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STRUCTURAL CAPITAL IN THE SYSTEM OF TECHNOLOGICAL DEVELOPMENT OF SOCIETY

The current state of socio-economic development, characterized by a radical change in the technical and technological paradigm in a globalized world, is marked by new phenomena and processes. In contrast to previous eras, when the formation of new technological methods of production was based on a small number of breakthrough inventions that changed the structure of production, today we observe an avalanche-like development of inventions, the products of which destroy the stability of all spheres of society. Accordingly, all resources possessed by a modern company must meet the requirements of the time in terms of their quality. Under such conditions, not only intellectual capital but also other components, that enable companies to maneuver in their innovative development, become very important.

Based on the analysis of modern conceptual approaches to determining the essence of the categories "structural capital" and "intellectual capital", the article forms the concept of "national structural capital". The latter is presented as an infrastructure for the formation, implementation and development of national human capital, an organizational and institutional system for the expanded reproduction of knowledge and skills of members of society. For the quantitative measurement of national structural capital, a methodological framework is proposed, which is based on the integral index of national structural capital created by the authors; its components are justified: knowledge & technology outputs, intangible assets, research & development (R&D), knowledge workers, knowledge absorption. Based on the proposed methodology for determining the integral index of national structural capital, its value was calculated for 26 countries for 2018-2020 and the dynamics for the period under study were shown.

Keywords: structural capital, intellectual capital, human capital, index of national structural capital, technical and technological development

JEL classification: ***E22, F29, O57***

Сучасний стан соціально-економічного розвитку, який характеризується радикальною зміною техніко-технологічної парадигми в умовах глобалізації світу, відзначається новими явищами та процесами. На відміну від попередніх епох, коли формування нових технологічних прийомів виробництва базувалося на невеликій кількості проривних винаходів, які змінили структуру виробництва, сьогодні ми спостерігаємо лавиноподібний розвиток винахідництва, продукти якого руйнують стабільність усіх сфер суспільства. Відповідно всі ресурси, якими володіє сучасна компанія, за своєю якістю повинні відповідати вимогам часу. За таких умов важливого значення набуває не лише інтелектуальний капітал, а й інші складові, які дають можливість компаніям маневрувати в інноваційному розвитку.

У статті на основі аналізу сучасних концептуальних підходів до визначення сутності категорій «структурний капітал» та «інтелектуальний капітал» сформовано поняття «національний структурний капітал». Останній представлено як інфраструктуру формування, реалізації та розвитку національного людського капіталу, організаційну та інституційну системи розширеного відтворення знань та вмінь членів суспільства. Для кількісного виміру національного структурного капіталу запропоновано методологічне підґрунтя, в основі якого знаходиться створений авторами інтегральний індекс національного структурного капіталу та обґрунтовано його складові: знання та результати технологій, нематеріальні активи, дослідження та розробки (НДДКР), інтелектуальні працівники, засвоєння знань. На основі запропонованої методології визначення інтегрального індексу національного структурного капіталу розраховано його значення для 26 країн світу за 2018-2020 рр. та показано динаміку за досліджуваний період.

Ключові слова: структурний капітал, інтелектуальний капітал, людський капітал, індекс національного структурного капіталу, техніко-технологічний розвиток

JEL classification: ***E22, F29, O57***

Introduction. Modern economy moves rapidly towards a radically new model of the development based on knowledge, information, and technological innovations. Contrary to the previous ages where labour, land, and capital were the main growth engines, today the intangible factors of progress, with the scientific knowledge being of the greatest importance, are gaining their significance. According to Manuel Castells, information and knowledge have always been essential factors in power and production. However, only when new information and communication technologies empower humankind with the ability to incessantly feed knowledge back into knowledge, experience into experience, does an unprecedented potential for productivity arises with a particularly close link between the activities of the mind, on the one hand, and material production, be it goods or services, on the other [1, p.11].

In this context, human capital is acquiring special importance for the provision of high and stable rates of social and economic development, since it is this factor of production that immediately produces new knowledge, generates new ideas, creates and implements new technologies. Thus, under current conditions, strengthening the critical mass of human capital becomes the basis for the increase in national welfare and progressive advance of the countries.

