they do not consider the issue of the effectiveness, which directly depends on hardware base performance.

Some experts make attempts to identify modern trends of digital independence based on the developed foreign countries experience. They also focus on digital ecosystems covering a lot of aspects of daily human life (Bezrukov et al., 2021).

Recently, there are a lot of forums on digital sovereignty formation. Hence, some experts dwell on electronic computing base development as a necessary basis for the digital infrastructure of the Russian Federation[3].

However, there are very few modern scientific works of domestic researchers devoted to the analysis of hardware basis current state of the Russian Federation digital sovereignty. Therefore, this paper provides a contribution to this scientific challenge.

Main part

An important indicator of any country digital sovereignty is the state of economic activity «Production of computers, electronic and optical products», which belongs to the manufacturing industries. The general dynamics of the main economic indicators of economic activity «Production of computers, electronic and optical products» in the Russian Federation is shown in Figure 1.

Based on the data obtained, digital technologies development in the Russian Federation since 2015 to the present can be divided into 2 periods:

The first one is 2015-2020. A distinctive feature of this period is a gradual decline in the volume of shipped goods on the economic activity «Production of computers, electronic and optical products» from 111.7% in 2015 to 98.2% in 2020. It was a result of reduced investment in this industry development. The hypothesised reason for the decline in the volume of domestic digital devices shipped over the period is high competition with imported digital products. Indeed, those products had higher manufacturing characteristics and lower costs.

The second period: since 2020 to the present. A distinctive feature of this period is the rapid growth of investments in the production of domestic digital devices caused by the COVID-19 pandemic and the epidemiological restrictions imposed. Furthermore, the international sanctions regime imposed on Russia in 2022 as a result of Russia's measures to protect its borders also had a positive impact on the growth of capital investment in the «Manufacture of computers, electronic and optical products» industry. The changing nature and tactics of SMO with a tendency to use the modern digital devices (drones, tracking devices, etc.) has also

of the Internet information and communication network and related sectors of the economy/ Available at: https://filearchive.cnews.ru/img/cnews/2015/10/08/dolgosrochnaya_programma_iri.docx (accessed: 08.11.2023).

[2] Ashmanov, I. Information sovereignty of Russia: a new reality. Available at: http://rossiyanavsegda.ru/read/948 / (accessed: 07.11.2023).

[3] Digital sovereignty. Discussion (summary) 2.09.2021. Roscongress Information and Analytical system. Available at: https://roscongress.org/sessions/eef-2021-tsifrovoy-suverenitet/discussion /# (accessed: 10.11.2023).

influenced active investment in the domestic digital industry. Moreover, an additional distinctive feature of this period is the high efficiency of investments in the development of the manufacturing industries digital sector. It shows the high growth of the industrial production index and the volume of shipped goods of own production, completed works and services, despite the decline in investments in 2022 to 98.5%.

The active growth of investments in the digital industry of the Russian Federation in the 1st half of 2023 is directly related to the introduction of IT soft-window facility by the Government of the Russian Federation. The IT Companies Support Program was adopted by Decree of the Government of the Russian Federation on 06.05.2023 No. 707 «On Amendments to the Rules for Granting Subsidies from the Federal Budget to Ensure Soft Lending to Digital Transformation Projects Implemented on the Basis of Russian Solutions in IT, and Invalidation of Certain Provisions of Certain Acts of the Government of the Russian Federation.» The purpose of its implementing was to accelerate the digital transformation of national economy sectors, and the introduction of domestic digital solutions.

