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COMPONENTS OF KNOWLEDGE ECONOMIES AS FACTORS OF CORPORATE SOCIAL DEVELOPMENT: CHALLENGES FOR UKRAINE

СКЛАДОВІ ЕКОНОМІКИ ЗНАНЬ ЯК ЧИННИКИ КОРПОРАТИВНОГО СОЦІАЛЬНОГО РОЗВИТКУ: ВИКЛИКИ ДЛЯ УКРАЇНИ

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Лема О.І., Олексів І.Б., Лема Г.В. Складові економіки знань як чинники корпоративного соціального розвитку: виклики для України. Науково-методична стаття.

У статті проаналізовано складові та елементи економіки знань як чинники корпоративного та соціального розвитку країни, а також проведено порівняльну оцінку позицій України за визначеними складовими. Відповідно до Global Knowledge Index (GKI Report) виокремлено шість складових економіки знань: початкова освіта; професійно-технічна та вища освіта; дослідження, розробки та інновації; інформаційно-комунікаційні технології; економіка; екологічна, соціальна та управлінська діяльність. Визначено основні виклики, що стримують корпоративний соціальний розвиток України, та обґрунтовано необхідність відповідних управлінських рішень. Актуальність дослідження зумовлена глобальними трансформаціями, зростанням ролі знань, інновацій, цифрових технологій і корпоративної соціальної відповідальності, а також необхідністю формування ефективної моделі економіки знань для підвищення конкурентоспроможності та сталого розвитку України.

Ключові слова: економіка знань, початкова освіта, професійно-технічна та вища освіта, дослідження, розробки та інновації, інформаційно-комунікаційні технології, економіка, екологічна, соціальна та управлінська діяльність, корпоративний соціальний розвиток

Lema O.I., Oleksiv I.B., Lema H.V. Components of Knowledge Economies as Factors of Corporate Social Development: Challenges for Ukraine. Scientific and methodical article.

The article analyzes the components and elements of the knowledge economy as factors of corporate and social development and provides a comparative assessment of Ukraine's position across the identified components. According to the Global Knowledge Index (GKI Report), six components of the knowledge economy are identified: pre-university education; technical and vocational and higher education; research, development and innovation; information and communication technologies; economy; and environmental, social and governance activities. The study identifies the key challenges hindering Ukraine's corporate social development and substantiates the need for appropriate management decisions. The relevance of the study is determined by global transformations and the growing role of knowledge, innovation, digital technologies, and corporate social responsibility, as well as the need to develop an effective knowledge economy model to enhance Ukraine's competitiveness and sustainable development.

Keywords: knowledge economy, primary education, vocational and technical and higher education, research, development and innovation, information and communication technologies, economy; environmental, social and managerial activities, corporate social development

The knowledge economy is one of the key areas of development of modern society, based on the effective use of intellectual resources, information and is socially responsible. In scientific research, considerable attention is paid to the analysis of factors that influence its formation, as well as to its assessment using various digital indices. An important aspect is also the characterization of the elements of the knowledge economy that determine its structure and functioning. Despite this, the issue of a clear definition of the components of the knowledge economy remains open and debatable. This necessitates further theoretical understanding and systematization of its components and elements. A clear separation of components allows for a deeper understanding of the mechanisms of development of the knowledge economy and to increase the effectiveness of its practical application. In addition, the definition of key components contributes to the formation of effective state policy in the corporate social sphere. This also creates a basis for the development of strategies for innovative development, increasing the competitiveness of the economy and its corporate social development. In modern conditions of globalization, the study of the knowledge economy acquires particular relevance and practical significance.

Analysis of recent publications on the problem

According to [2], the elements of the knowledge economy are: knowledge production, knowledge implementation and knowledge dissemination. In the opinion of the authors, the factors that influence the dissemination of knowledge are important, the main of

which are: access to technology, education and human capital, innovation systems, innovation culture and cooperation between sectors.

