

THE IMPORTANCE OF DIGITALIZATION IN ENSURING THE ECONOMIC SECURITY OF ENTERPRISES

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Abstract. *Digitalization has become a key factor in ensuring the economic security of enterprises. By leveraging digital technologies, businesses can enhance the transparency of their economic operations. This article explores the theoretical foundations of the information society, enterprise digitalization, and digital transformation, using an industrial enterprise in Uzbekistan as an example. It analyzes the economic performance of industrial enterprises, identifies relevant trends, and presents scientific and practical insights on strengthening economic security in the industrial sector.*

Keywords: *information society, digitalization, economic security, industry, automation, digital technologies, digital transformation.*

ЗНАЧЕНИЕ ЦИФРОВИЗАЦИИ В ОБЕСПЕЧЕНИИ ЭКОНОМИЧЕСКОЙ БЕЗОПАСНОСТИ ПРЕДПРИЯТИЙ

Аннотация. *Цифровизация стала ключевым фактором обеспечения экономической безопасности предприятий. Используя цифровые технологии, бизнес может повысить прозрачность своих экономических операций. В данной статье рассматриваются теоретические основы информационного общества, цифровизации предприятий и цифровой трансформации на примере промышленного предприятия Узбекистана. Анализируются экономические показатели промышленных предприятий, выявляются соответствующие тенденции и представляются научные и практические выводы по укреплению экономической безопасности в промышленном секторе.*

Ключевые слова: *информационное общество, цифровизация, экономическая безопасность, промышленность, автоматизация, цифровые технологии, цифровая трансформация.*

An information society is a society in which most workers are engaged in the production, storage, processing, and sale of information, especially the highest forms of knowledge. This stage of development of society and the economy is characterized by the following:

- increasing the role of information, knowledge, and information technologies in society;
- increase in the number of people employed in the production of information technologies, communications, and information products and services, as well as the share of ICT in the gross domestic product;
- informatization of society through telephony, radio, television, the Internet, and both traditional and electronic media.

The creation of the global information society has led to:

- effective, informal human interaction;
- access to global information resources;
- meeting their needs for information products and services;
- development of e-democracy, digital economy, e-government, digital markets, e-social and business sectors.

The impact of digitization on the innovative development of industrial enterprises was considered based on the calculation of efficiency indicators of the innovative activity for selected systems of the production process.[1]

The impact of contemporary information and communication technologies on the performance of trading enterprises, particularly under challenging management conditions, is scrutinized.[2]

Digitalization processes have a particularly significant impact on the economic activities of business entities and, consequently, on ensuring their economic security. The demand for security is fundamental for individuals, enterprises, society, and the state as a whole.[3] Some scholars have focused on national economic security [4], the economic security of households [5], and the economic security of the individual [6]. Others have paid attention, in addition to the above, to “economic security of the region and economic security of the enterprise” [7]. Also, the ability to influence modern information, telecommunications and modern communication systems in protecting intellectual resources of enterprises has been studied.[8] It can be seen that economic security is the most important element at all stages of economic development, and it requires protection from internal and external threats.

In addition, investigations by Kolomiets H. M. and Hlushach Yu. S. actualize transformation stages of digital technologies defining their role in business as auxiliary ones; as an important factor of achieving business-results of activities; as the basis for providing a business strategy; and, finally, as a business-model identifier [9].

This is important for understanding significance of digitalization at the current stage of development of individual industries. Thus, Hojeghan S.B. and Esfangareh A.N. show impacts of the digital economy on the tourism industry [10].

The concept of enterprise digitalization is associated with the introduction of new technologies that have become available to businesses in recent years, including big data analytics, machine learning, artificial intelligence, robotization, augmented reality, the Internet of Things (IoT), 3D printing, and cloud computing. The prerequisites for the development and implementation of digitalization include the decreasing cost of technology and computing power, as well as an increase in the capacity for high-speed data transfer. Digital technologies allow businesses to analyze sales, inventories, production volumes, and operational processes at an advanced level. This, in turn, leads to qualitatively new perspectives on the company's products, relationships with suppliers and customers, and organizational processes. The digital economy, functioning on information technology platforms, is developing at an accelerating speed that necessitates the creation of new models of such platforms.[11]

Digital transformation in an enterprise can be viewed from two perspectives. The first perspective is the digitalization of the business model, which involves changing interactions with customers by moving from traditional sales to a smart product model supplemented by digital services. The second is operational digitalization—the introduction of digital tools to improve the efficiency of the enterprise within the existing business model.

