

## COMPETITIVENESS OF THE NATIONAL ECONOMY IN THE CON-TEXT OF DIGITALIZATION: TRENDS AND FACTORS

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*Formulation of the problem.* Analysis of competitiveness factors and identification of mechanisms for managing competitiveness in the modern digital economy, both at the enterprise level and at the national economy level, is a necessary tool for today's changing economic environment. *The purpose of the article* is to investigate trends and factors that determine the competitiveness of the national economy in the context of digitalization. *The object of the study* is the digital economy as a medium for forming the competitiveness of the national economy. *Methods used in the study.* System approach, structural-logical and statistical analysis, generalization. *The hypothesis of the study.* Competitiveness factors are being transformed as part of the development of the digital economy. *Statement of the main material.* Distinctive features of the digital economy are formulated as key factors of economic competitiveness at both the micro and macro levels. The world experience in developing state policy in the field of digital economy demonstrates a keen understanding of the need to use digital economy tools to increase the level of national competitiveness. The analysis of the directions of the policy of digitalization of the economy of the Republic of Belarus allowed us to state certain, but insufficient, efforts of the government to form a holistic approach to digitalization at all levels of government. *Originality and practical value.* Transformation of competitiveness factors in the digital economy, identification of a number of competitive trends and the main factors of success in digitalization as factors of competitiveness. *Conclusions.* The main factors of success in digitalization are properly organized state policy, increased interest from the industrial sector, and their competent interaction, taking into account the specifics of the goals of each of the agents.

**Key word:**

digital economy, digitalization, competitiveness, key success factors.

## КОНКУРЕНТОСПРОМОЖНІСТЬ НАЦІОНАЛЬНОЇ ЕКОНОМІКИ В УМОВАХ ЦИФРОВІЗАЦІЇ: ТРЕНДИ ТА ФАКТОРИ

*Постановка проблеми.* Аналіз факторів конкурентоспроможності та виявлення механізмів управління конкурентоспроможністю в сучасній цифровій економіці як на рівні підприємств, так і на рівні національної економіки є необхідним інструментом сучасної мінливої економічної кон'юнктури. *Мета статті* - дослідити тренди і фактори, що визначають конкурентоспроможність національної економіки в умовах цифровізації. *Об'єкт дослідження* - цифрова економіка, як середовище формування конкурентоспроможності національної економіки. *Методи, що використовуються в дослідженні.* Системний підхід, структурно-логічний і статистичний аналіз, узагальнення. *Гіпотеза дослідження.* Фактори конкурентоспроможності трансформуються в рамках розвитку цифрової економіки. *Виклад основного матеріалу.* Сформульовано відмінні риси цифрової економіки в якості ключових факторів конкурентоспроможності економіки як на мікро, так і на макрорівні. Світовий досвід розробки державної політики у сфері цифрової економіки демонструє гостре розуміння необхідності використання інструментів цифрової економіки для підвищення рівня національної конкурентоспроможності. Аналіз напрямів політики цифровізації економіки Республіки Білорусь дозволив констатувати певні, але недостатні зусилля уряду щодо формування цілісного підходу до цифровізації на всіх рівнях управління. *Оригінальною і практичне значення дослідження.* Трансформація факторів конкурентоспроможності в умовах цифрової економіки, виділення ряду конкурентних трендів і головних факторів успіху в цифровізації в якості факторів конкурентоспроможності. *Висновки.* Головними факторами успіху в цифровізації виступають правильно організована політика

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держави, підвищений інтерес з боку промислового сектора, їх грамотне взаємодія, що враховує специфіку цілей кожного з агентів.

**Ключові слова:**

цифрова економіка, цифровізація, конкурентоспроможність, ключові фактори успіху.

