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# PROSPECTS OF USING INDUSTRY-4.0 TECHNOLOGIES IN INDUSTRIAL ENTERPRISES

**KAMALOV SHUKHRAT KAMALOVICH**

**Abstract**

*The article explores the ways of using Industry 4.0 technology in the organization of corporate financial planning. The analysis of the current state of use of Industry 4.0 in the implementation of additional banking and finance, insurance, public administration, e-commerce, industrial enterprises, internal clearing, stock accounting, personal card information system is highlighted. In addition, a KPI-analysis of the use of Industry 4.0 technology in effective corporate financial management was conducted, and as a result, a digitalization transformation model of industrial enterprises was developed.*

**Keywords:***Keywords: Industry 4.0 technologies, corporate management, financial planning, crypto-assets, KPI, digitization transformation, "cloud" technologies, robotization, artificial intelligence, Big Data*

**Author correspondence:**
**KAMALOV SHUKHRAT KAMALOVICH**
*Associate Professor, PhD, Tashkent Financial Institute, Tashkent, Uzbekistan*
*E-mail:*kamalov_sh_k@gmail.com

## INTRODUCTION

The use of Industry 4.0 technologies is considered important in the implementation of financial planning in an effective corporate management system, and the use of Industry 4.0 technologies in the process of working with companies can be considered as a means of getting rid of declaration mechanisms and additional paperwork. The application of this mechanism in the implementation of corporate financial management reduces the demand for accountants and provides an opportunity to save financial resources in real terms. In addition, through the use of Industry 4.0 technology, it is possible to use the products, works and services produced by them in the corporate management, to sell them on electronic markets and to keep their accounts correctly. It has advantages such as reducing the cost of advertising goods, timely accurate and qualitative analysis and evaluation of the demand for them, introducing the practice of submitting financial reports submitted to various levels of government bodies in a timely manner in short periods of time, the proper management of personnel competence in the enterprise, and the effective evaluation of the flow of personnel.

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## LITERATURE REVIEW

Within the scope of the topic, the use of Industry 4.0 technology in the organization of corporate financial planning and the possibilities of the technology, as well as the research of a number of scientists who are conducting scientific research in the countries that are achieving high economic growth using this technology, were studied. The use of Industry 4.0 in the organization of corporate financial planning and the possibilities of its technology, as well as the research of a number of scientists who are conducting scientific research in the countries that are achieving high economic growth using this technology today, were studied within the scope of the topic.

In particular, the use of Industry 4.0 in business management allows to exclude the human factor, fully automate the process, maximize the company's profit as a result of effective use of resources, and minimize costs (Artem Genkin, Aleksey Mikheev, 2018).

Cryptocurrency is an important factor in the operation of blockchain technology from Industry 4.0 technology. Cryptoanalysis is the process of identifying a cipher or other form of cryptographic object, extracting the raw information from the encrypted data without the key, or calculating the key from the original encrypted data (Jeremy Slark, 2016).

A large database collected in Industry 4.0 technology makes it possible to predict forecast indicators with 90% accuracy in developing the necessary conclusions and strategies for future enterprise activity (Phil Champagne, 2014).

Industry 4.0 technologies are important because they operate directly on the basis of the "government-citizen" formula and enable the maximum limitation of additional commission payments (Roger Wattenhofer, 2016).

The use of Industry 4.0 in organizations is the most effective method of the next generation of technology, and the technology is resistant to external cyber attacks (Pavan Duggal, 2015).

One of the main advantages of Industry 4.0 technology is its decentralized operation. In this case, the data will be visible to all participants in the block in the same way, and it will not be possible to delete or change the entered data (Siraj Raval, 2016).

The implementation of digital economy "blockchain" technologies and the creation of platforms for the circulation of crypto-assets serve as a means to solve a number of economic and social problems (William Mougayar, 2016). The importance of cryptology in the process of ensuring the security of the database collected during the digitization of the economy is important (D.Tapscott, 2018).