According to the 2018 KPMG Global Survey, 95 percent of industry leaders see digital transformation as an opportunity to improve efficiency and grow their business.

How does digitalization affect productivity and performance?

The introduction of digital tools into operations will allow enterprises to improve the quality of decision-making and achieve positive results within the first year. In particular, solutions based on IoT and big data analytics play a significant role in enhancing the efficiency of production processes. They facilitate the rapid collection of material performance data, convert it into digitized format for further processing, share information electronically along the value chain, and utilize machine learning and artificial intelligence to generate new insights. In addition, they can be used to remotely control the production process and the physical parameters of equipment based on decisions made, considering the results of in-depth analysis.

By combining different technologies, enterprises have the tools to increase the output of finished products, drastically reduce the amount of unusable products, reduce material intensity, and increase the usefulness of equipment. For example, with the participation of KPMG consultants, Russian enterprises have developed solutions to reduce ferroalloy consumption in steel production; it has become possible to predict steel defects at the initial stages of production,

optimize the operating parameters of the gas fractionation plant in real time, and determine in advance when the distillation column will clog, allowing for timely repairs and prevention of accidents.

The resulting optimization effect, of course, also depends on the characteristics of the particular enterprise.

How are enterprises approaching digitalization?

The development of new technologies is transforming entire industries and private enterprises. The stages of digital transformation are putting pressure on management. However, digitization requires investment, so companies on this path must define tactical and long-term transformation goals, roadmaps, and business cases.

According to KPMG research, six out of ten industries worldwide currently have a digital transformation program in place. However, a quarter of enterprises have a program designed for less than 12 months, while the majority (61%) plan to implement their existing programs within one to three years. These figures, however, reflect the development level of the largest enterprises—industry leaders.

However, leaders are also at the stage of building the necessary digital skills and implementing pilot projects. Eighty-nine percent of the largest industrial enterprises surveyed by KPMG have begun implementing solutions or pilot projects based on machine learning and artificial intelligence within limited processes. The OECD estimates that only 12 percent of enterprises in Western Europe are already using big data analytics.

Pilot companies are tasked with testing these technologies, demonstrating measurable economic impact, and initiating cultural change within the organization. In most cases, such pilot projects are implemented with external expertise from equipment suppliers, IT companies, consultants, and technology start-ups.

For those that are not market leaders, new technologies are still in the planning stages. Small and medium enterprises (SMEs) lag behind the largest businesses not only in adopting digital technologies but also in traditional robotics and factory automation. This difference in adoption rates is due to the availability of financial resources, experience in implementing advanced technologies, and cost savings.

What limits digitization?

In 2018, the OECD presented the results of an analysis of factors influencing the pace of digitization. These factors can be divided into two groups: internal organizational capabilities and the availability of incentives for digitization.

An organization's internal capabilities include the presence of a strategic decision and the ability to implement it, which are characterized by the competence of the company's

management and the quality of its management processes. This includes the knowledge and skills of employees required for digital transformation: the knowledge and skills of not only IT specialists but also other digital specialists (as well as the level of knowledge of low-skilled employees) have a significant impact. Internal capabilities also involve the efficient allocation of resources to the company's employees based on their knowledge and skills.

The incentives for digitalization can include, for example, the level of competition in the industry, which stimulates higher productivity in enterprises.

In addition, it is important to have access to digital technologies and an open market, the ability to finance investments in digital technologies, and the ability to flexibly enter and exit projects in the context of risky investments in new technologies. Flexibility of labor legislation becomes important in terms of reallocation of resources, and availability of additional tax and regulatory benefits.

By working with these factors, the government can support enterprises and accelerate the adoption of digital technologies, as up to 60% of the available potential for increasing enterprise productivity depends on them.

Internal digitalization opportunities and additional incentives allow enterprises an opportunity to start on the path of transformation. However, even with the necessary resources, companies face internal resistance, reluctance to change business processes, and difficulties in integrating with "traditional" solutions.