## КОНКУРЕНТОСПОСОБНОСТЬ НАЦИОНАЛЬНОЙ ЭКОНОМИКИ В УСЛОВИЯХ ЦИФРОВИЗАЦИИ: ТРЕНДЫ И ФАКТОРЫ

*Постановка проблемы.* Анализ факторов конкурентоспособности и выявление механизмов управления конкурентоспособностью в современной цифровой экономике как на уровне предприятий, так и на уровне национальной экономики является необходимым инструментом современной меняющейся экономической конъюнктуры. *Цель статьи* – исследовать тренды и факторы, определяющие конкурентоспособность национальной экономики в условиях цифровизации. *Объект исследования* – цифровая экономика, как среда формирования конкурентоспособности национальной экономики. *Методы, используемые в исследовании.* Системный подход, структурно – логический и статистический анализ, обобщение. *Гипотеза исследования.* Факторы конкурентоспособности трансформируются в рамках развития цифровой экономики. *Изложение основного материала.* Сформулированы отличительные особенности цифровой экономики в качестве ключевых факторов конкурентоспособности экономики как на микро, так и на макроуровне. Мировой опыт разработки государственной политики в сфере цифровой экономики демонстрирует острое понимание необходимости использования инструментов цифровой экономики для повышения уровня национальной конкурентоспособности. Анализ направлений политики цифровизации экономики Республики Беларусь позволил констатировать определенные, но недостаточные усилия правительства по формированию целостного подхода к цифровизации на всех уровнях управления. *Оригинальной и практическое значение исследования.* Трансформация факторов конкурентоспособности в условиях цифровой экономики, выделение ряда конкурентных трендов и главных факторов успеха в цифровизации в качестве факторов конкурентоспособности. *Выводы.* Главными факторами успеха в цифровизации выступают правильно организованная политика государства, повышенный интерес со стороны промышленного сектора, их грамотное взаимодействие, учитывающее специфику целей каждого из агентов.

**Ключевые слова:**

цифровая экономика, цифровизация, конкурентоспособность, ключевые факторы успеха.

**Problem statement.** Information is the main resource both in society and in business processes. People transform it into knowledge, and socio-economic relations are transferred to the network space. A balanced, scientifically grounded, structural macroeconomic policy is one of the main instruments of restructuring and the process of shaping the digital economy and “new industry”.

The term «digital economy» is used by economists, politicians, lawyers, often not attaching its true meaning. The term “Digital Economy” became widespread after the ministerial conference of 40 developed countries held under the auspices of the OECD in Cancun (Mexico) in 2016, which adopted the Declaration «Digital Economy: Innovation, Growth and Social Well-being».

The term «digital economy» was first used relatively recently, in 1995, by the famous American scientist from the Massachusetts Institute of Technology N. Negroponte in connection with the intensive development of information and communication technologies (ICT), the be-

ginning of the second generation informatization process. In fact, all spheres of human life (economic, social, political, cultural, social and others) have changed to one degree or another due to the discovery and development of ICT, however, the changes in recent years allow many to assert that a new stage of informatization is beginning, the name of which is «digital economy». According to the experts of The Boston Consulting Group: «for some countries, this is a logical continuation of the evolutionary development of the digital ecosystem and the opportunity to fully implement that very «creative economy», «new economy» - a system of interconnections where the border between online and offline becomes conditional, and the level of involvement of the state, business and citizens reaches 100%. This is a near future for the leading countries. For catching-up countries, digitalization is an opportunity to preserve real competitiveness in the long term, as well as sustainability» [1].

Literally «digital economy» means the economic activity of society using electronic means. Economists understand it as the imple-





mentation of added value using electronic technologies. Instead of the term «digital economy», one can also find «digital economy», «Internet economy», «web economy».

Having studied the approaches with the definition of the essence of this concept, we can formulate the following distinctive features of the digital economy:

- the main activities of business entities are concentrated on digital platforms that combine them into a single information environment, which allows access to banking services 24/7 regardless of the territorial affiliation of clients;

- a significant contribution of individual entities that have ICT and unique mechanisms for processing and analyzing data in the innovative inclusive development of the national economy and obtaining valuable relay information that allows to reduce transaction costs, increase efficiency through digital technologies and forecasting accuracy;

- standardization and unification of the services and goods provided contribute to the formation of personalized service models that allow you to highlight the target audience and attract certain groups of consumers, individual freelancers and startups;

- direct interaction of producers and consumers reduces the action of distributors in the chains of movement of goods and services, the very approach to supply chain management is changing. A significant contribution to the development of the digital economy is made by individual participants who perform transactions on an outsourced basis;

- insufficiently clear formulation of the theoretical basis for the innovative development of the digital economy, which makes it difficult to assess the benefits of using digital technologies;

- threats and risks of digital transformation and ensuring the security of the introduction of digital information and communication technologies for the state, business and the population.