In the study [6], a thorough bibliometric study of the terminology related to the knowledge economy was conducted. In particular, the authors highlighted the following terms: "digital economy, information economy, creative economy, impression economy", etc. and listed the countries and the number of publications for the highlighted terms in the Scopus scientometric database. Scientists noted an increase in publication activity on the knowledge economy since 2000 in economically developed countries, while such activity was not observed in Ukraine.

According to [8], a comparative analysis of indices that provide an assessment of the knowledge economy was conducted: the knowledge economy index, the global knowledge economy index and the knowledge society index. According to the study [8], the global knowledge economy index consists of technological, state-institutional, and macroeconomic sub-indices.

Along with the study of works on the knowledge economy, it is also relevant to study the works and the components that make up the knowledge economy. Thus, it is necessary to analyze the work [9], which explores approaches to assessing the level of development of the digital economy. In particular, the author analyzed one of the components of the knowledge economy, namely: information and communication technologies (ICT). The study [9] was based on the indices of ICT development, global connectivity, e-government development, global digital competitiveness, the global innovation index and the national cybersecurity index and Ukraine's place in their structure.

In accordance with [5], an analysis of the knowledge economy was carried out on the basis of information and communication technologies. In particular, the authors analyzed the information and telecommunications industry of Ukraine and characterized international indices of the development of the knowledge economy.

The work [10] is also based on the study of information and communication technologies. The authors listed the advantages and disadvantages of implementing ICT. The authors also focused on e-commerce, among which online stores, digital platforms, digital payment systems, and other logistics and financial services are relevant, the development of which has been accelerated by ICT.

In [15], the process of knowledge management is shown through operationalization and empirical testing of knowledge spaces. The authors investigate how the value of knowledge contributes to innovation in the era of digital transformation. Thus, the authors have identified different types of knowledge that influence the formation of innovations in different regions. According to the study, the key elements in knowledge management are innovation and digital transformation. It is worth noting the thorough analysis of scientists in the field of knowledge economy, a detailed study of factors that influence the formation of the knowledge economy, the characteristics of digital indices and

indices of the knowledge economy, as well as elements of the knowledge economy. However, the issue of determining the components of the knowledge economy still remains relevant, since their clear structuring and separation allows for a more comprehensive understanding of the mechanisms of its functioning and corporate social development.

Identification of previously unresolved parts of the general problem

In order to understand and study the trends in the development of the knowledge economy, it is necessary to isolate its components and elements. Accordingly, the isolation of the components of the knowledge economy will make it possible to conduct an in-depth study of each element separately, which will contribute to a more accurate determination of their impact on the overall level of development of the knowledge economy, as well as the formation of effective management decisions regarding its further development.

Formulation of research objectives (task setting)

The aim of the article is to theoretically substantiate and generalize approaches to determining the essence of the knowledge economy, as well as to isolate its key components and elements in order to comprehensively analyze the challenges of the knowledge economy for Ukraine.

Materials and methods

Accordingly, to achieve the set goal, it is necessary to perform the following tasks:

- 1) to determine the components of the knowledge economy as key drivers of influence on the socio-economic development of the country;
- 2) to determine the elements of the knowledge economy in order to substantiate management decisions regarding their further development;
- 3) carry out a comparative characteristic of Ukraine according to the knowledge economy index;
- 4) to identify the main challenges for Ukraine within the components and elements of the knowledge economy.

Presentation of main results and their justification

Achieving the goal and fulfilling the research objectives involves, first of all, processing and analyzing reports on the knowledge economy.

Analysis of the Global Knowledge Index (GKI) Report for 2024-2025 provides an opportunity to see changes in the components of the knowledge economy [11, 12]. In 2024, the knowledge economy consisted of seven components, namely: primary education (PE); vocational education and training (VET); higher education (HE); research, development and innovation (RDI); information and communication technologies (ICT); economy (E) and enabling environment (ES) [11]. In 2025, changes are taking place in the structure of the components of the knowledge economy, the number of which is already 6: primary education (PE); vocational education and higher education (VHE); research, development and innovation (RDI); information and communication technologies (ICT); economy (E) and environmental, social and governance (ESG) [12].