It is important to remember that digital business transformation is not about replacing all employees with robots, but about empowering managers and employees with new technologies. More than 60% of industrial managers believe that digitalization will create additional jobs rather than reduce their number.

Digitization in industry is a relevant, even contemporary topic today, and it has entered a new era of industrialization. It provides a high degree of flexibility and a wide coverage of the customer base in shaping business models by integrating Cyber-Physical Systems (CPS - Cyber-Physical System) and Internet of Things (Internet of Things-IoT) into the production process.

The implementation of new technologies is based on the desire to comprehensively improve efficiency and create conditions for the successful functioning of the enterprise.

What does industrial digitization mean?

Industrial digitization is the concept of a new digital space that includes production equipment, life support, and enterprise security, i.e. the entire electronics system of an organization.

Sensors and sensors make it possible to combine various physical objects into a virtual network in which they can interact with each other without human intervention.¹

The main benefit of digitalization is to increase the efficiency of the enterprise by reducing the time it takes to develop a new product, bring it to market, and deliver it to the consumer, and to optimize company resources, which increases productivity.

The concept of corporate digitization was first published in 1996 by Nicholas Negroponte, head of the MIT Media Lab, in the book "Being Digital". However, it was only a theory, and now it is technically possible to put the ideas of the digital enterprise into practice.

Today there is a real need for digitization of industrial enterprises, as the problem of processing large amounts of information that arises in large industries can only be solved with the help of machines. Modern technologies allow machines not only to perform automatic actions but also to interact with each other in various areas of the enterprise.

Thus, it is not only about automating individual production steps but also the end-to-end digital production process, including financial and organizational activities. The new approach increases mobility, faster decision-making, and process variability depending on customer needs.

Digital Transformation of the Enterprise.

As mentioned above, the transition to a digital enterprise requires fully digitizing and integrating manufacturing and other processes vertically, from product manufacturing to logistics and industry service. However, there is also a need for horizontal integration that goes beyond a single organization to include the firm itself, partners, suppliers, and customers.

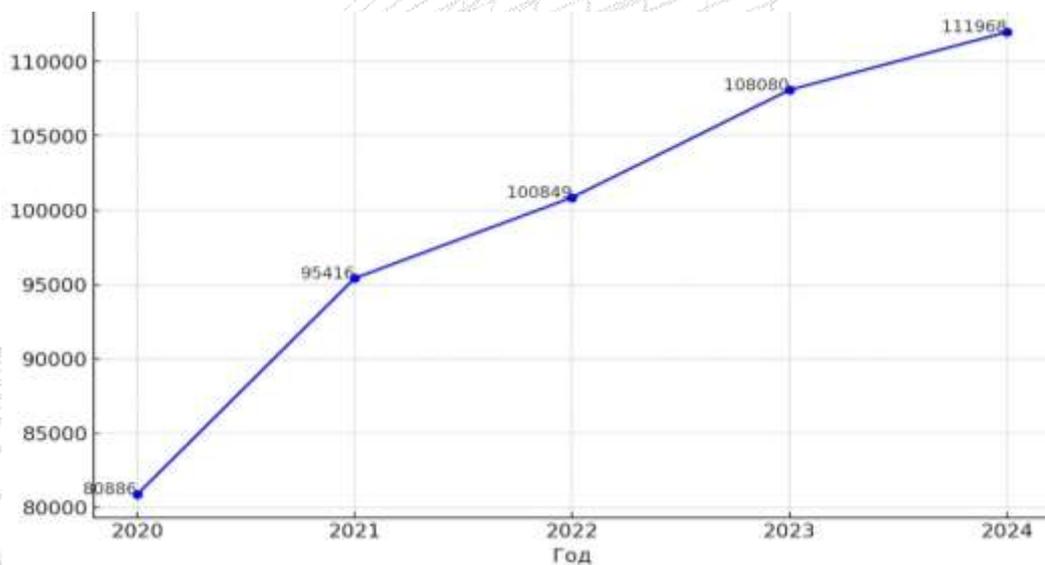


Figure 1 - The growth of the number of industrial enterprises in Uzbekistan (2020-2024).²

¹ <https://center2m.ru/tsifrovizatsiya-promishlenosti>

² Source: compiled by the author on the basis of statistical data from www.stat.uz - official website of the State

The realization of digital transformation using various modern technologies should be based on an appropriate digital platform. The digital platform is understood as digital data, models, and tools, informationally and technologically integrated into a unified automated management system of the target field of science, in addition, this platform should organize the interaction of stakeholders with each other.