New technologies and digital platforms allow companies and the public to reduce transaction costs of interaction on an ever-increasing scale and to maintain closer contact with business entities and government agencies.

The very concept of «digitalization» testifies to a new stage in the development of production management of goods and production itself based on the "end-to-end" application of modern information and communication technologies, from the Internet of things to electronic

government technologies. Therefore, the digital economy functions most effectively in markets with a large number of participants and a high level of penetration of ICT services [2].

The transition to digital technologies is carried out both at the level of individual companies and on the scale of the national economy as a whole. We are talking about the use of broadband communication channels, cloud technologies, big data, artificial intelligence and the Internet of things - all these are key opportunities for digital transformation. Technology adoption increases production efficiency and stimulates innovation. As a result, this leads to an improvement in the supply in the market in order to meet the demand and further satisfy the ever-growing needs of the buyers. Ultimately, digital technologies as a whole stimulate and support the accelerated development of the economy.

Big data also balances supply and demand, and is used as intelligent leverage to optimize structure. Each compound with the ability to perceive is like refineries that collect, move and process data, and then forward it to the source of the request for further "cleaning" and reuse. This cycle will be fundamental to the new world.

**The aim of the article** is explore trends and factors that determine the competitiveness of the national economy in the context of digitalization.

**Presenting main material.** The governments of industrialized countries understand the need to develop a state policy in the digital economy, aimed at using the accumulated technological material for accelerated modernization of the economy.

So, the world community, in particular the Eurasian Economic Union (EAEU), has come up with an initiative for digital transformation in the industry. Attention to this issue was expressed not only by the governments of various countries, but also by integration associations, including transaction companies. Further, the approval of digital strategies around the world followed, in particular: the EAEU adopted the Digital Europe 2020 program, after which the Federal Republic of Germany published the Industry 4.0 project, then the Industrial Internet Consortium in the United States was announced. —the United States of America, and then the People's Republic of China created the program "Internet +". The presented projects were initiated at the state level, the industry supported the proposed direction of development and the largest industrial companies began to implement development strategies

in the concept of "Industry 4.0", "Internet +" (Siemens, General Electric, SAP, Intel).

At the state level of the EU countries, activities are provided, firstly, to develop a legal framework, and, as a result, to regulate work and reduce the cost of creating a network, and secondly, to introduce network services at all levels the interaction of both the industrial sector between themselves and the state, and the private sector; thirdly, to provide targeted financing in those areas where it was necessary for the development of high-speed Internet. Experts of the World Bank say, provided that the level of high-speed Internet use grows by 10%, the annual GDP growth can range from 0.4 to 1.4% [3]. A marker of the importance of using digital technologies in the economy is the growth of their share in the GDP of countries by almost 20%; for industrially developed states, a value of 7% is typical [4].

Germany in 2011 adopted the strategy "Industry 4.0", based on the concept of the industrial Internet of things. The creators of this concept were the scientific and business community of Germany. Initially, the main interest in the program was shown by the leading industrial enterprises, which ensure Germany's leading position in the world economy. As part of the digital transformation of the national economy, the state actively supports this initiative, seeking to involve corporate structures in its implementation and at the same time using it to increase the attractiveness and competitiveness of German industrial goods. According to calculations, by 2030, the use of the Internet to extract maximum efficiency and productivity of the industry will allow to switch to "Internet-based production", this requires constant investment of funds from German industrial companies in the development and implementation of technologies "industrial Internet".

As part of the formation of pilot initiatives for digital transformation, the project "Digital Factory" was proposed. Some of the EAEU countries have supported the initiative, for example, the technological development program "Horizon 2020" is already operating on the basis of Volkswagen (car-building, Germany) and AgustaWestland (helicopter-building, England-Italy). In the future, these factories will create a base for Smart and Virtual Factories, and by 2035 their market volume will reach almost 1.5 trillion. US dollars [5].