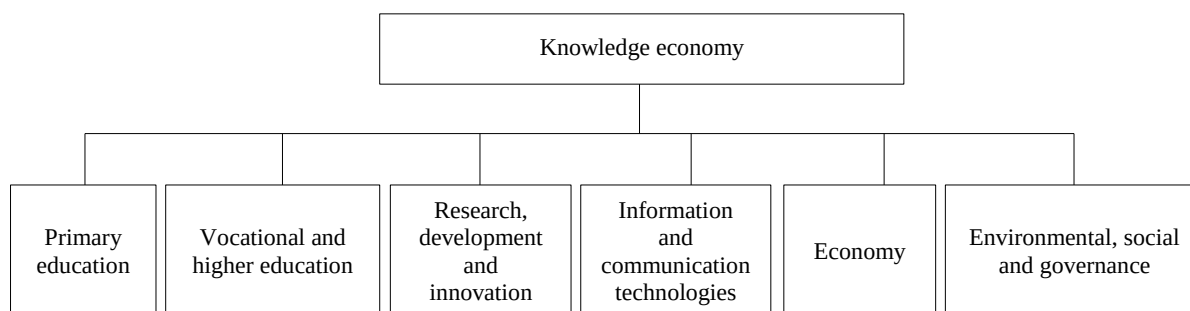


Figure 1. Structure of the knowledge economy according to the Global Knowledge Index Report

Source: elaborated by the authors based on [11-14]

In order to clearly reflect the knowledge economy and its components in 2025, we will present it graphically (Fig. 1).

Accordingly, each component of the knowledge economy, presented in Fig. 1, has its own elements. Let us consider in detail each element of the components of the knowledge economy. Until 2025, the component of the knowledge economy "primary education" had only two elements: "knowledge capital" and "favorable

educational environment" [11]. In 2025, the elements of the components of the knowledge economy change and their number is 3, respectively, there are changes in the number of subelements of the general structure [12].

Fig. 2 presents the elements of the component of the knowledge economy primary education and their evaluation indicators.

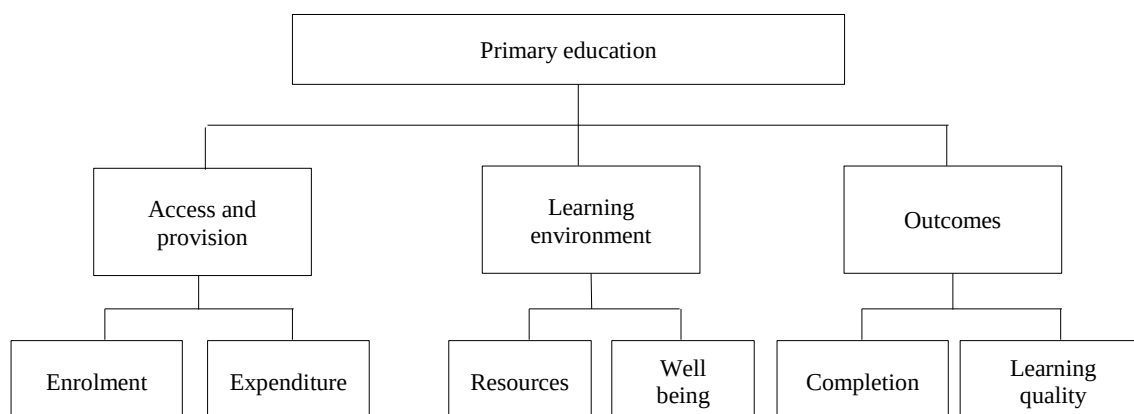


Figure 2. Elements of the knowledge economy component primary education according to the Global Knowledge Index Report

Source: elaborated by the authors based on [11-14]

The elements of primary education according to the GKI Report are access and provision, learning environment and main outcomes of primary education completion. The basis for calculating the elements of the knowledge economy are the enrollment rates of preschool and primary education, gender parity, spending on primary and secondary education. When calculating the element of "learning environment", indicators of the availability of computers in preschool and primary education, the ratio of students to teachers, stunting and obesity of students, as well as cases of bullying among schoolchildren are taken into account. The learning outcomes are indicators of completion of preschool and primary education, reading skills and test results [12]. According to the GKI Report 2025, the value of the component of the knowledge economy "primary education" for Ukraine is 63.6, which indicates a high value of the component [12]. However, comparing the values with previous years, there is a decrease in the component by almost 10 points [11].