Around each digital platform, a corresponding digital enterprise ecosystem emerges, including resource and component suppliers, customers, service providers, and operations. It is also important that all information about practical processes, their efficiency, quality management, and operational planning is available in real time on the organization's integrated network. Summarizing all of the above, we can say that a sharp increase in production volumes and enterprise value, as well as its competitiveness in the market, occurs under the condition of a complete digital transformation of all business processes.

Goals and objectives of digitilization.

Previously, optimization of production implied modernization of its elements and stages.

On the other hand, digitilization is the transformation of a simple enterprise into a digital one, which can be seen as a global process that covers not only all stages of production but also the renewal of all the company's activities.



Figure 2 - Directions for Enterprise Digitilization

Based on the overall concept of digitalization, its goal is to increase the speed of decision-making in production, increase the variability of production processes, and reduce the number of employees involved.

The goals are achieved through digital transformation, productivity improvement, collaboration, cooperation, cooperation, quality control, support, and forecasting of production

results. This creates the opportunity to dramatically increase profits, competitiveness, and the overall market value of the enterprise.

Directions for digitalization of production

Digital transformation is currently underway in virtually all industries, including mining, engineering, aviation, aerospace, energy, food, and others.

Part of this process is, of course, done with the Internet of Things or the Industrial Internet of Things (IIoT).

The Industrial Internet of Things is a multi-tiered system that includes:

1. devices installed on individual assemblies and devices of the plant;
2. devices for data collection, transmission, and visualization;
3. computerization of employees' workplaces;
4. unification of workplaces and the entire fleet of equipment into a single information network;
5. tools for analyzing and automatic interpretation of received data (data are often transmitted by human operators, which reduces the probability of emergencies and accidents due to human factors).

Of course, digitization in mining and other manufacturing industries can bring great opportunities for development and revenue growth, but also serious risks, as the failure of a single system can cost much more than normal failures and undesirable events. Therefore, high demands are placed on software and technical solutions to create a modern digital enterprise.

However, there are several main directions in the process of digitization of industrial enterprises:

1. accelerating the market launch of new products;
2. improving safety and reliability of production;
3. increasing the flexibility of production;
4. improving the quality of products;
5. improvement of overall production efficiency.

Complete digital transformation of an enterprise involves working on all of the above.

Digitization of industrial enterprises.

Before digitization, business owners should conduct extensive research that will allow them to anticipate how modern concepts and technologies can affect their business. In order to set digital transformation goals correctly and end up with a positive result, it is essential to have clear information about the goals and capabilities, the overall objective, and the state of the business.

To put together an industrial digitization program, the following questions must

first be answered:

1. What can digitilization bring to an enterprise?
2. What are its goals for the enterprise?
3. at what stage of digital transformation is the organization currently at, and what technologies can be used?
4. What digitilization work can the company do itself and/or engage specialists? As the list of issues expands, it becomes necessary to select appropriate tools, software, and technical solutions. However, at the first stage, it is necessary to decide whether such a change will lead to positive results for the company at present and whether this transition will be economically justified. What does digitilization provide?

The benefits of digital transformation are evident in the examples.

One of the most successful projects to date is the Siemens project, in which not only intelligent systems are developed, but also applied.

Amber Corporation has launched an electronics plant specializing in the production of industrial controllers. The company produces about 12000000 controller products of more than 1000 items per year. More than 75% of all work performed is done by robots and automated machines, and production is integrated with the design subsystem - the subsystems transmit all necessary process information directly to production. The codes entered into the models provide information about the technological orientation of the equipment and the requirements for each operation performed. This technology makes it possible to achieve a product quality index of 99.999% at the plant.

More than 50 million production and technical records are created daily in manufacturing, which can be used to track the entire lifecycle of manufactured products.