According to our local scientists, activities in the field of crypto-asset circulation, including mining, smart-contract, consulting, emission, exchange, storage, distribution, management, insurance, crowd-funding, as well as "Industry 4.0" should be carried out in order to diversify various forms of investment and entrepreneurial activity. "is the introduction and development of technologies (E. Muminova, 2019).

In organizing the financial planning process in enterprises, the use of accounting books from Industry 4.0 technologies allows to increase the efficiency of the internal and external audit process in the enterprise, to prepare financial reports easily and quickly in a short period of time, and to ensure their transparency (E. Muminova, 2020).

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Today, the "Smart Factory" or "Smart Enterprise" using Industry 4.0 technologies, DLT, Internet of Things, additive manufacturing, big data (Big Data) and others is spreading widely in the world market. In developing markets, the share of export enterprises using these technologies is a small percentage, among large global players, it is an undeniable fact that several companies that have developed a company-wide strategy for Industry 4.0 or a foreign market-specific strategy have a high position in the export market.

Industry 4.0 technologies include new Fintechs, automated tools, high automation of machines installed in factories. And they are interconnected in the network through Industry 4.0 technologies, as a result of which data is constantly collected and analyzed. Machine parameters are set based on quality requirements and historical data, and condition-based monitoring becomes an important part of maintenance activities. Predictive maintenance excels at preventive and reactive maintenance - technicians are alerted to potential technical failures before machines break down, and supply chain and production disruptions are avoided. From the moment the raw material enters the warehouse until the final product is shipped, production and output are tracked. Production plans are developed based on demand and inventory levels at distribution centers and retail stores.

Decentralized and adaptive structure The organizational structure of future production enterprises will be more smooth, adaptive, decentralized and changeable. The level of adoption of Industry 4.0 varies, ranging from slow adoption of Industry 4.0 technologies to fully functional, fully automated smart factories in innovation-driven industries such as automotive. The potential for future implementation was evaluated according to five main indicators, which determine the effectiveness and impact of Industry 4.0 in a certain area:

1. Virtualization of business processes: the extent of using technologies such as augmented reality, virtual reality, etc. for automated information exchange and monitoring, control and simulation.

2. Level of added value and complexity of the value chain: The quantum of added value and simplified processes created by the use of artificial intelligence and digitization technologies.

3. Disruption technologies: the level of changes in business models and processes with the adoption of new technologies such as the Internet of Things, 3D printing, smart networks, etc.

4. By using Industry 4.0 technologies to increase the resource efficiency of the main operations, increase the efficiency of all types of resources and achieve optimization of the operation of the technologies used in these systems.

5. Anticipate new framework or regulation: Develop policies or initiate initiatives to facilitate adoption of new technologies.

In the use of Industry 4.0 technologies, the use of computing equipment includes data storage devices, high-performance computing, and interfaces. Real-time data processing using software, database management for business processes, cloud computing, real-time image processing (for example, OCR) are performed using complex algorithms. Robotics, 3D printing, and automated equipment as production equipment greatly contribute to the production of quality products by speeding up the production process. The use of digital technologies listed above requires high-speed mobile Internet (4G, 5G), Internet protocols, local broadband connection (Wi-Fi) systems, short-range and low-power transmission (Bluetooth, NFC) technologies to work 24/7/365.

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The Industry 4.0 revolution will bring a high level of automation and interdependence in the production process. The tools, technologies and machines used are expected to be different from today. Intelligent machines coordinate production processes independently, intelligent service robots collaborate with workers on the parts assembly line, and intelligent transportation systems move goods from one place to another. Tablets and smart devices are used to collect and analyze data in real time. In particular, automated production lines equipped with robots, humanoids and machines will be organized, continuous production monitoring will be carried out, production downtime will be determined and losses will be prevented, as a result, predictive maintenance with high accuracy will be established through the data analysis system.