For Ukraine, the key challenges in the field of primary education remain ensuring equal access to quality education in conditions of war, destruction of educational infrastructure and forced displacement of students and teachers. Current problems include the shortage of teaching staff, increasing workload on teachers, worsening of the psycho-emotional state of children, increasing risks of bullying and the need to create a safe and inclusive educational environment [1]. Important areas remain increasing investment in the modernization of educational institutions, providing them with modern digital equipment, supporting the professional development of teachers, as well as implementing measures aimed at improving the quality of primary education and ensuring equal opportunities for all children regardless of their place of residence or social status [7].

Fig. 3 presents the elements of the component of the knowledge economy vocational and technical and higher education and their assessment indicators.

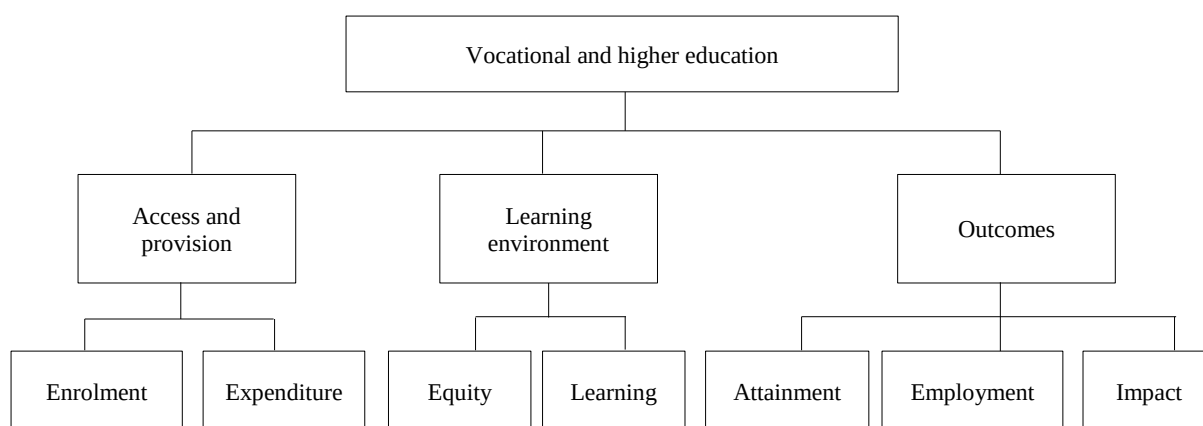


Figure 3. Elements of the knowledge economy component vocational, technical and higher education according to the Global Knowledge Index Report

Source: elaborated by the authors based on [11-14]

According to the GKI Report, the elements of vocational and higher education are accessibility, learning environment and outcomes. Indicators of accessibility are enrollment rates in vocational, undergraduate and graduate education, as well as public spending on education. The learning environment is characterized by gender-based enrollment rates in vocational and higher education, student-teacher ratios. The outcomes of vocational and higher education are indicators of secondary education, bachelor's, master's and doctoral degrees obtained, unemployment rates for each type of education, research rates, and university cooperation in scientific research and development [12].

According to the GKI Report 2025, the value of the knowledge economy component vocational and higher education for Ukraine is 50.9 [12]. Considering the combination of the two components of «vocational and technical education» and "higher education" into a single component, comparing it with the previous period is incorrect. In the previous period, the values of

"vocational and technical education" and "higher education" were 51.5 and 44.7, respectively [11]. In modern conditions, this component also faces significant challenges, the most important of which are the destruction and damage of educational institutions as a result of military actions, the forced displacement of students and teachers, a reduction in funding for the educational sector, the outflow of highly qualified personnel abroad, the inconsistency of the content of educational programs with the modern needs of the labor market, the insufficient level of material and technical support of educational institutions, unequal access to quality education and digital infrastructure, as well as the need to modernize vocational and higher education in accordance with the requirements of the digital economy, post-war recovery and European integration of Ukraine [4].