One of the main elements of these factories is additive manufacturing, the basis of which

is the use of 3D modeling and printing technologies, a feature of which is the layer-by-layer manufacturing of products.

The result of the implementation of strategies, programs and concepts for the development of digital technologies (their development and implementation) in different countries has become a dynamic development of this market and increased competition in it. To further advance the selected areas of development, world leaders among industrially developed countries are building a proper line of behavior, which is expressed in programs of scientific, technical and industrial potential, updating the technical base, primarily in the manufacturing industry. An analysis of world experience allows us to conclude that state support is indispensable in the implementation of digital technologies in all spheres of the economy. In addition, developed countries are increasing investment in scientific research - sources of "breakthrough" technologies.

The World Economic Forum (WEF) has released a new Global Competitiveness Index (GCI) for 2019. Singapore has the highest GCI score of 4.0 among all considered economies (84.8 points out of 100). Among the G20 countries, the top ten included the United States (2nd position), Japan (6), Germany (7) and Great Britain (9), but all of them showed a decrease in competitiveness. Of the advanced economies, only Korea (13), France (15) and Italy (30) improved their results this year. Among the BRICS countries, China (28) is the best in the ranking, ahead of Russia (43), South Africa (60), India (68) and Brazil (71).

Based on an analysis of the collected data, the report identifies the key drivers of economic growth, which continues to be critical for improving living standards. In addition, a special thematic chapter of the report examines the relationship between competitiveness, shared prosperity and environmental sustainability. The report shows that simultaneously achieving the three goals of increasing competitiveness, creating a fairer society and moving to an environmentally sustainable system does not imply the need to make concessions. However, this requires a comprehensive, proactive, long-term approach. The report examines new and promising "win-win" policy options to achieve three goals.

Experts from the World Economic Forum note that the world economy is ill-prepared for a possible downturn in business activity, since the







past decade has been “lost” in terms of taking measures to increase productivity. The average GCI 4.0 for all countries studied is 60.7 points, which means that almost 40 points are missing to the ideal state. Advanced economies consistently perform better than the rest of the world, but overall they still lag 30 points behind ideal conditions.

Policy makers of governments need to develop not only monetary policy, but also other types of economic strategies, investments and incentives to revive productivity growth. The stimulus for investment is seen by the report's authors as an appropriate measure to restore growth in stagnant advanced economies. Finding a balance between technological integration and investment in human capital will be critical to improving productivity. Data based on GCI 4.0 show that in some countries with significant innovation and technological capabilities (South Korea, Italy, France, Japan), underdeveloped labor resources can increase the risk of negative social consequences. Developing countries with growing innovation potential, such as China, India and Brazil, also need to better balance technological integration and investment in human capital. [7]

The authors of the report conclude that policy measures should be aimed at addressing factors that can lead to higher productivity while reducing economic inequality. These include the following four promising areas: enhancing equality of opportunity, promoting fair competition, improving taxation and social safety nets, and promoting investment competitiveness.

Belarus' neighbors Poland and Russia remained the same, taking 37th and 43rd places. Ukraine in 2019 lost two positions in the Global Competitiveness Index, dropping to 85th place. Belarus is traditionally absent in this rating.

Belarus has approved the State Program for the Development of the Digital Economy and the Information Society for 2016–2020, the purpose of which is to improve the conditions that facilitate the transformation of the spheres of human activity under the influence of ICT, including the formation of the digital economy, the development of the information society and the rise of electronic government.

The Belarusian Program-2020 should be linked to the developed programs “Digital Kazakhstan” and “Digital Russia” and integrated into the much-needed program “Digital EAEU”, and the main aspects of it should be the practical aspects of introducing digital technologies into

education, healthcare, agriculture. (precision farming), public services (e-government), industry (digital manufacturing and robotics). First of all, it is necessary to develop those sectors of the digital economy that will increase the competitiveness of the traditional economy, and this will require, among other things, the use of new business models based on digital technologies.