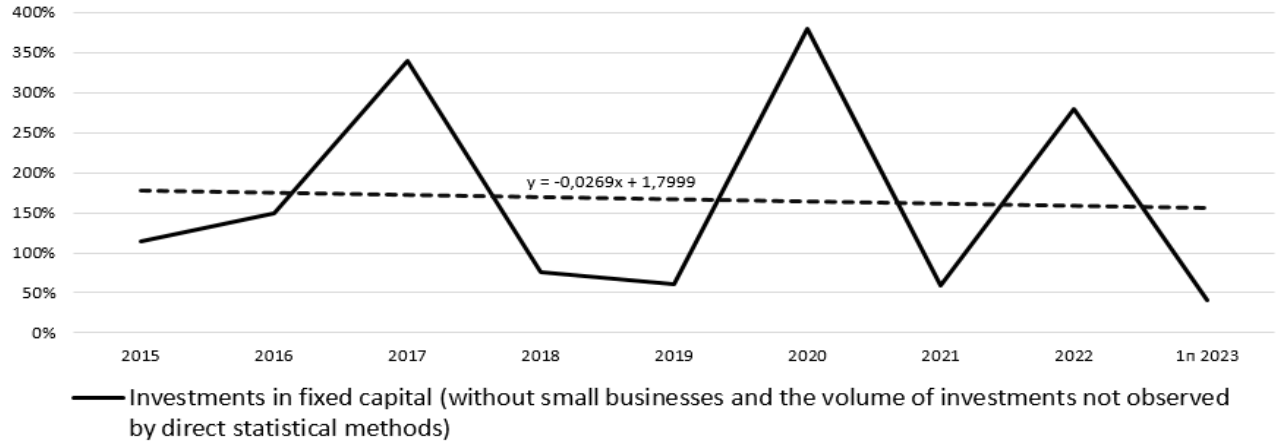

Figure 1. The general dynamics of the main economic indicators of «Production of computers, electronic and optical products» in the Russian Federation[4]

Source: composed by the author based on Unified Interdepartmental Statistical Information System[5]

The main advantage of the IT project support program was 3% soft lending for accredited IT companies tax relief free[6]. According to the Russian Government, the use of soft lending is expected to help IT companies maintain their current operations and implement new digital projects. Furthermore, the IT project support programme provides an opportunity to use loan funds for incentive payments to IT specialists and reimbursement of their expenditures.

But the terms of soft lending for IT companies are different:

- preferential loan rate: from 1 to 5% (up to 3% for accredited IT organizations);
- the loan value for IT project implementation: minimum – 5 RUB mln, maximum – 5 RUB bn;
- the loan amount for implementation of the program (a set of projects): minimum – 500 RUB mln, maximum – 10 RUB bn.

Indeed, the main risk of implementing the IT project support program is the limitation of budget funds aimed at the digital transformation of the national economy sectors. This risk is directly correlated with the monetary policy pursued by the Central Bank of the Russian Federation.

The implementation of the IT project support programme, according to statistics on capital investment in the development of the «Manufacture of computers, electronic and optical products» industry of the Russian Federation, has already provided an active introduction of domestic digital solutions. This prompt

[4] *The analysis 2015-2016 uses «Production of electrical equipment, electronic and optical equipment» in the absence of statistical information on the studied branch of production for the given period (the correction is applicable to all paper analyses for the given period).*

[5] *Available at: https://www.fedstat.ru/indicator/61497*

[6] *Ministry of Digital Development, Communications and Mass Media of the Russian Federation /Activities/ Preferential lending to companies. Available at: https://digital.gov.ru/ru/activity / directions/942 (accessed: 01.11.2023).*

and effective governmental action, meanwhile, makes it possible to increase the digital sovereignty of the Russian Federation from the import of software products to a higher level.

An effective use of industrial trends in management activities for the growth of economy and well-being of the residents of any Russian region makes the Head of this entity an effective leader.

Currently, the industrial profile of the Ivanovo region is determined by manufacturing industries. For instance, the largest volume in the structure of the Gross Regional Product (hereinafter – GRP) of the Ivanovo region at the end of 2021 for manufacturing industries was 22.7%. Besides, only manufacturing industries show stable positive dynamics in terms of their share in the Ivanovo region GRP structure, increasing from 14.5% to 22.7% over the period of 2016-2021. This positive trend in the change of the GRP structure is a positive factor for the development of Ivanovo region. Hence, the development of the real economic sector increases the region's population quality of life (Savin, 2023).

Additional evidence of the development of regional manufacturing industry is increasing of the share of manufacturing industries, shipped goods of own production, completed works and services for the period 2015-2023 by 11.66% from 75.48% to 87.14%, respectively.