In Fig. 4 presents the elements of the knowledge economy component research, development and innovation and their evaluation indicators.

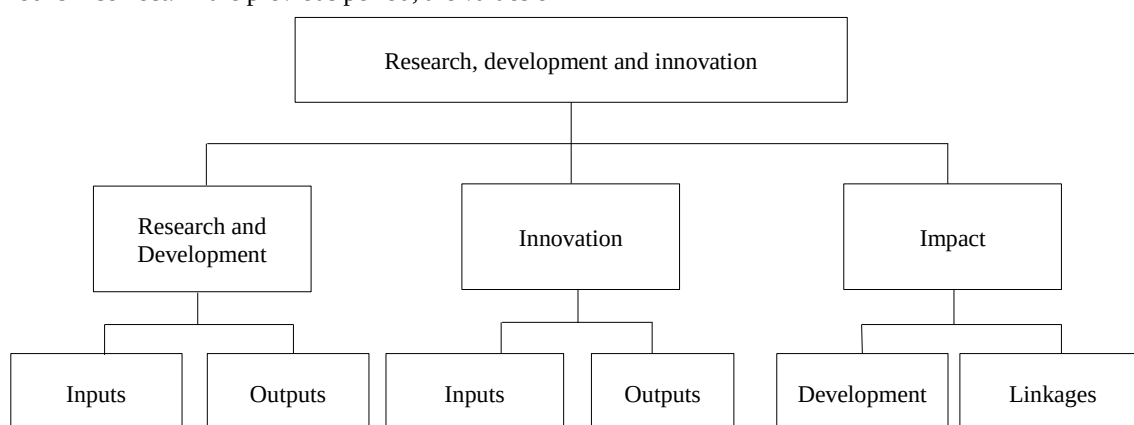


Figure 4. Elements of the knowledge economy component research, development and innovation according to the Global Knowledge Index Report

Source: elaborated by the authors based on [11-14]

Research and development according to the GKI Report includes the following indicators: research and development expenditures, number of researchers, number of publications in the most cited journals, articles in scientific and technical journals, h-index of

scientists, etc. The element of "innovation" is provided by calculating the following indicators: quality certificates, payments for intellectual property, patent applications, trademark applications, etc. The impact of research, development and innovation is assessed

through development and connections. The main indicators characterizing this element are: applications for industrial designs, enterprises producing new goods and services, high-tech exports, employment in industries with medium and high R&D intensity, level of cluster development, international co-authored publications, joint publications of the academic and corporate sectors [12].

According to the GKI Report 2025, the value of the component of the knowledge economy "research, development and innovation" for Ukraine is 18.6. Compared to other countries of the world, this is a low result [12]. Analysis of the Global Innovation Index reports [13, 14] shows a decrease in Ukraine's position in 2025 compared to 2024 by 6 positions down (2024

– 60th place; 2025 – 66th place) among all countries of the world, which indicates a decrease in Ukraine's innovative activity. Also, if we analyze research and development expenditures, then for 2015-2025 there is a decrease in expenditures – the share of R&D expenditures in GDP in 2015 – 0.55% and in 2025 – 0.39%. In this sector, there are serious challenges for Ukraine associated with insufficient funding for science, staff turnover and a low level of commercialization of innovations.

Fig. 5 presents the elements of the component of the knowledge economy information and communication technologies and their assessment indicators.