There is an opinion that Belarus with its ICT potential (32nd place in the world according to the ITU rating) should not hesitate. First of all, it is necessary to dramatically increase the training of personnel for this sector of the economy - and not only programmers, but also business informatics, IT marketers, etc. The share of people employed in the IT sector is only 2.2% of the employed population (according to estimates EY), while in the USA - 3.8%, in the EU - 3.7%. It is also very important to organize effective continuous development of digital competencies for all specialists and prepare them for the coming changes.

Thanks to Decree No. 8, Belarus has a chance to attract investors to such an important section of the digital economy as digital cryptocurrencies based on blockchain technology, and become, as it was once planned, an international financial center based on virtual currencies - this will allow by 2025 to triple the size of the digital economy, as recommended by Russia McKinsey. In addition, the introduction of technologies such as Industry 4.0, Internet of Things, 3D printing, touch interfaces, robotization will allow our factories to regain competitiveness and reach the forefront.

The need for the transition to the Internet - economy leads to the emergence of new subjects for the management of already existing institutions. New responsibilities appear not only for the state, but also for the electronic network institutions that have been created to implement new opportunities. Such institutions are, first of all, e-democracy, e-government, political crowdsourcing, etc.

Building a modern effective system of e-government is one of the tasks of the state policy of the Republic of Belarus. In this direction, a number of legislative acts have been adopted, special technical support has been created for the transfer of certain state services into electronic format. Among the main normative acts adopted in this area, one can single out the Strategy for the Development of Informationization of the Republic of Belarus for 2016–2022. (Strategy-2022), according to which the development of

the information society in Belarus: “is one of the main factors improving the system of public administration, increasing the maturity of civil society” [8].

An important area of work is a large-scale transfer of administrative procedures and public services into electronic format, which will simplify business and interaction between the state and citizens. In this regard, at the state level, a set of measures is being implemented to transfer departmental information resources to cloud technologies.

All of the above activities and projects testify to the gradual introduction of e-government principles in the country. However, this process is not happening as fast as in other post-Soviet countries (for example, Estonia or Georgia).

In the Belarusian legislation, there is no unified approach to the definition of a state electronic service or service. Because of this, both informing about administrative procedures, and providing information about the activities of state bodies and organizations, and directly interactive services (for example, placed on a single portal of electronic services) are often called electronic services, while mixing in essence different generations of services that are characteristic for different stages of e-government development.

Of the more than 60 procedures currently provided by the Single portal of electronic services, only 19 are designed for individuals, while the procedures available to them are not of great social importance and demand among potential users. It should be noted that the government strategies and programs adopted in recent years in the field of e-government development in Belarus provide for a number of serious measures to deepen electronic interaction between citizens and government bodies.

The determining factor of competitiveness in the modern world is the adoption of the fourth industrial revolution. The founder and president of the World Economic Forum, Klaus Schwab, points to the possibility of new global gaps between countries that understand and accept innovative transformations and countries that do not.

The digital economy has tremendous potential for transforming traditional industries, which until recently were considered fairly conservative in the use of digital technologies. The set of related tools under the name digital industry includes such innovative methods as big data analysis, machine learning, machine vision, the industrial Internet of things, virtual reality, aug-

mented reality, 3D modeling, 3D printing, robotics. These technologies are already transforming industry around the world, and their full-scale implementation could have an effect on productivity and the labor market, comparable to the three industrial revolutions of the past.

Digital transformation in each industry has its own specifics. For Belarus, apart from mechanical engineering, it is an important petrochemical sector, which requires immediate digital transformation to remain competitive. How to do it? Deloitte's recent report on the digital transformation of the chemical industry is a good answer to this question.

To this end, the report formulates five objectives:

- 1) development of an industrial plan for business transformation, starting with a clear strategy for the formation of a modern digital enterprise;
- 2) creating the necessary conditions to stimulate the use of digital technologies throughout the enterprise;
- 3) development of a structured approach to identifying risks in complex and dynamic ecosystems;
- 4) building a system for the continuous integration of innovations into corporate culture;
- 5) building flexible operating models that can effectively plan, regulate and control digital processes.

PwC prepared a similar report on the steel industry based on 157 interviews with directors of the respective plants. Average indicators of benefits of digitalization based on the survey results: additional revenue - plus 2.7% per year, costs - minus 3.2% per year. The main conclusion of the report is that the main benefits are provided by the latest big data analytics tools, which today only 11% of metallurgical enterprises have, but in 5 years 83% intend to use them [9].

