

**SECTION 2. SOCIAL AND ECONOMIC PROBLEMS OF EDUCATION  
AND SCIENCE DEVELOPMENT IN THE 21<sup>st</sup> CENTURY**

UDC 338.2; JEL Classification: O11, O14

**STUDY OF SECTORAL SHIFTS IN THE CONTEXT OF  
DIGITALIZATION OF THE ECONOMY**

**ИССЛЕДОВАНИЕ ОТРАСЛЕВЫХ СДВИГОВ В  
УСЛОВИЯХ ЦИФРОВИЗАЦИИ ЭКОНОМИКИ**

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*Ключевые слова: цифровизация экономики, отраслевая структура экономики, отраслевые сдвиги.*

*Abstract. This article discusses the impact of digitalization on the sectoral structure of the economy. A review of the literature on the problem under study and the results of similar studies conducted in other countries is given. Structural shifts in the economy of Belarus have been identified, confirming the movement of the national economy towards digitalization, both from the standpoint of the structure of gross value added and from the point of view of the employment structure. However, assessing the impact of digitalization on the economy is a difficult task that requires the search for new theoretical approaches and analytical tools.*

*Аннотация. В данной статье рассматриваются вопросы влияния цифровизации на отраслевую структуру экономики. Приведен обзор литературных источников по исследуемой проблеме и результатов подобных исследований, проведенных в других странах. Выявлены структурные сдвиги в экономике Беларуси, подтверждающие движение национальной экономики в сторону цифровизации, как с позиции структуры валовой добавленной стоимости, так и с точки зрения структуры занятости. Однако оценка влияния цифровизации на экономику представляется сложной задачей, требующей поиска новых теоретических подходов и аналитических инструментов.*

The digital transformation of the economy is understood by scientists as a change in the economic structure, a change in traditional markets, social relations, public administration, associated with the penetration of digital technologies into them; changing the structure of the economy through the formation of more efficient

economic processes supported by digital infrastructures; transition of the function of the leading mechanism for the development of the economy to institutions based on digital models and processes. Digital transformation is inextricably linked with the most important global trend in the formation of modern society – the transition from a resource-based and industrial economy to a new economy based on knowledge, intellectual resources, high-tech and information technologies [5]. A number of authors consider digital transformation as "... the process of changing (transforming) established economic and social institutions in connection with the introduction of digital technologies" [2].

Among the consequences of digital transformation, the authors note such a phenomenon as industry shifts, which reflect a change in the main ways the market or economy functions [1, 2, 4]. Some authors consider the change in the sectoral structure of the economy towards a decrease in the share of industrial production and an increase in the share of the service sector as the consequences of digital transformation [1, 2, 5]. However, this trend was typical for the global economy even earlier, before digitalization, and reflected the transition to a knowledge economy, an innovative economy, etc.

The results of an ad hoc ECB survey of leading euro area companies looking at the impact that digitalization has on the economy shows, that in the manufacturing and energy sectors, artificial intelligence, the "internet of things", robotics and 3D printing are almost equally widespread, with respondents tending to report that the real impact comes when these technologies are combined. The main obstacles to the adoption of digital technologies are the difficulty of adjusting the organization of the company and the need to recruit and retain highly skilled ICT staff [3].

As the authors [4] point out, the impacts of digital transformation on innovation in specific sectors are largely unknown. Since industries significantly differ in their products and processes, their structures and in how they innovate, the impacts of digitalization on innovation are also likely to differ [4].

Most authors recognize the existence, state and development of digital technologies and information and communication infrastructure as an essential factor in digital transformation. It is these indicators that are most often used in the formation of international ratings of the digitalization of the economy [7]. The share of the IT sector in GDP and the availability of digital skills of the staff are also recognized as important factors of digital transformation. Fluctuations in the position of Belarus in global rankings related to the processes and results of digital transformation indicate the uneven process of digitalization of the economy in the country [7].

The sectoral structure of the economy of Belarus for the period from 2010 to 2020 is characterized by an increase in the share of the service sector and a decrease in the share of the production sector (according to the National Statistical Committee of the Republic of Belarus, <https://www.belstat.gov.by/>), which is in line with global trends. Thus, in the structure of the gross value added of the Republic of Belarus, the share of the production sector over this period decreased from 50.5 to 43.7 %. The main industries for which there was a decrease are agriculture, forestry and fisheries (by 2.3 %), construction (by 4 %), manufacturing (by 1.3 %). In the services sector, the

main growth was provided by informatization and communications (by 5.4 %, which is more than 2.5 times), real estate operations (by 1.3 %), professional, scientific and technical activities (by 0.7 %), healthcare and social services (by 1.5 %). However, the share of the industrial sector in the economy of Belarus is still much higher than in neighboring countries, including European ones.

National statistical indicators of the development of the digital economy in the Republic of Belarus (their list was developed by the National Statistical Committee of the Republic of Belarus) indicate a positive trend in the digitalization of the national economy. The calculation of these indicators is based on such criteria as information and communication infrastructure, the use of information and communication technologies by the population and organizations, informatization infrastructure, digital transformation, and the national ICT industry.

The possibilities for measuring structural shifts are not limited to the analysis of shifts in the structure of gross value added. It is also necessary to study the structure of employment in the economy. A number of authors note that digitalization presents unequal opportunities for developed and developing countries [6]. Among the reasons, they note a different level of information, digital and innovative infrastructure, a different level of technological development. At the same time, developing countries have high hopes for digital technologies. Literature on structural change views technology as one driver of employment shifts between economic sectors, but underlying mechanisms are often overlooked. Similarly, evidence on digitalization highlights its impacts on employment, but the causes and effects require further investigation. Research [6] suggests that digitalization is likely to affect sector productivity, but is unlikely to cause cross-industry shifts.

However, it should be noted that the number of people employed in the field of informatization and communications in the Republic of Belarus is also growing in absolute and relative terms. The prestige of the profession of a programmer stimulates the influx of young personnel into this area, while, for example, a decrease in the prestige of the profession of an engineer reduces the influx of personnel into the sphere of industrial production. In addition, professional mobility (learning a new profession) is also a modern trend in the field of employment.

Thus, the digitalization of the economy leads not only to an increase in labor productivity due to the introduction of digital technologies, but also to structural shifts in the sectoral structure of the national economy.

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## METHODOLOGICAL TOOLS FOR ASSESSMENT OF BALANCE IN THE DEVELOPMENT OF INDUSTRIAL ENTERPRISES

## МЕТОДИЧЕСКИЕ ИНСТРУМЕНТЫ ОЦЕНКИ СБАЛАНСИРОВАННОСТИ РАЗВИТИЯ ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЙ

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*Abstract. The article summarizes the methodological tools for assessing the balance of development of industrial enterprises. The key relative indicators characterizing the*