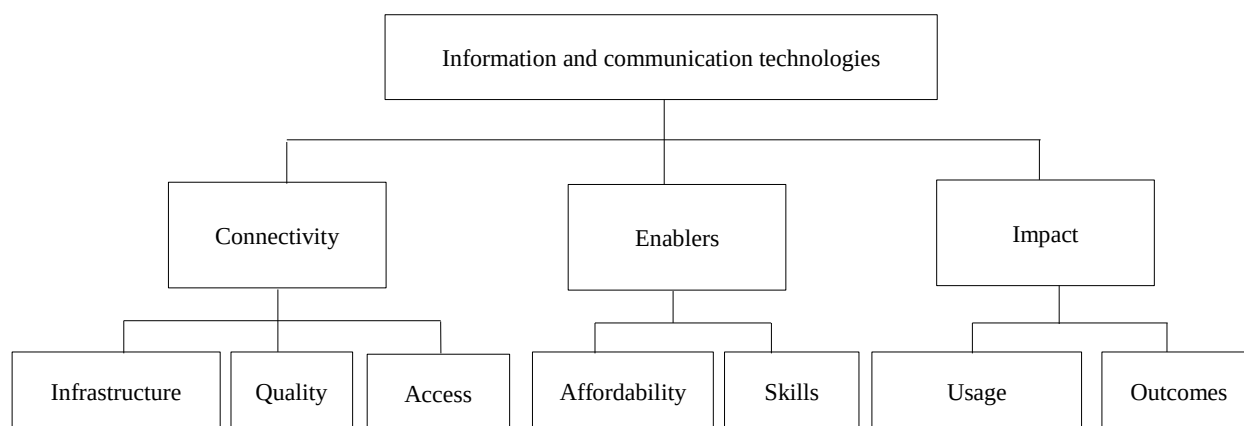


Figure 5. Elements of the knowledge economy component information and communication technologies according to the Global Knowledge Index Report

Source: elaborated by the authors based on [11-14]

The elements of information and communication technologies according to the GKI Report are: mobile network coverage, mobile Internet download speed, connected data center participants, fixed broadband Internet download speed, and others. Development factors are calculated based on the cost of a fixed broadband and mobile Internet package, the number of people using a computer, graduates of higher education institutions in ICT specialties and employment in the field of information and communications. The impact of information and communication technologies is estimated by the number of Internet users, the number of social network users, the export of computer and information services, the added value of the information and communication sector, etc. [12].

According to the GKI Report 2025, the value of the component of the knowledge economy information and communication technologies for Ukraine is 44.6 [12]. In comparison with other studied countries, Ukraine occupies an average level in this element. According to research [10], information and communication technologies (ICT) are the driver of modern business and economy in general. The authors also emphasize that ICT contributes to increasing labor productivity, reducing costs, faster entry to the market, etc. According to the ICT development index in 2024, Ukraine received 81 points, which indicates a high level of the indicator. The e-government development index in 2024 was 0.88 (30th place) among all

countries of the world, and according to the national cyber security index in 2024, Ukraine received 80.8 points (15th place) compared to 24th place in 2023 [9]. Along with high ratings and good results of the component of the knowledge economy «information and communication technologies», this field also faces certain challenges, namely: uneven access to digital infrastructure between regions and an insufficient level of digital skills in part of the population. In addition, the issues of cyber threats and the need for constant updating of the technological base remain relevant.

In fig. 6 presents the elements of the knowledge economy component economy and their evaluation indicators.

The elements economy is calculated in terms of inputs, outputs and their impact. This element can be calculated using the following indicators: gross accumulation of fixed capital, net inflow of foreign direct investment, energy intensity of GDP, level of labor force participation, productivity of the transport system, financing deficit of micro, small and medium-sized enterprises, share of non-performing bank loans, added value of medium and high-tech production, industry and service sector, employment of highly qualified workers, level of underutilization of labor force, economic complexity, gross domestic product per capita, out-of-pocket health care expenditures per capita and other indicators [12].