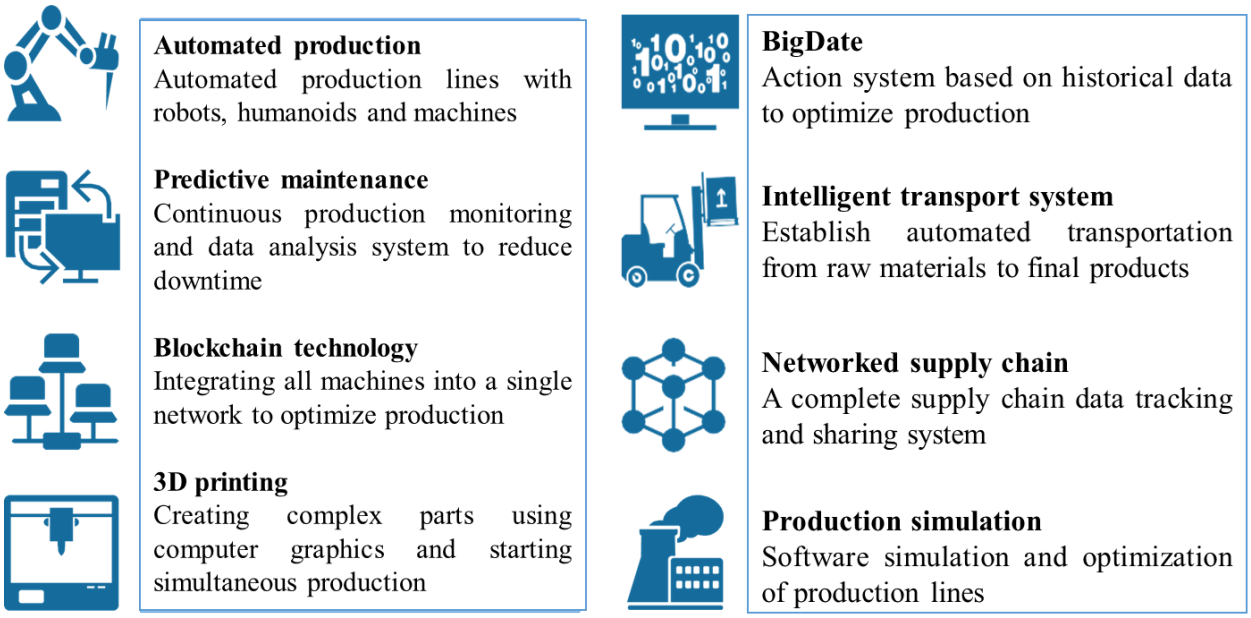


**Fig. 1. Description of directions of use of digital technologies in industrial enterprises**[1]

Enable simultaneous manufacturing of complex components using computer graphics through 3D printing printers. With the help of Industry 4.0 technology, it is possible to use a system of actions based on historical data to ensure the transparency of the system for everyone, to optimize production through Big Data. Intelligent transportation system, complete supply chain information can be tracked and shared. The software enables the simulation and optimization of production lines.

Today, industrial enterprises have started implementing digital technologies at a high pace. In particular, a mechanism for the implementation of the "Digital mine" technology project has been established at "Uzbekneftgaz" JSC. As a result, the technology consists of collecting, processing and transmitting data about mines online, performing daily data monitoring and analysis, and developing recommendations using artificial intelligence based on factor analysis. In addition, it creates an opportunity to ensure the reliability and safety of information, to monitor and analyze data dynamics.

[1] "Made in China 2025: Chinese government aims at Industry 4.0 implementation", Control Engineering

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Visual model of mines Development of digital geological and hydrodynamic models of the underground part of mines continues within the concept of "Digital mine". Currently, digital geological and petrophysical models for each productive layer of 37 out of 100 deposits have been developed. As a result of the digital technology of "Digital Mine", full automation of the process from extraction of raw materials from the well to processing was achieved. It increases the transparency of the information needed for management, and increases efficiency by performing analyzes based on real-time data, planning production and forecasting with high accuracy.