Critical literature review. Human capital as a factor of economic growth was first introduced in the models with endogenous technical progress developed by P. Romer in 1990 and R. Lucas in 1988. The authors show that investing in the Research & Development sector generates new knowledge and stimulates its further materialization in the new technological processes that accelerate scientific and technical progress along with the economic growth. Since the Research & Development sector operates through the activities of scientists and engineers, a model of economic growth will be complemented by human capital, which determines the very possibility of the origin of new knowledge as well as technical and technological improvements, on the one hand, and creates the required level of personnel qualifications, on the other hand,

making it possible to apply this knowledge and improvements in the production.

Early models of endogenous economic growth assessed the contribution of human capital to economic growth through the search for interconnection between educational indicators and GDP growth rates. It was believed that the national system of education was a system in which scientific and engineering brainpower, whose knowledge and abilities produced knowledge, was trained along with the formation of the necessary level of labour-power qualification. Production experience being the result of people's training in the process of their activities and a factor of their labour productivity growth, also has acquired significant importance.

With the course of time, a structure of human capital has been expanded to include the assessment of health factors in its methodology. After M. Grossman introduced the concept of "health capital" into scientific practice in 1972 as an asset that helped its owner to use its human capital as long as possible [8], all researchers of economic growth up to the 20th century evaluated human capital by combining the indicators of education and health [2]. Innovative theoretical concepts [3], [4], [5] and others were not exception; those were concepts in which human capital evaluated differently in the context of education and health was a factor of generation of new knowledge and innovations in the Research&Development sector.

When the economy of the developed countries of the world gradually approached the model of the knowledge economy, which required special qualities of human capital and a special type of organizations that were supposed to create knowledge and introduce innovations into the production system, which, in turn, would be able to develop innovative development strategies, attention in the economic discourse was focused on the concept of intellectual capital. Thanks to research by Mahlap in 1962 and Drucker in 1968, this category represented the intellectual skills of the knowledge worker, that is, workers who produce knowledge. Thus, the category of intellectual capital entered the field of economic science.

Initially, this theory became widespread at the microeconomic level. Highlighting the determining influence of human capital on economic processes, such scientists as L. Edvinsson and N. Malone, T. Stewart, G. Becker, R. Hall and others tried to analyze the conditions for the effective application of the available skills of corporate personnel on the final results of the company. In this context, L. Edvinsson and N. Malone stated that intellectual capital was the company root – the hidden conditions of the company development [6].

T. Stewart understood the intellectual capital of an organization as a set of knowledge, information, intellectual property and experience that can be used to create wealth that ensures the competitiveness of this organization [7]. This is the context of knowledge and skills, intangible assets of a company, where intellectual capital is analyzed by modern researchers who consider it as a necessary attribute to maintain the current success of the organization and its further development.

The current state of socio-economic development, which is characterized by a radical change in the technical and technological paradigm within a globalized world, is marked by new phenomena and processes. In contrast to previous eras, when the formation of new technological methods of production was based on a small number of breakthrough inventions that changed the structure of production, today we are witnessing an avalanche-like development of inventions, the products of which destroy the stability of all spheres of society. If we proceed from the fact that society is a complex system in which various spheres of human activity interact and influence each other, then it is possible to present innovations as a technical and economic phenomenon and, at the same time, as a product of a certain culture. Culture and innovations are interrelated in value determination of innovative or anti-innovative types of types of motivation of human activity, what makes people of different countries either more disposed to

creativity, inventiveness, innovativeness and changes or makes them more conservative [8, p. 109].

Any inventor is faced with the need to possess the potential of stability and, at the same time, flexibility. This will allow him to remain on the market for a long period of time, bringing out novelties in accordance with modern requirements. Inventors must also have the ability to make the process of invention and innovation continuous, despite the threats of internal and external factors of influence. Accordingly, all resources possessed by a modern company must meet the requirements of the time in terms of their quality. Human capital produces innovations, therefore higher demands are placed on its quality.

Under such conditions, not only intellectual capital is important, but also other components that enable companies to maneuver in innovative development. One of these components is structural capital, which T. Stewart determines as "the organizational skills of the company to meet market needs" [7, p.127] and includes into the patents, license agreements, technologies, management systems, technical and software support, organizational structure and culture etc. Actually, this is the structural capital that, according to the author, ensures the company's ability to unite and use individual knowledge and abilities of its personnel in terms of common activity. Intellectual capital itself is of low value without the effect of attracting the company's structural capital.