The analysis of manufacturing industries by the structure of shipped goods for 2022 reveals the tendency for the Ivanovo Region economy to be stable due to the historically established branches of textile products (share of 35.5%) and clothing (share of 8.6%). Moreover, new promising direction of development of the region's economic system «Manufacture of computers, electronic and optical products» (share of 7.9%) appeared. In the first half of 2023, since the production of textile products (37.1%) increased to meet the needs of the SMO, the shares of clothing production, production of computers, electronic, and optical products decreased to 8% and 6.4%, respectively. Despite the decrease of its share in the structure of the total volume of shipped goods, works, and services, currently «Manufacture of computers, electronic and optical products» belongs to the group of leading branches of the Ivanovo region manufacturing industries.

Figure 2 shows the dynamics of investments in fixed capital (without small businesses and the volume of investments not observed by direct statistical methods) in the Ivanovo region according to «Production of computers, electronic and optical products» industry since 2015 to the present.

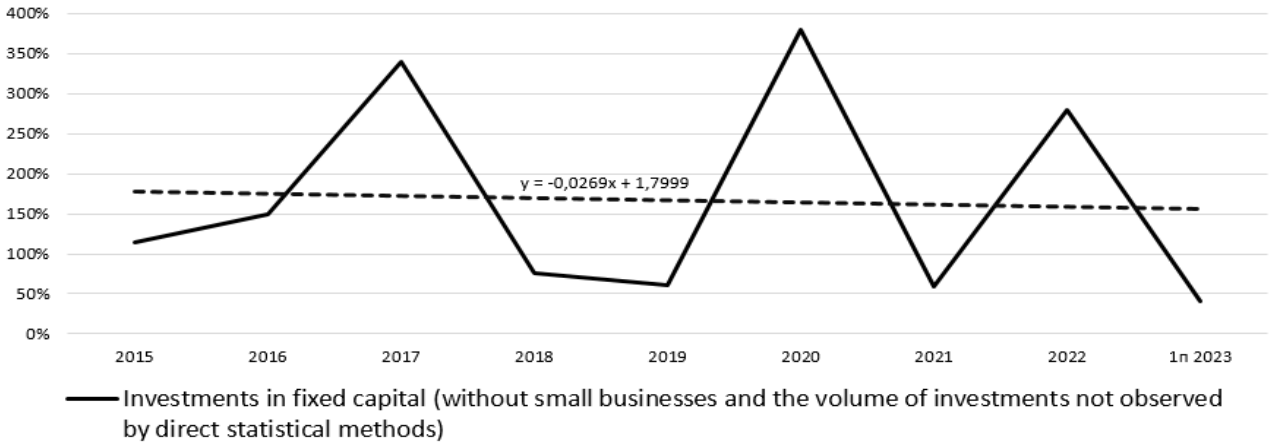

Figure 2. Dynamics of investments in the Ivanovo region

Source: composed by the author based on Federal State Statistics Service for the Ivanovo region[7]

The high-fluctuating nature of investments in the production of digital devices in the Ivanovo region indicates the low efficiency of measures implemented toward the realisation of a sustainable long-term strategy of digital transformation in the Ivanovo region. They also show insufficient realisation of the great potential for its development as a new economic growth potential for the region.

The higher capital investment in digital devices production in the Ivanovo Region in 2020 is caused by the large government order. For instance, within the framework of the All-Russian Population Census in 2020, the IT company Aquarius, Shuya, Ivanovo region, produced 225 thousand tablets and specialized

[7] *Territorial authority of the Federal State Statistics Service for the Ivanovo region. Report «Socio-economic situation of the Ivanovo region». Available at: https://37.rosstat.gov.ru/folder/31699 (accessed: 01.11.2023).*

software for the purposes of the population census for the Federal State Statistics Service.