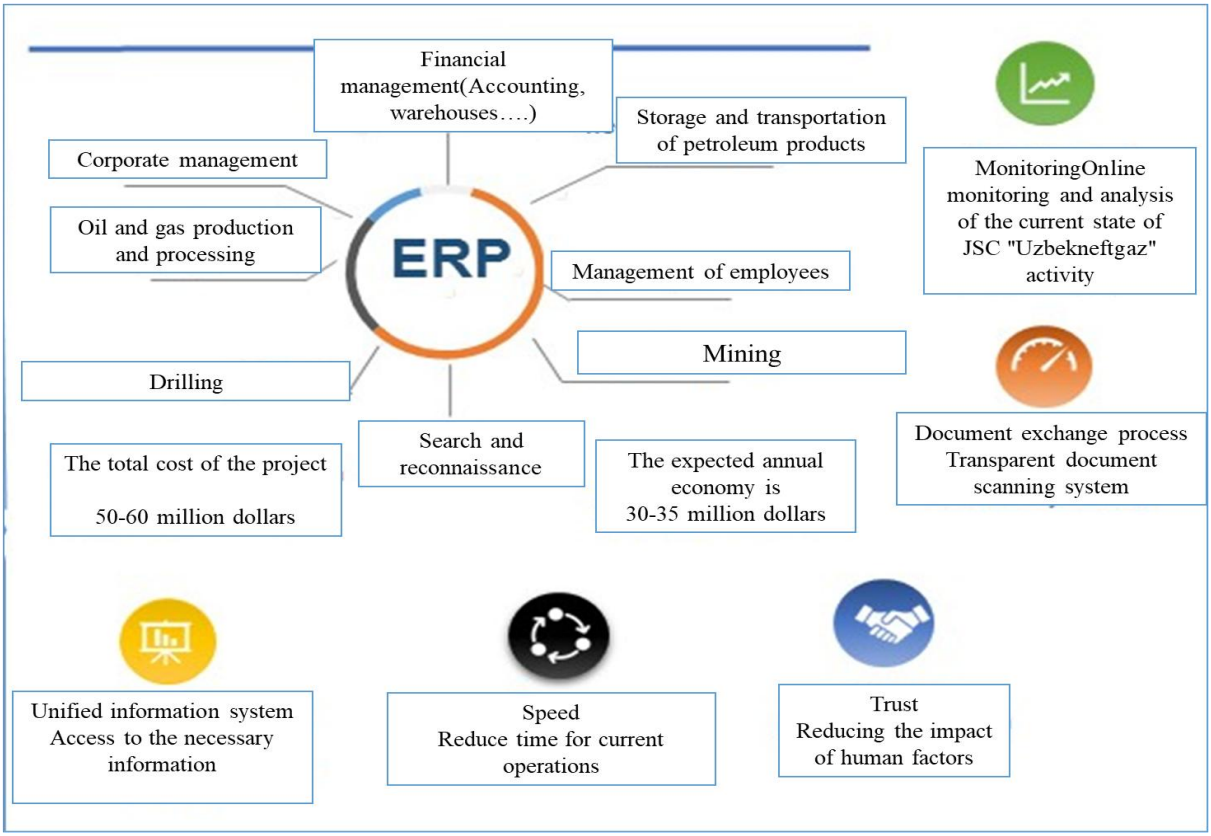


**Figure 2. Analysis of the efficiency of using digital technologies in oil and gas enterprises**[2]

In the process of automation of oil depots, the pouring and storage of oil products is counted by installing digital level gauges on the capacities of the oil depots and providing control. As a result, an average of 300 tons of gasoline (1.4 billion soums) and 450 tons of diesel fuel (2.8 billion soums) will be saved in a year during the loading period. As a result, it provides continuous control and transparency in the management of oil products in vertical and horizontal capacities in oil bases.