Taking into consideration the fact that this object is being actively studied by modern economics, its content and methods of calculation are being constantly improved. At the same time, at the macroeconomic level, structural capital is rather a disputable issue. There is no single view of its qualitative and quantitative measurement parameters; there is also no clear understanding of its relationship with national human capital.

The purpose of the article is to clarify the role of structural capital in the technical and technological development of society, to propose a methodology of its measurement by forming a special index and to evaluate its parameters for certain countries of the world.

Methodology and results. The theoretical basis of the study was modern conceptual approaches to defining the essence of the categories "structural capital" and "intellectual capital", which became the basis for the formation of the concept of "national structural capital". The methodology of quantitative measurement of the role of national structural capital in the technical and technological progress of society involves the development of an integral index developed on the basis of a combination of indicators that represent the component of national structural capital and make it possible to identify the development trends of the countries of the world in terms of the technical and technological component.

It should be noted that for a long-time structural capital was evaluated within the framework of a much wider concept of intellectual capital. The first attempts to assess the effect of intellectual capital at the macroeconomic level of the analysis were connected with the efforts to use the theoretical model "Scandia model" developed by L. Edvinsson to measure tangible and intangible assets of a certain economic subject. The works by E. Pasher [9], N. Bontis [10], and L. Edvinsson [6] were aimed at studying the potential of intellectual capital of the corresponding country and its possibilities to provide its long-term innovative development.

A feature of L. Edvinsson's "Skandia model" is the specifics of the structuring of intellectual capital, namely: its division into human and structural capital with the allocation of additional four components in the section of the structural capital – organizational, client, innovative, and process capitals [11]. While the researchers were relatively unanimous, speaking about the features of human capital in various versions of the national intellectual capital estimations, considerable differences were observed in case of the structural capital content. Thus, for instance, the report of Israeli intellectual capital considers such

components as process and market capitals as well as renovation and development capital.

Process capital, which the authors of this paper define as structural intellectual assets, involves: information systems, hardware, software, databases, laboratories, national infrastructure, and management focus. Market capital is characterized as total assets realized in the nation's relations with the international market; they include loyalty and satisfaction expressed by the strategic clients, brands etc. Finally, the renovation and development capital refers to the country's capabilities and real investments, made to increase its competitiveness on the future markets; as a result, it stimulates future growth. The renovation and development assets include investments in research and development, patents, trademarks, startups etc. [12].

Another methodological approach is based on the structuring of intellectual capital proposed by T. Stewart and is somewhat different from L. Edvinsson's point of view. He singled out three components – human, organizational, and consumer capitals. It should be noted that this three-element set is the most widespread in modern science. The main difference between these dominant approaches to the essence of intellectual capital lies in the slightly different understanding of structural capital. It is believed that Stewart's approach is more detailed and adapted to the conditions of the market economy, as it highlights in the structure of intellectual capital relations and relationships with consumers, which are the source of the company's real profit.

In fact, the importance of the role of structural capital, which, according to the apt remark of N. Bontis, acts as an auxiliary infrastructure of human capital [13] and strongly determines intellectual capital, thus determining the potential of general economic development, caused quite a number of publications where structural capital plays a role of a separate research object. In this context, papers by N.S. Beltramino, D. García-Perez-de-Lema, and L.E. Valdez-Juárez analyzed the effect of structural capital of small- and medium-sized enterprises of Argentina as well as innovative and organizational efficiency of the country's development [14]. The authors of other studies tried to evaluate the structural capital of Malawi and concluded about the unevenness of the influence of its components on the economic development of this country [15].

It should be emphasized that understanding of the essence of structural capital and its filling with relevant indicators in different studies is not unanimous. It is clear that the existing approaches differ, first of all, in the tasks that researchers set for themselves within the framework of the relevant scientific projects. At the same time, we are sure that the composition and quantitative indicators of structural capital should correspond to the essential feature of the phenomenon, i.e. the infrastructure of formation, implementation, and development of national capital, existing in a concrete society, or, in other words, organizational and institutional systems of the expanded representation of knowledge and skills of members of society, which contribute to real and potential national economic development.