Corporate digital security is a complex concept that encompasses all areas of a company's lifecycle. It includes at least three areas:

1. Defense against external attacks. Hacker attacks continue to be a serious problem, especially for large enterprises. Hundreds of companies face unauthorized access attempts to their corporate perimeter and technology management systems. Given global digitilization, the enterprise must be fully protected against unauthorized access attempts.

- 2- Employee Safety. The company's employees must be well protected from any injuries.

This is facilitated by competent optimization of production, and careful control over workers' health and production processes.

3. production safety. The products manufactured at the plant and the entire production process need special protection.

Many Western and Asian countries are the most active in the field of digitalization, while Russia is engaged in the development and dissemination of technologies. Already now many industrial companies are optimizing their business models and production with the help of digital transformation.

Examples include such companies as PJSC KAMAZ, Kalashnikov Concern, RusAl, and Petrozavodskmash.

At the same time, the digitalization of production in Russia is gaining momentum. For example, a special Digital Transformation Center was established at KAMAZ PJSC, which has enabled the implementation of several successful projects at once:

1. Organization of the planning department of the logistics center;
2. Implementation of automatic scheduling in the ERP system;
3. Development of a monitoring and operational production management system in cooperation with Siemens;
4. Transforming the sales business model into a customer engagement system based on the SAP Hybris Cloud platform for the client;
5. The introduction of robots, the number of which exceeded 900 in 2020.

One year after KAMAZ PJSC (Public Joint stock Company) began its digital transformation, it increased sales by 21%.

Other Russian enterprises, such as Russian Helicopters or UAC (United Aircraft Corporation), have also switched to digitalization. The enterprises produce high-tech products that can compete with the products of other well-known world manufacturers in terms of their characteristics. And at the same price, it is possible to achieve the same quality only with the help of digital transformation.

Digitalization is becoming more and more prevalent in such a highly regulated and restricted field as industrial safety, as employee health and safety issues are a priority and relevant for any company. News is not meant to eliminate the consequences of events that have occurred, but to prevent them, and to be proactive. This happens through the introduction of new production methods and digital solutions that contribute to improving production efficiency; reducing occupational injuries and the exclusion of workers due to health conditions, and improving loss rates and production safety.

For example, digital technologies can detect previously undetectable industry phenomena - this comes in handy when employees work in unsafe or enclosed spaces, or when there is a lack of personal protective equipment. In addition, "digital" information about personnel activity at certain stages of production, as well as automatically obtained duration of work performed in

real-time, allows building a digital model of all working days of employees and analyzing processes at the enterprise based on this information.

When it comes to improving plant safety, the company behind Center Vision's video analytics system develops proven systems that can recognize objects with up to 98% accuracy, as well as monitor the entire production process in detail and report on safety violations.

The opportunities and benefits of digitalization are rarely, if ever, debatable.

According to statistics, the share of the digital economy in Russia is 5%, while in Western countries it is 16-35%; the number of enterprises in innovative industries is 11%, while in some Western countries, it is up to 60%; the number of people employed in high-tech and cognitive industries is 4%, while in Western countries it is 6%.

Localization of Uzbekistan's production.

Uzbekistan envisages deepening of localization of industrial production, development of intra and inter-sectoral cooperation, including with the involvement of economic entities, on the basis of which the volume of production and export of domestic products is increasing, as well as the creation of new jobs.