Although the general trend of investments in «Manufacture of computers, electronic and optical products» industry in the Ivanovo region for the period under study is decreasing and described by the formula y = - 0.0269x + 1.7999 (the trend is calculated in the MS Excel software), it is still involved into the range of fixed capital investment growth. This growth is 150% per year. The declining trend of capital investment in the digital industry indicates the insufficient efficiency of operational and tactical managerial decisions of the Ivanovo region authorities in terms of this type of production development.

Indeed, an important indicator of any industry state is the volume of own shipped goods, works, and services. This indicator is a direct consequence of investments efficiency. Figure 3 shows this indicator dynamics in the Ivanovo region since 2015 to the present.

A decrease in the share of «Production of computers, electronic and optical products» industry in terms of the volume of goods shipped, works, and services in the Ivanovo region from 7.9% in 2022 to 6.4% in the 1st half of 2023 is direct consequence of reduced investment in this industry by regional enterprises. In addition, changing the share of digital industry in the manufacturing structure of Ivanovo region is directly related to the structural reorganisation of the Russian economic system to meet the needs of SMO.

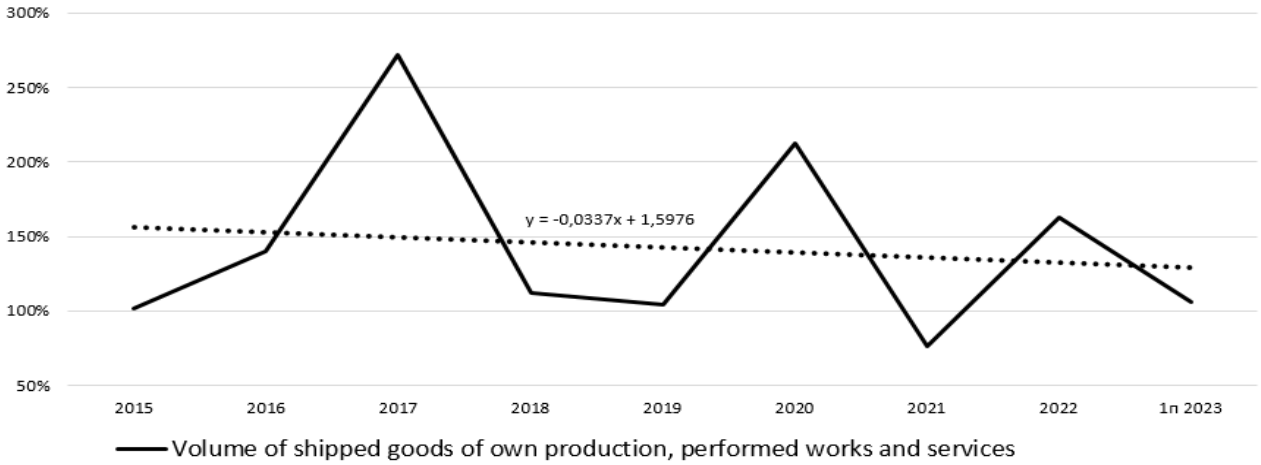

Figure 3. Dynamics of the volume of own shipped goods, works, and services in the Ivanovo region
Source: composed by the author based on Federal State Statistics Service for the Ivanovo region[8]

In the Ivanovo region, during the period under study, the economic indicator volume of shipped goods, works, and services was in a positive growth zone and decreased below 100% only once in 2021, reaching 76.3% compared to the previous year; it was 212.1%. The peak value was 271.6% in 2017 compared to the previous year fairly high value – 139.6%. These results may indicate the active spread of regional digital solutions to the IT product market.

The general appearance of the indicator is the volume of shipped goods, works and services of «Production of computers, electronic and optical products» industry. In the structure of manufacturing industries, like investments in fixed capital, it has an oscillatory character with a negative trend described by the formula y = - 0.0337x + 1.5976 (calculated in the MS Excel software). Moreover, the general trend of shipped goods, works and services of the industry under study is currently in the positive zone above 130% annual growth of this indicator. It may be a consequence of the active process of investment in the digital industry.

The general situation of the digital industry development in the Ivanovo region since 2015 to the present is shown in Figure 4. Combining the main economic indicators of «Manufacture of computers, electronic and optical products» industry into a common system allows us to conduct a more objective analysis of the efficiency assessment of capital investment in the digital development of manufacturing industries in the Ivanovo region.