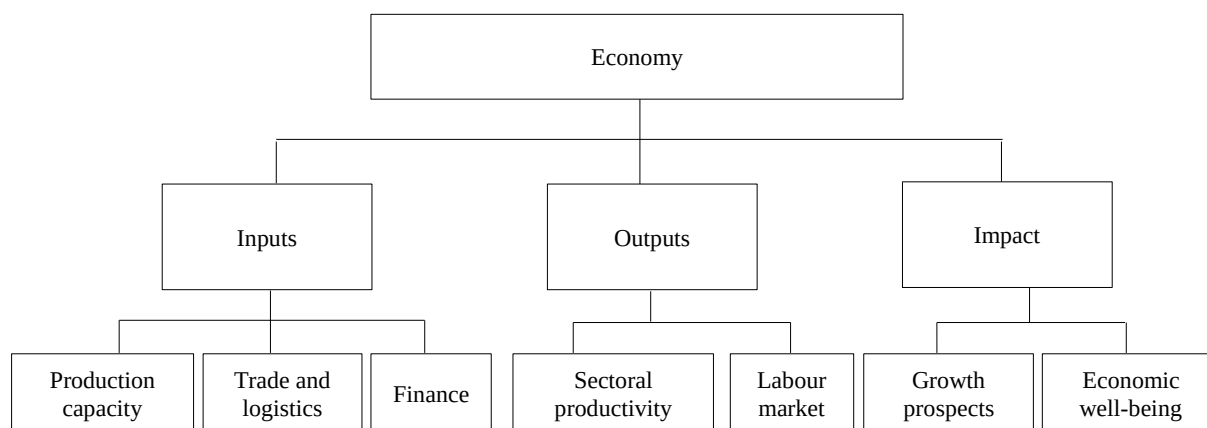


Figure 6. Elements of the knowledge economy component economy according to the Global Knowledge Index Report

Source: elaborated by the authors based on [11-14]

According to the GKI Report 2025, the value of the knowledge economy component economy for Ukraine is 37 [12]. Compared to other studied countries, Ukraine ranks low in this element. The value of the indicator is affected by the above-mentioned indicators, which during the war in Ukraine are quite variable, since the country's economy undergoes constant destruction, accordingly, the economic well-being of the country's population is constantly changing and has been decreasing in recent years. According to [3], the volumes of commodity flows for export-import operations of Ukraine in 2022 are

decreasing. In 2023, the country's exports continued to decline, which indicates a significant slowdown in the functioning of the economy. According to the economy component, there are constant challenges regarding the employment of the population, the destruction of business and the reduction of investment activity. This, in turn, limits the possibilities of economic recovery and long-term growth of the country.

In fig. 7 presents the elements of the knowledge economy component environmental, social and governance and their evaluation indicators.

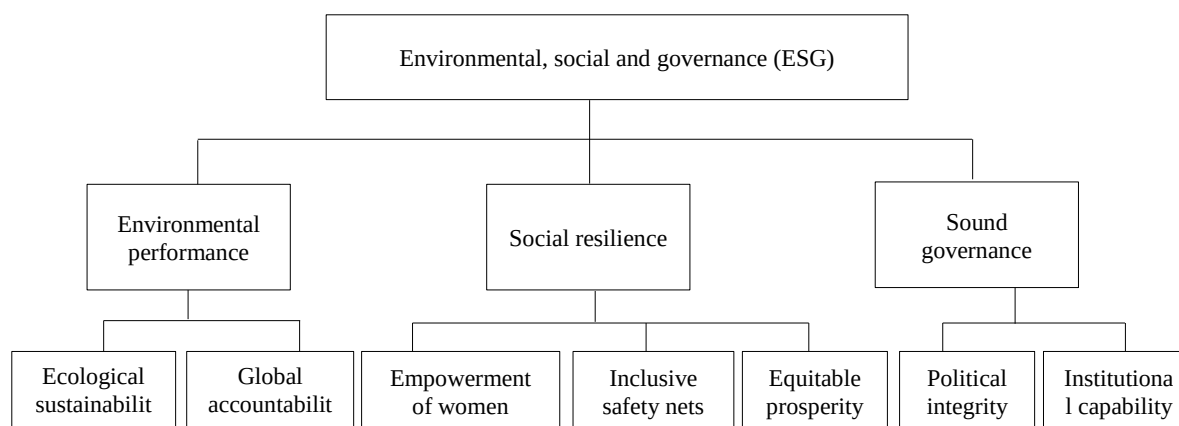


Figure 7. Elements of the knowledge economy component ESG according to the Global Knowledge Index Report

Source: elaborated by the authors based on [11-14]