In the direction of the centralized dispatching service, the operation modes of the technological devices in the factories can be transferred to the dispatching services. As a result, the management and enterprises under the jurisdiction of JSC "Uzbekneftgaz" provide an opportunity to directly monitor the processes of extraction and production, delivery and export of hydrocarbon raw materials to consumers. It leads to the reduction of transparency and human factor in the

[2]Тадқиқотчи ишланмаси.

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system, the minimization of costs, as a result, the reduction of costs and the maximization of profit (Figure 2).

In order to improve the management system of corporate information resources in oil and gas enterprises, it is planned to use SAP ERP S4/HANA digital software products. The advantage of this software product is that all processes from production to delivery are fully automated. It is useful in making corporate management decisions, implementing investment projects, and collecting necessary information resources for export operations.

Today, 41 objects (enterprises) have been selected for the introduction of the SAP ERP system, the estimated cost of the project is 50.0 million dollars, and this project is being implemented based on the decision of the chairman of the board of "Uzbekneftgaz" JSC No. 40 of September 16, 2020. The technical task for the implementation of ERP was examined, the introduction of SAP ARIBA - procurement process digitalization system will be ensured, as a result of transparent and efficient management of society's resources, the expected average annual efficiency is 30-35.0 million dollars, and the period of reimbursement of expenses is 1.3 years (fig.3).


**Figure 3. Comparative analysis of the main technical and economic indicators of "Uzbekneftgaz" JSC**[3]

[3] https://www.ung.uz/shareholders/reports/11/sub/30/1

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It consists of evaluating, monitoring, analyzing the efficiency of reindustrialization using Industry 4.0 technologies, developing infrastructure, increasing employment in the manufacturing industry and increasing the share of industrial production in the gross domestic product, wide application of environmentally friendly technologies, activating scientific research and creating technological opportunities. In this process, the performance indicators of industrial sectors can be evaluated using the proposed methodology for calculating KPI based on the relationship with the goals of digital technology development from the point of view of comparison (Table 1).

**Table 1.**

**Description of the systematic assessment methodology of KPI (Key Performance Indicator) in digitalization of industrial enterprises**[4]

| **Thegoals** | KPIs for re-industrialization of digital technologies |
|---|---|
| To maximize the level of global leadership (competitiveness) in high-tech markets | KPI-1 Илмий-тадқиқотватажриба-конструкторликишларигасарфланганхаражатларЯИМганисбатанфоизда, % |
| | KPI-1 Expenditures on scientific research and experimental construction work as a percentage of GDP, |
| | KPI-2 Share of value-added products of medium and high-tech industry in total value-added,% |
| | KPI-3 Total financial support for digital infrastructure (investments, loans, loans, etc.), at the prices of year T, in soums |
| | KPI-4 Number of researchers per million population (in full-time equivalent), people |
| Growthoflaborproductivity | KPI-5 Annual growth rate of real GDP per employment, % |
| | KPI-6 Share of value added in the "manufacturing" industry in GDP for the previous year, % |
| | KPI-7 Domestic material consumption of raw materials per unit of GDP, kg / $ at the prices of year T |
| Growth of the standard and quality of life of the population | KPI-8 Annual growth rate of real GDP per capita, % |
| | KPI-9 CO2 emissions per unit of added value, kg CO2e / $ at the prices of year T |
| | KPI-10 Share of the population covered by 4G mobile networks, % |
| | KPI-11 Added value of industry Production per capita, t year at prices ($) |
| | KPI-12 Growth rate of per capita income among the poorest 40% of the population, in % |
| | KPI-13 Domestic material consumption per capita, tons |
| Employment growth in non-resource industries | KPI-14 Share of young people (aged 15 to 24) without higher education, unemployed and without professional skills to the total employed population, in % |
| | KPI-15 Employment in the manufacturing industry as a percentage of total employment, % |

Analyzing the directions and results of the digital transformation program for industrial enterprises, a number of unresolved issues can be resolved today (Table2).