[8] *Territorial authority of the Federal State Statistics Service for the Ivanovo region. Report «Socio-economic situation of the Ivanovo region». Available at: https://37.rosstat.gov.ru/folder/31699 (accessed: 01.11.2023).*

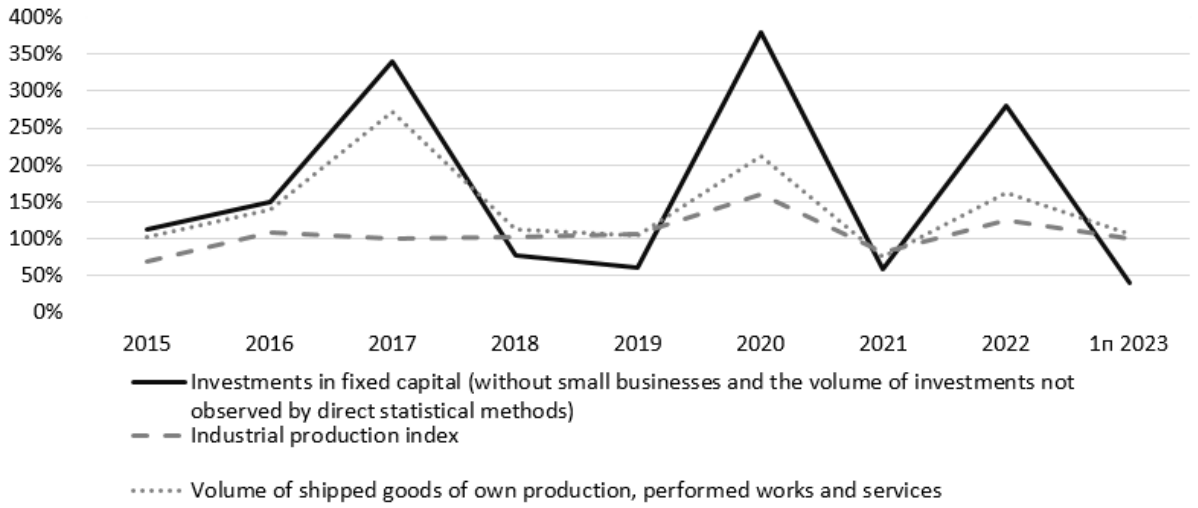

Figure 4. The general dynamics of the main economic indicators of «Production of computers, electronic and optical products» industry in the Russian Federation

Source: composed by the author based on Federal State Statistics Service for the Ivanovo region[9]

The common analysis of the main economic indicators of «Manufacture of computers, electronic and optical products» industry shows the short-term nature and low efficiency of capital investments caused by a high percentage spread. However, a significant decline of fixed capital investment efficiency in the development of digital devices in the Ivanovo Region started since 2020 and still continues. However, the efficiency of fixed capital investments in the development of the digital industry is, on the contrary, highly efficient in the Russian Federation since 2022.

An additional indicators allow us to analyse the industrial digital development of the Ivanovo region are regional IT companies financial results (Fig.5).