Such an expanded representation of knowledge and skills in modern conditions should reflect, first of all, a system of infrastructural elements that is aimed at the possibilities of innovative development of society, since this trend is the only viable one in modern conditions [16]. As the innovation theories of the 20th century prove, the innovation-based economic growth will take place only if the innovator has the opportunity to receive rewards in the form of monopoly rent from the innovations by means of their patent protection. If that happens under an effective patent system, the market leader earns a flow of monopoly rent as a remuneration for the previous investments in the research.

That flow lasts up to the advent of a rival – a company offering an even better version of the same product. It is understood that under conditions of a market economy, patenting new ideas protects innovators and stimulates them to develop. The number

of patent applications, the volume of income from intellectual property, possible publications of scientists' ideas in relevant journals, etc. largely reflect the technological and scientific level of a country, being without a doubt the basis for its further development on an innovative basis. Consequently, we believe that the indicator reflecting the results of knowledge and technologies of a certain country should be an element for the structural capital measurement.

According to the most popular understanding of the essence of intellectual capital as, first of all, the total intangible assets, structural capital should include their characteristics. Thus, the availability of corresponding trademarks, brands, industrial samples in a country is important as at the expense of reduced consumer risks and competitive advantages for manufacturers, they encourage both market activity and national economic growth.

New knowledge is formed mainly in the R&D sector, which is an agent of fundamental and applied research, on the one hand, and a developer of design and technological documentation for developed innovative products and technologies, on the other. By bringing together scientists and engineers in their laboratories, various design departments, industries and research groups, scientific institutions, design, technology and information R&D departments release their creative vitality and direct it to the creation of new knowledge and innovations.

Innovative activity is impossible without new ideas; therefore, the more ideas are generated in a certain society, the more opportunities it has to create new products, technologies and methods of organizational activity. The so-called "economy of scale" is at work here - the greater the research effort, the more knowledge and ideas are generated, with the consequent superior performance owing to their implementation in the production.

Thus, an increase in the number of scientists who are immediate creators of new knowledge generates an effect of scale in the functioning of scientific institutions, accelerates scientific and technological progress and, as a consequence, economic growth. Consequently, the evaluation of structural capital should involve a parameter representing the specific weight of scientists among the entire population of the country.

Taking into account the fact that under current conditions the form of interaction between the participants of innovation process, where integration of scientific potential and corporations and university science starts playing a leading role, is experiencing drastic changes, contribution made by the high-education academic community to the total volume of knowledge generated in society is becoming increasingly important. That is why we have chosen the average score of the top three universities in the QS World University Rankings as a measure of this contribution.

Financing of science and higher education creates economic conditions for the production of new knowledge and training of highly qualified personnel with the required value of human capital. Therefore, representing this process in terms of gross R&D expenditure as a % of GDP and the average similar purpose expenditure of the world's top three companies can be an indicator of the economic ability to support the functioning of both fundamental and applied science. At the same time, given the fact that technical and economic development depends not only on fundamental and applied science, but also has corporate human capital as its source, our attention will inevitably be drawn to the activities of those entities that influence the direct implementation of knowledge into production.

In the studies of K. Arrow (1962) and H. Uzawa (1968), it was shown that, along with the gained production experience, enterprise employees demonstrate increasing labor productivity. After all, the more products are manufactured, the greater the production experience is, which helps invent new methods and techniques of the production maximization. Therefore, there is an inverse effect of the production activity

on knowledge – the more time a worker spends on production, the more he/she learns about it, and that new knowledge allows for accelerating technological progress.

Relying on this regularity, we propose to consider the "knowledge workers" parameter while calculating structural capital – a parameter based on determination of specific weight of the companies offering formal training as well as companies engaged in science-intensive services and R&D volume made by the business. As one might assume, such an integral index indicates more clearly an increase in scientific and technical knowledge created directly by companies: the more science-intensive products are produced, the more technical improvements its workers make and, accordingly, the opportunity arises to produce more.

As practice shows, in modern conditions of economic development, which is becoming global, countries have more and more opportunities to borrow technical and technological experience to accelerate their technical and technological growth. However, according to W. Cohen and D. Levinthal [17], the potential of acquired knowledge can be used to increase the efficiency of production factors solely from the point of view of the existing critical mass of those subjects who are able to master this knowledge, see areas of its implementation and receive incentives for its practical application. In other words, the economy must be able to use the acquired knowledge, that is, have absorptive capacity.