Thus, after analyzing some important directions of the policy of digitalization of the economy in the Republic of Belarus, we can state certain, but insufficient efforts of the government to form a holistic approach to digitalization at all levels of government.

**Conclusions and prospects of further researches.** Along with a systematic approach to identifying factors affecting the assessment of competitiveness indicators, and managing competitiveness, it is also necessary to take into account the synergistic effect of the influence of various factors, for example, a strong emphasis





on technology can provide opportunities for leaps and bounds in the least developed countries. Thus, the development of new technologies will increase the production potential of the country and identify areas in the field of research and development, will help overcome the digital divide and technological lag in support of ensuring sustainable development and increasing income population. Stimulating the development of new technologies, allocating budget funds with an emphasis on the development of science, technology and innovation will contribute to the development of public-private partnerships in this area, create and strengthen, where appropriate, institutional structures and a knowledge base to support local, national and regional efforts in research and development, science and technology; promote cooperation and interaction between research institutions and the private sector in order to encourage research and development and innovation in science and technology. Thus, various indicators of the national economy, taken into account when determining competitiveness, will improve: innovation, institutional factor, infrastructure, education, level of technology development, etc.

In the digital economy, in order to achieve a competitive advantage, along with the scientific potential of the organization's employees, knowledge and active use of information technologies in business processes, the ability to self-development and self-improvement to adapt to the emergence of new technologies of production, marketing and interaction with consumers.

Thus, there is a transformation of competitiveness factors from consideration of the traditional concept of Porter's five forces of competition to a shift towards the rational use of information and communication technologies and the transformation of business processes into a digital format. The mechanism for managing the organization's personnel is also undergoing transformation as a factor in increasing competitiveness. In this aspect, it is necessary to provide the company's employees with the opportunity to regularly improve their qualifications, use modern IT systems in their work and stimulate their initiative and involvement in the process [5].

The mechanism for managing competitiveness in the digital economy is also based on such a factor of competitive advantage as flexibility and the ability to change. The company's strategy can no longer be a fixed plan for the future. Its formulation should include an approach that adapts to rapidly changing conditions so that

the company does not miss out on opportunities in the external environment and does not create gaps for threats from competitors.

In the foreign scientific literature, there is also an increase in competitive pressure between enterprises in the digital environment due to the high degree of interchangeability of products and services, which also affects the construction of relations with consumers within the framework of a customer-oriented approach, the offer of comprehensive services.

Thus, a review of world experience, in particular, the introduction of digital technologies in industry, allowed us to highlight the main concepts: Industry 4.0, Smart Manufacturing, Digital Manufacturing, Internet in industry. A number of competitive trends that are characteristic of the digital transformation of the national economy are based on these concepts:

1) the use of intelligent devices for measuring the parameters of the production lines; 2) rejection of a large number of workers and the transition to robotic technologies; 3) replacement of the distributed resources of their own capacities for storage and computing; 4) creation of a unified information system for automation and integration of production processes; 5) the use of the entire mass of data for analytics; 6) introduction of mandatory electronic circulation of documents; 7) implementation of digital technologies at all stages from idea to operation; 8) the use of specialized services for the purchase of materials and raw materials, as well as their subsequent delivery to the customer; 9) the implementation of the sale of invented goods via the Internet.

The main factors of success in digitalization are a properly organized government policy, increased interest from the industrial sector and, of course, their competent interaction, taking into account the specifics of the goals of each of the agents.

The improvement of industrial production in Belarus, taking into account the transitional stage of the economy into a digital environment, can be carried out only if the issues of productive involvement of enterprises in the process of using digital technologies, personnel training and assistance in transition to a new business organization processes. In this regard, there is a need for the development and testing of an algorithm for the implementation of digital technologies at industrial enterprises.

As a conclusion, would like to note that the transformation of competitiveness factors is

manifested as the digitalization of business models, the integration of information and communication technologies into the process of making strategic decisions and causes a systemic synergistic effect of increasing competitiveness and efficiency. companies.

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