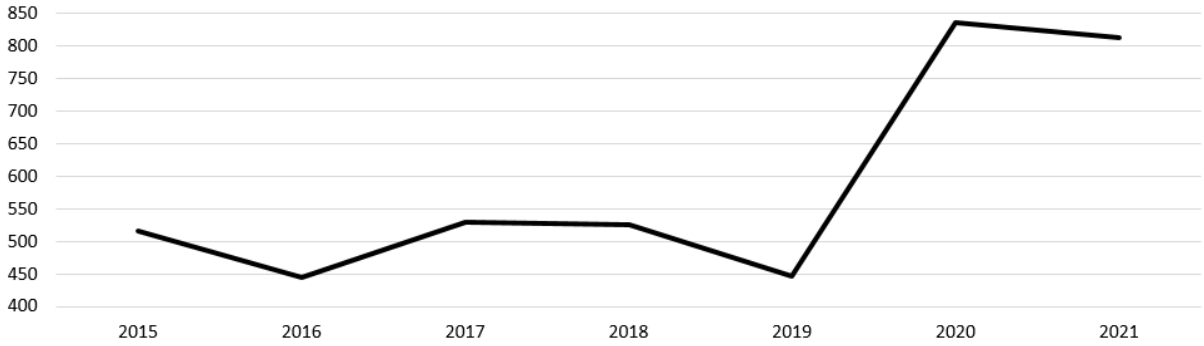

Figure 5. The financial result of «Production of computers, electronic and optical products» industry, the Ivanovo region, RUB, mln[10]

Source: composed by the author based on Federal State Statistics Service for the Ivanovo region[11]

In 2015-2019, the financial result of «Production of computers, electronic and optical products» industry in the Ivanovo region, according to digital enterprises accounting documentation, was 445-529 RUB, mln in actual prices. However, the peak values of capital investments were in 2017. It affected on the profit growth of 118.8% in relation to the previous year (in actual prices).

Hence, based on financial statistics, the period 2015-2019 for «Manufacture of computers, electronic and optical products» industry in the Ivanovo region, despite a single active surge in fixed capital investment

[9] *Territorial authority of the Federal State Statistics Service for the Ivanovo region. Report «Socio-economic situation of the Ivanovo region». Available at: https://37.rosstat.gov.ru/folder/31699 (accessed: 01.11.2023).*

[10] *Figure 5 shows the financial result for organizations in actual prices (according to accounting documents). Extended data for 2022-1023 by the entities of the Federal State Statistics Service for the Ivanovo region have not been published yet.*

[11] *Territorial authority of the Federal State Statistics Service for the Ivanovo region. Statistical Yearbook «Ivanovo region». Available at: https://37.rosstat.gov.ru/folder /31706 (accessed: 11/01/2023).*

in 2017, can be characterised as stagnating.

The rapid growth of capital investments in 2020 caused by the state order to provide the All-Russian Census with digital devices resulted in «Manufacture of computers, electronic and optical products» industry recovering from stagnation. The result of this state order immediately had an impact on the financial result of regional enterprises. The growth of the positive result in actual prices in 2020 compared to the previous year amounted to 187.3%, and reached 835.5 RUB mln.

Operating profitability is an important financial indicator representing the efficiency of the economic activity (Fig.6).

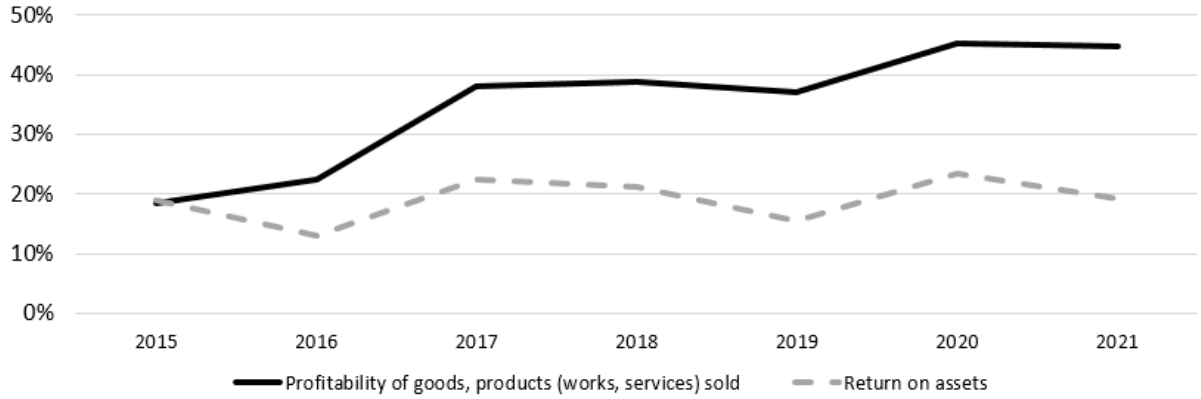

Figure 6. The operating profitability of «Production of computers, electronic and optical products» industry, the Ivanovo region, RUB, mln