The ESG component of the knowledge economy consists of three elements: "environmental performance", "social sustainability" and "sound governance" [12]. Accordingly, for the purpose of assessing environmental performance, environmental sustainability and global environmental responsibility are calculated based on indicators of internal environmental management, ISO 14001 environmental certificates, renewable energy consumption, etc. Social sustainability is calculated based on indicators of women's empowerment, leadership positions (gender parity), Internet use (gender parity), social protection

coverage, health coverage, healthy life expectancy, poverty level, Gini index and other indicators. Sound governance is assessed through political integrity and institutional capacity. The indicators for assessing these sub-elements are: political integrity, freedom of expression and accountability, rule of law, government effectiveness, quality of state regulation, support for the multilateral system based on the United Nations (UN).

According to the GKI Report 2025, the value of the knowledge economy ESG component for Ukraine is 48.7 [12]. Comparing this value with the previous

period is incorrect, since in the previous year this component "enabling environment" contained other calculating indicators [11]. The assessment of this component is extremely important, since it contributes to ensuring sustainable development and corporate social responsibility of the country as a whole. Accordingly, environmental, social and governance is characterized by a number of challenges, including an insufficient level of environmental safety, the need to raise social standards, as well as the need to improve the corporate governance system. This requires the implementation of comprehensive reforms aimed at harmonizing economic development with environmental and social priorities [16].

Conclusions and prospects for further research

As a result of the study, theoretical approaches to defining the essence of the knowledge economy were summarized and its key components and elements were identified in accordance with the Global Knowledge Index. It was established that the modern structure of the knowledge economy is undergoing transformations, in particular, in 2025 there was an enlargement of the components and a change in their content, which complicates direct comparison with

previous periods. The analysis showed that Ukraine has relatively high positions in the field of primary education, but significantly lags behind the component of research, development and innovation, which hinders the corporate social development of the knowledge economy in general. A significant part of the components faces systemic challenges caused by military actions, insufficient funding, the outflow of human capital and uneven access to resources. The development of environmental, social and managerial activities as an important component of ensuring sustainable and socially responsible development requires special attention.

Therefore, the effective development of the knowledge economy in Ukraine requires a comprehensive approach that involves the modernization of the education system, stimulation of innovative activity, development of digital infrastructure and implementation of the principles of sustainable development and corporate social responsibility. The practical implementation of these measures will contribute to increasing the competitiveness of the national economy, its adaptation to global challenges and ensuring long-term socio-economic growth.

Abstract

The article analyzes the components and elements of the knowledge economy as the main factors of the country's corporate and social development, and provides a comparative description of Ukraine's rating in terms of the highlighted components and elements. According to the Global Knowledge Index (GKI Report), six components of the knowledge economy are highlighted: primary education; vocational and technical and higher education; research, development and innovation; information and communication technologies; economy; environmental, ESG, while in the previous year there were seven components of the knowledge economy, where vocational and technical and higher education were distinguished, and the last component ESG was an "enabling environment". It is established that the modern structure of the knowledge economy is undergoing transformations, in particular, in 2025 there was an enlargement of the components and a change in their content, which complicates direct comparison with previous periods.

The isolation of the components of the knowledge economy makes it possible to conduct an in-depth study of each element separately, which contributes to a more accurate determination of their impact on the overall level of development of the knowledge economy, as well as the formation of effective management decisions regarding its further corporate social development. The analysis showed that Ukraine has a relatively high position in the field of primary education, but significantly lags behind the component of research, development and innovation, which hinders the corporate social development of the knowledge economy in general. Based on the analysis of the components and elements of the knowledge economy, the main challenges for Ukraine have been identified that hinder its corporate social development within the knowledge economy and require appropriate management decisions.

The relevance of the study is due to the need to adapt the national economy to global transformations associated with the growing role of knowledge, innovation, digital technologies and corporate social responsibility to society. In addition, in the context of modern challenges, the formation of an effective model of development of the knowledge economy as the basis for increasing its competitiveness, sustainable development and corporate social responsibility is of particular importance for Ukraine.

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