[4]Муаллиф тадқиқотлари асосида ишлаб чиқилди.

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**Table 2. Analysis of the implementation directions of the digital transformation program for industrial enterprises and the results to be achieved**[5]

| Keyinitiatives | Implementation mechanisms | Analysis of achievable results |
|---|---|---|
| Conduct research on the challenges and opportunities of the digital economy for industry. Building a knowledge base on digital transformation ideas and practices. Conduct situational analysis of digital trends in business and develop innovative solutions, non-standard ideas, and prototypes | - conducting a brief analysis of consumers, business, market, competitors;<br>- analysis of the international practice of digital transformation in the study of technological aspects in the world;<br>- analysis of technology, customer and industry trends;<br>- implementation of technological training sessions and organization of educational seminars;<br>- identifying the main possibilities of digital transformation and formulating ideas. | - map opportunities for digital transformation;<br>- development of trends map for technology, consumer, industry;<br>- creation of business cases for the main directions of transformation. |
| Evaluationofdigitizationprocesses | – - development of digital evaluation and analysis directions of the company using the international digitalization evaluation methodology, taking into account human, capital, value, technology, organization, internal and external environmental factors | – - introduction of the digital maturity index (individual diagnosis and assistance in necessary cases, dividing into start-up, transitional, developing enterprises). |
| Launching digital transformation. Using design thinking, go from detailed audience analysis to creating a prototype solution in selected priorities. | - conducting additional research<br>- highlighting consumer preferences and detailed analysis of the target audience;<br>- conducting generative sessions to develop ideas and search for solutions;<br>- prototyping solutions;<br>- testing the created prototypes on representatives of the target audience. | - providing solutions for a new product or concept through a prototype;<br>- providing detailed reports on the target audience and identified preferences;<br>- keeping a register of ideas and solutions;<br>- development of business cases for key ideas and use as a ready-made guide. |
| Creating a minimum viable product. Creating a digital twin. | - forming a hypothesis to be tested during the experiment; | - creating a report on the real performance indicators |

[5]Муаллиф тадқиқотлари асосида ишлаб чиқилди.

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| | | |
|---|---|---|
| Increase the buyer's loyalty to the product. Rapid confirmation or rejection of a business hypothesis about the effectiveness of solutions and concepts created in real advertising campaigns | - creation of an MVP (Most Valuable Player) system that allows the most reliable verification of hypotheses;<br>- creation and implementation of advertising campaigns to test business hypotheses on real users;<br>- form conclusions on the success of data collection and hypothesis testing. | of the solution and its individual components;<br>- Creating a database of MVP, ideas for its improvement, the most effective MVP versions and creatives. |
| Scaling. Simultaneous or direct scaling. Achieving a circular and productive economy by defining and expanding promising directions. | - implementation of organizational and process design;<br>- creation of advertising tactics on the electronic channel;<br>- implementation of technological mechanisms for implementation of the digital platform and monitoring of implementation quality;<br>- testing digital modeling in financial and economic activities; | - implementation of scaling tactics and development strategy for tested cases;<br>- application of technical assignments to the development of a complete version of the product. |

The only way to move to a digital economy is to start with digitizing all stages of production. It is an important step towards the application of new technologies presented in the concept of Industry 4.0 in the development of production and export of high-tech industrial products. This includes digitizing not only models of complex products, but also production processes, systems, resources and other elements that are part of the product life cycle. It is possible to produce innovative, high-quality and competitive industry 4.0 products based on digital technologies based on the direction of production enterprises that meet the requirements of the foreign market. It enables cost optimization and profit maximization in product production and sales, the development of digital platforms and the search for new export markets by conducting in-depth marketing research in foreign markets. Through this, it is possible to develop a digital cluster system specializing in the export of modern industrial products, and through the development of export activities, to improve our position in the world market ranking, to significantly reduce production costs, to solve various problems arising in business management processes, and to increase efficiency in modern business.