Source: composed by the author based on Federal State Statistics Service for the Ivanovo region[12]

Profitability of selling goods, products (works, services) is calculated as the ratio between the value of the balanced financial result (profits minus losses) from the sale of goods, products (works, services) and the cost of goods, products (works, services) sold, including selling and administrative expenses[13]. Nevertheless, during the period of financial stagnation in 2015-2019, the enterprises of the Ivanovo region's digital industry annually attempted to improve production processes to reduce costs. As a result, it had a qualitative impact on the profitability indicators for this period. The capital investments in 2020 made it possible to increase the profitability.

Meanwhile, the profitability of goods sold, products (works, services) above the level of 30% is a very high indicator. In 2020-2021, this indicator for»Manufacture of computers, electronic and optical products» industry in the Ivanovo region was 45%. It indicates a high internal efficiency of regional IT companies.

However, the Ivanovo region has a large potential to provide a hardware base for the modern and innovative digital devices, despite some aspects of management decision-making efficiency. OOO PC Aquarius, Shuya, is a leader in the production development of computer equipment in the Ivanovo region. For more than 30 years, OOO PC Aquarius has been producing high-tech equipment. Currently, its production capacity is more than 800,000 digital devices per year. At the same time, the enterprise is one of the largest manufacturers of computer equipment in the Russian Federation.

In the information technology market, OOO PC Aquarius has a well-developed two-bin system. Its partner network includes more than 1,300 organizations throughout the Russian Federation. Company has the largest service network in Russia, consisting of more than 200 service centers in 135 cities of the Russian Federation. OOO PC Aquarius product portfolio is as follows: personal computers, laptops, servers, monitors, and data storage systems.

The engineers of the Scientific and Technical Center of OOO PC Aquarius are engaged in the creation of integrated software and hardware solutions in addition to new digital devices development.

[12] *Territorial authority of the Federal State Statistics Service for the Ivanovo region. Statistical Yearbook «Ivanovo region». Available at: https://37.rosstat.gov.ru/folder /31706 (accessed: 11/01/2023).*

[13] *Territorial authority of the Federal State Statistics Service for the Ivanovo region. Statistical Yearbook «Ivanovo region». Available at: https://37.rosstat.gov.ru/folder /31706 (accessed: 11/01/2023).*

The enterprise produces computer equipment for government agencies, large organizations, and small developing companies. Currently, the most well-known partners of OOO PC Aquarius are Federal Ministries, Regional Government Authorities, the Federal Tax Service, the Central Bank of the Russian Federation, the Federal State Statistics Service, the Social Insurance Fund of the Russian Federation, the Pension Fund of the Russian Federation, Rosreestr, Sber, Russian Post, Russian Railways, Yandex, Mail.ru, VK and etc.[14]

The modernization of the motherboard installation workshop in 2022 allows OOO PC Aquarius to assemble all types of motherboards for modern digital devices. The production capacity also allows the enterprise to produce about one million digital devices per year. In 2021-2025, Aquarius plans to invest more than 1.5 RUB bn for the development of its production facilities in Shuya, Ivanovo region.

Moreover, besides the current work on the development and implementation of the hardware base of digital devices, the successful implementation of individual elements of digital transformation in the Ivanovo region is its recognition as the best one among the entities of the Russian Federation in terms of the efficiency of industrial policy implementation by the end of 2022. The result of effective work in the State Information System of Industry of the Ministry of Industry and Trade of Russia was presented at the international industrial exhibition Innoprom-2023[15].

Nevertheless, enterprises in the Ivanovo region have been successfully applying the achievements of individual elements of the Russian Federation digital transformation system. For instance, sales via online marketplaces. It resulted in the leading positions of the Ivanovo region in this segment. This transition to a new type of marketing of manufactured products outside the Ivanovo region allows local producers to increase the volume of manufactured products sales and find new markets.