To represent this absorptive capacity, we use the "research talent" factor as the percentage of a creative part of the human capital represented in business. Owing to the combination of the latter with the factors "payment of intellectual property", % of general trade", "high-technology import, % of total turnover", "import of the ICT services, % of overall volume of trade" that represent the knowledge spillover scale, we obtain one more subindex to evaluate structural capital – "knowledge absorption".

We believe that the greatest corresponding quantitative content of the proposed indicators for measuring structural capital is typical for the data of the World Intellectual Property Organization (WIPO), which annually publishes the Global Innovation Index. This index includes 81 indicators grouped into 7 sub-indices. In particular, sub-index 6 stands for "Knowledge & Technology Outputs", indicator 7.1 – for "Intangible assets", indicator 2.3 – for "Research & development (R&D)", indicator 5.1 – for "Knowledge workers", and, finally, indicator 5.3 – for "Knowledge absorption". Generally, a composition of the national structural capital index and its components are represented in Table 1.

The numerical values of the proposed subindices were selected from the reports of the Global innovation index for 2018-2020 [18-20] and used to calculate the national structural capital index of 26 countries. The selection of data for countries was based on two criteria – the level of economic development and the level of innovation. In addition, the sample included some countries that have undergone certain transformations of their economies from a centrally planned economy to a market economy.

To bring the scale of variations to similar indicators, a standardization (normalization) procedure was applied for all components of the national structural capital index. The theoretical boundaries for changing the system of index components made it possible to carry out the standardization (normalization) procedure using a formula that takes into account the distribution interval, which defines the boundaries from 0 (worst value) to 1 (best price). Since all subindices used to create the national structural capital index are characterized by the same magnitude and direction, an averaging method using a geometric formula is applied to summarize their assessment for the period 2018-2020. Table 2 shows the values of the integral assessment of the national structural capital index. Fig. 1 shows a graphical representation of this index.

Table 1

Subindices and components of the national structural capital

№	Subindex	Subindex components
1	Knowledge & technology outputs	Patents by origin/bn PPP$ GDP PCT patents by origin/bn PPP$ GDP Utility models by origin/bn PPP$ GDP Scientific & technical articles/bn PPP$ GDP Citable documents H index Growth rate of PPP$ GDP/worker, % New businesses/th pop. 15–64 Computer software spending, % GDP ISO 9001 quality certificates/bn PPP$ GDP High- & medium-high-tech manufactures Intellectual property receipts, % total trade High-tech net exports, % total trade ICT services exports, % total trade FDI net outflows, % GDP
2	Intangible assets	Trademarks by origin/bn PPP$ GDP Industrial designs by origin/bn PPP$ GDP ICTs & business model creation ICTs & organizational model creation
3	Research & development (R&D)	Researchers, FTE/mn pop. Gross expenditure on R&D, % GDP Global R&D companies, top 3, mn US$ QS university ranking, average score top 3
4	Knowledge workers	Knowledge-intensive employment, % Firms offering formal training, % firms GERD performed by business, % GDP GERD financed by business, % Females employed w/advanced degrees, %
5	Knowledge absorption	Intellectual property payments, % total trade High-tech net imports, % total trade ICT services imports, % total trade FDI net inflows, % GDP Research talent, % in business enterprise

Source: [18-20]

Table 2

The value of the national structural capital index in 26 selected countries, 2018-2020

№	Country	2018	2019	2020	№	Country	2018	2019	2020
1	Switzerland	0,817	0,853	0,853	14	Thailand	0,296	0,317	0,282
2	Sweden	0,737	0,790	0,809	15	India	0,226	0,260	0,318
3	USA	0,673	0,738	0,792	16	Bulgaria	0,315	0,306	0,342
4	UK	0,614	0,668	0,689	17	Poland	0,317	0,377	0,383
5	Rep. of Korea	0,719	0,765	0,837	18	Estonia	0,401	0,432	0,411
6	Netherlands	0,777	0,751	0,760	19	Georgia	0,141	0,177	0,155
7	Finland	0,680	0,711	0,657	20	Lithuania	0,227	0,274	0,259
8	Singapore	0,753	0,735	0,743	21	Moldova	0,206	0,191	0,173
9	Germany	0,669	0,696	0,709	22	Ukraine	0,309	0,300	0,359
10	France	0,588	0,651	0,687	23	Russia	0,364	0,373	0,381
11	Japan	0,647	0,686	0,735	24	Uganda	0,000	0,000	0,000
12	China	0,764	0,802	0,839	25	Zimbabwe	0,000	0,000	0,000
13	Brazil	0,306	0,318	0,346	26	Bangladesh	0,000	0,029	0,036