## CONCLUSION

As a result of the scientific research carried out on this topic, the following scientifically based conclusions were reached.

First, using the initial structures of Industry 4.0 technology in operational activities in enterprises can have a direct positive effect on the size of the enterprise's financial indicators.

Second, media pressure is increasing today, and the demand for transparency is increasing. The demand for qualified specialists is increasing. It is the Industry 4.0 technology that is emerging as a technology that guarantees transparency not only in the process of corporate financial management, but also in all aspects of society. Industry 4.0 technology is a revolutionary technology that changes many business models, makes corrections to the structural structure of the economy and society, and can rapidly apply science and technology innovations.

Thirdly, using Industry 4.0 technologies, it is possible to assess, monitor, analyze the effectiveness of reindustrialization, develop infrastructure, and increase employment in the manufacturing industry. And it consists in increasing the share of industrial production in the gross domestic product, wide application of environmentally friendly technologies, activation of scientific research and creation of technological capabilities.

Fourth, the advantages of the working principles of Industry 4.0 technology, which is a component of Industry 4.0 technology in the process of corporate financial management, are as follows. Any information uploaded to the system is instantly viewable by every user connected to the system, and serves to ensure that this uploaded information is saved or to prevent it from being deleted. Availability of the ability to ensure a high level of transparency in the process of database distribution; provides an opportunity to establish a clear target observation in the exchange of data and information. The low cost of data storage and processing, the duration of the data storage period, data processing, targeted description and categorization provide opportunities.

Fifth, the main condition for the transition to the digital economy is the rapid application of Industry 4.0 technology to all aspects of society, identifying problems that may arise in this process and ensuring their timely elimination. In this process, the performance indicators of the industrial sectors can be evaluated using the proposed methodology for the calculation and regular evaluation of KPI based on the relationship with the development goals of digital technologies from the point of view of comparison.

**REFERENCES**

1. Артем Г, Алексей М. (2018) Саноат 4.0 : Как это работает и что ждет нас завтра– М. Альпина Паблишер. 592 с.
2. Jeremy Clark. (2016) Bitcoin, blockchain, cryptocurrency, cryptology (A detailed and technical study of Bitcoin, blockchain, cryptocurrency, and cryptology). 499 с.
3. Phil Champagne. (2014) The Book Of Satoshi: The Collected Writings of Bitcoin Creator Satoshi Nakamoto. 396 с.
4. Roger Wattenhofer. (2016) The Science of the Blockchain.124 p.
5. Pavan Duggal. (2015) Blockchain Contracts and Cyberlaw \\ Internationonal Journal of science and technology \\. 39 p.
6. Siraj N. (2016) Decentralized Applications: Harnessing Bitcoin's Blockchain Technology» 1-еиздание; 150 стр.
7. William Mougayar. (2016) The Business Blockchain: a Primer on the Promise, Practice and Application of the Next Internet Technology. 20 p.
8. Д.Тапскотт. (2018) Электронно - цифровое общество.14 p.

9. Э.Муминова, 2019. "The role and importance of "Industry 4.0" technologies in the development of the digital economy in Uzbekistan" // "Economics and innovative technologies" scientific electronic journal // No. 2, March-April, 2019. 6 p.

10. E. Muminova, 2020. "Using Industry 4.0 technology in enterprise financial management - a guarantee of transition to new generation technologies" // International Finance and Accounting // No. 1, 2020. 6 p.

11. 11. Technological approach to digital transformation of Navoi mining and metallurgical combine Proceedings of the Republican Scientific and Practical Conference on "Digitalization in Public Administration: Problems and Solutions" // Academy of Public Administration under the President of the Republic of Uzbekistan. Tashkent 2019, 162 p.