Conclusions

The analysis of the industrial digital development of the Ivanovo region allows us to conclude the following:

- the efficiency of investments in «Production of computers, electronic and optical products» industry of the Ivanovo region needs additional adjustment;
- regional IT companies have high profitability indicators; it indicates high internal production efficiency;
- the Ivanovo region has a strong production base for the further development of regional digital industry;
- in the Ivanovo region, «Production of computers, electronic and optical products» industry can become one of the leading branches of production, qualitatively increasing its share in the structure of regional manufacturing industries.

Therefore, on the way to digital sovereignty system formation the Ivanovo region, like any other constituent entity of the Russian Federation, barriers to development may be encountered. They are: incorrectly set goals and objectives of the digital transformation project, errors in planning the types and sequence of work; incorrect initial information about the object of digital solutions implementation, technological incompetence of users; absence of special measures of state support for the use of digital technologies by companies; regulatory restrictions on the use of digital technologies by companies; and the absence of special measures to support the use of digital technologies by companies.

To avoid these barriers to the digital transformation of the Russian Federation to digital sovereignty, it is necessary to take consistent and effective measures for foreign economic activity sustainable development in terms of «Production of computers, electronic and optical products» industry. To its successful implementation both in the Ivanovo region and other entities of the Russian Federation, there is a need to actively implement and apply innovative digital solutions based on international experience, so as import digital technologies and devices for subsequent replication within the framework of the import substitution program.

Sustainable digitalization of national economy branches of the Russian Federation entities will ensure

[14] *The official website of OOO PC Aquarius. Available at: http://www.aqs.ru (accessed: 22.11.2023).*

[15] *Ivanovo Region is the country's leader in the development of digital and online capabilities in the economy / Available at: https://ivanovoobl.ru/?type=news&id=57943 (accessed: 22.11.2023).*

the steady growth of the national economy, its GDP, and become the basis of national digital sovereignty system.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

References

1. Bezrukov, A., Mamonov, M., Suchkov, M., & Sushentsov, A. (2021). Sovereignty and "digit". The competition of technological platforms, or how to behave in the new world. *Rossiya v global'noj politike,* (2). DOI: 10.31278/1810-6439-2021-19-2-106-119. Retrieved from https://globalaffairs.ru/articles/suverenitet-i-czifra (accessed: 10.11.2023) (in Russian).

2. Efremov, A. A. (2017). Formation of the concept of information sovereignty of the state. *Pravo: Zhurnal Vysshej shkoly ekonomiki*, (1), 201-215 (in Russian).

3. Klochkova, N. V. (2021). Digital transformation of industries: starting conditions and priorities. In *Teoreticheskie i prakticheskie aspekty cifrovizacii rossijskoj ekonomiki: sbornik trudov IV Mezhdunarodnoj nauchno-prakticheskoj konferencii, Yaroslavl', 09 dekabrya 2021 goda.* (pp. 92-97). Yaroslavl: Izdatel'stvo YAGTU (in Russian).

4. Savin, O. A. (2023). Trends and prospects for the development of the manufacturing industry in the Ivanovo region. In *Innovacionnye podhody razvitiya ekonomiki: problemy, tendencii, perspektivy: Sbornik trudov Mezhdunarodnoj studencheskoj nauchno-prakticheskoj konferencii, Orel, 23–24 maya 2023 goda.* (pp. 325-330). Orel: Orlovskij gosudarstvennyj agrarnyj universitet imeni N.V. Parahinoj (in Russian).

5. Brokes, F. (2018). Russia's Sovereign Internet. *Observer.* Retrieved from https://.eu/cse-and-cis/russias-sovereign-internet/ (accessed: 09.11.2023) .

6. Kaloudis, M. (2021). Sovereignty in the Digital Age – How Can We Measure Digital Sovereignty and Support the EU's Action Plan? *New Global Studies, 16*(3), 275-299; Padilla, M. (2017). Technological Sovereignty: What Are We Talking about? *Technological Sovereignty*. Barcelona: Descontrol, *2*, 3-15. Retrieved from https://www.ritimo.org/IMG/pdf/sobtech2-en-with-covers-web-150dpi-2018-01-10.pdf (accessed 10.11.2023).

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