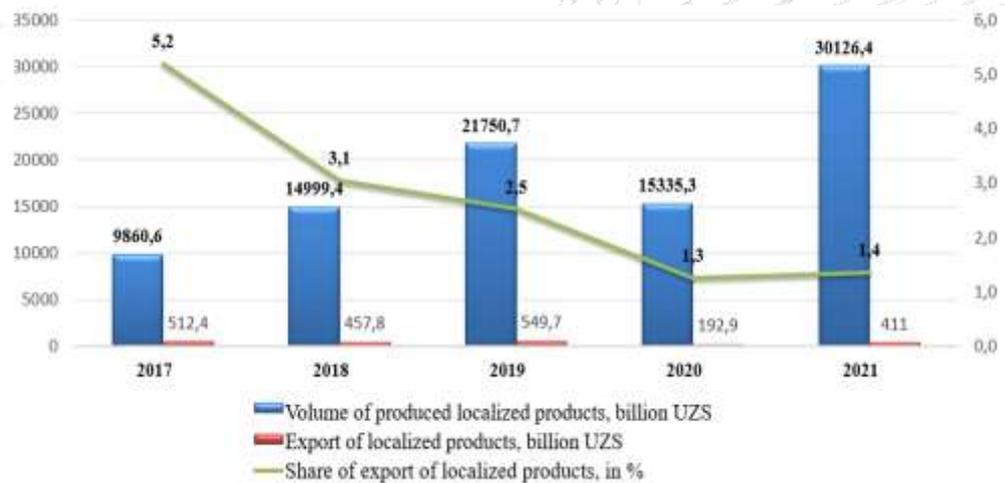


Figure 3 - Localization of Uzbekistan's production³

In the following figure you can see the volume of produced localized products. In the figure you can see that the localization of production of industrial products compared to 2017 increased by 3 times. Under Pandemic production decreased to 15335.3 billion soums. But the share of export of localized products in 2017 was 5.2 percent and decreased to 2021 by 4 times

³ Source: compiled by the author on the basis of statistical data from www.stat.uz - official website of the State Statistical Office of the Republic of Uzbekistan.

and amounted to 1.4 percent in the total volume of produced localized products. In the future, the increase in the share of expert localized products of the industrial sphere should be ensured.

The index of profitability of fixed assets is one of the main indicators of economic security and it reflects the level of profitability of enterprises, as well as the economic efficiency of their activities in industry.

If we analyze the structure of manufacturing industry in the last two years has the following picture:

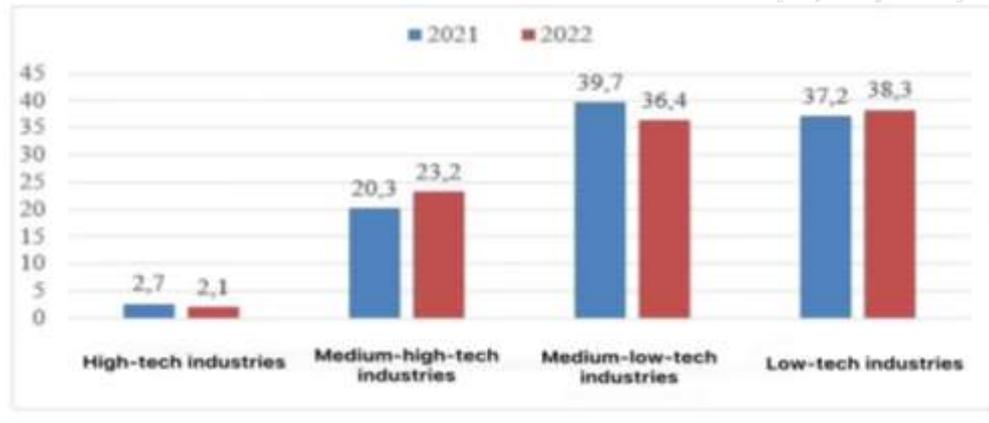
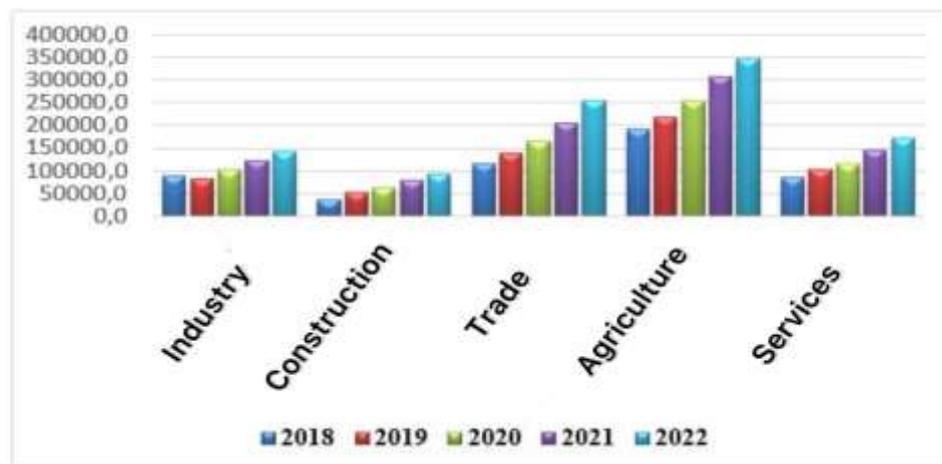


Figure 4 - "Structure of Manufacturing Industry in Uzbekistan".⁴

Over the last two years, the share of high-tech industries in the structure of the manufacturing industry amounted to 2.7% in 2021 and 2.1% in 2022. In the structure of manufacturing, medium-low-tech industries will account for 39.7% in 2021 and 36.4% in 2022, and low-tech industries will account for 38.3% in 2021 and 37.2% in 2022. The low share of high-tech industries is a threat to the development of the industrial sector in the long term. It requires renewal of production with more modern production technologies.

Low share of high-tech production is a threat to the development of the industrial sector in the long term. This requires the renewal of production with the most modern technologies.



⁴ Source: compiled by the author on the basis of statistical data from www.stat.uz - official website of the State Statistical Office of the Republic of Uzbekistan.

Figure 5 -The volume of production of small business and private entrepreneurship in the industrial sphere of Uzbekistan.⁵

The growth of production of small business and private entrepreneurship in industry, for the last 5 years have a low rate than in other areas (agriculture, trade and services). On this basis, the most important priority is to create favorable conditions and support the development of small business and private entrepreneurship in industry.

Ensuring the economic security of the industrial sector in the digital economy.

Territorial-economic potential can be restored with minimum expenditure of resources and time only if there is a high degree of economic security of the region. At the same time to increase the reproduction of economic entities to the region, that is, to improve the quality of life of the population.

During the development of regional economic policy, local governments should take measures to support the basic sectors of the economy that have an impact on the security of the region.

On April 28, 2020, the Decree of the President of Uzbekistan "On measures for wide implementation of digital economy and e-government No. PPP-4699" was adopted. This document outlines a range of topical issues related to the wide introduction of digital technologies in the work of domestic enterprises and public services and many others.

To this end, on October 5, 2020, the President of the Republic of Uzbekistan signed a decree "On approval of the Strategy "Digital Uzbekistan - 2030" and measures for its effective implementation". Digital transformation of state and economic management, ensuring their openness and transparency with the help of modern information technologies is one of its main directions.

Ways to ensure economic security of the industrial sphere:

- Expansion and deepening of intra-industry and inter-industry cooperation ties;
- Establishment of joint exports of manufactured products to third countries;
- Creation of conditions for attraction of private and foreign investments, as well as modern technologies ensuring production of high-quality and competitive products;
- Training of professional staff for local industry enterprises taking into account modern trends, wide use of training programs;
- Supporting the development of small business and private entrepreneurship in the industrial sector;

⁵ Source: compiled by the author on the basis of statistical data from www.stat.uz - official website of the State Statistical Office of the Republic of Uzbekistan.

- Introduction of a system for assessing performance indicators (KPI) of activity;
- Creation of competitive conditions for expanding the content of domestic products within the framework of investment projects realization;
- Technological support of processes, installation and commissioning of equipment by foreign specialists;
- Realization of ready for transfer scientific developments and technologies, through the Electronic Cooperative Portal, for the purpose of their commercialization.

Conclusion

Experts have identified four reasons for lagging behind the leading countries in digitalization:

1. Economic instability increases sanctions.
2. Lack of clear standards.

To effectively develop the high-tech market, it is necessary to have IoT standards in domestic legislation. The fact that some processes are not structured at all at the state level is a serious obstacle to the adoption of digital technologies.

3. Lack of qualified specialists.

External specialists are attracted due to the fact that the country's education system lags behind the development of the digital technology market and fails to provide interested companies with quality personnel.

4. Businesses seeking quick profits. Many domestic companies are only interested in the most liquid projects that will bring big profits in the short term. In Western countries, corporations are happy to invest billions of dollars in projects that can pay off within 30 years, while local companies try to invest in technologies that will pay off within two years. For this reason, digitalization is considered relatively less attractive to local businesses.

Unfortunately, many enterprises are still unable to fully realize the full potential of digitalization and the possibilities of transitioning to new technologies.

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