Fig. 1. Dynamics of the national structural capital index in 26 selected countries, 2018-2020

As can be seen from the figure, the world leaders in terms of national structural parameters of capital are Switzerland, the Republic of Korea, China, Sweden, the USA and Singapore. If we compare the positions of these countries in terms of their success in technical and technological development, we will see that "structural capital matters." The results of calculating the national structural capital index turned out to be quite consistent with other indices, demonstrating the level of readiness of the countries' economies to meet requirements of the modern 4th industrial revolution. An example here is the Global Knowledge Index which is a summary indicator allowing to track the level of knowledge in countries in the fields of pre-university, technical, vocational, higher education, research, development and innovation, information and communication technologies and economics. According to the Global Knowledge Index 2020, the countries with the highest INSC scores are also leaders in this ranking: Switzerland, the USA and Sweden occupy 1st, 2nd and 3rd places, respectively. Singapore ranks 7th, the Republic of Korea 19th.

From the point of view of the dynamics of the national structural capital index, a significant increase in its value is characteristic of the national structural capital of the USA, the Republic of Korea, France, Japan, China, India, Poland and Ukraine, which appears to create a certain potential for higher rates of innovative of renewal their economies in the future. As practice shows, it is the improvement of the national human capital infrastructure that is one of the most important prerequisites for maintaining and increasing national competitiveness.

Conclusions. The formation and development of the economy requires fundamentally new approaches to determining the sources of society's progressive advancement towards better conditions. Traditional approaches implemented in models of economic growth with endogenous technical progress, as well as their Schumpeterian variations, have highlighted human capital and its ability to generate innovation. However, in the context of developments and achievements of the 4th industrial revolution (artificial intelligence, cloud technologies, open innovation and other scientific achievements) beyond national borders, the formation of global markets for high-tech goods and innovative products has significantly accelerated the process of creating and disseminating innovations, deepening turbulence and instability of technical and technological development. As a result, the intellectual component began to stand out in the structure of human capital and companies were faced with the challenge of ensuring the conditions for capital accumulation and maintaining the

company's ability to meet new challenges while combining and using the individual knowledge and skills of personnel within the framework of overall activities. The concept of structural capital is used by economists to describe all these processes. However, at present we still do not have a consensus on its essence from a national perspective. In addition, we still do not have a methodology for its quantitative assessment for different countries of the world. In our opinion, national structured capital is defined as an organizational and institutional system of expanded representation of the knowledge and skills of members of society that contribute to actual and potential national economic development.

To perform the quantitative estimation of national structural capital, methodological basis for its measurement is proposed by means of the created similarly-named integral index, which combines such indicators as knowledge & technology outputs, intangible assets, research & development (R&D), knowledge workers, and knowledge absorption. Such a component composition of the index best corresponds to the essential characteristics of structural capital and facilitates the growth of national human capital being a key factor in modern technical and technological development.

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STRUCTURAL CAPITAL IN THE SYSTEM OF TECHNOLOGICAL DEVELOPMENT OF SOCIETY

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The current state of socio-economic development, characterized by a radical change in the technical and technological paradigm in a globalized world, is marked by new phenomena and processes. In contrast to previous eras, when the formation of new technological methods of production was based on a small number of breakthrough inventions that changed the structure of production, today we observe an avalanche-like development of inventions, the products of which destroy the stability of all spheres of society. Accordingly, all resources possessed by a modern company must meet the requirements of the time in terms of their quality. Under such conditions, not only intellectual capital but also other components, that enable companies to maneuver in their innovative development, become very important.

Based on the analysis of modern conceptual approaches to determining the essence of the categories "structural capital" and "intellectual capital", the article forms the concept of "national structural capital". The latter is presented as an infrastructure for the formation, implementation and development of national human capital, an organizational and institutional system for the expanded reproduction of knowledge and skills of members of society. For the quantitative measurement of national structural capital, a methodological framework is proposed, which is based on the integral index of national structural capital created by the authors; its components are justified: knowledge & technology outputs, intangible assets, research & development (R&D), knowledge workers, knowledge absorption. Based on the proposed methodology for determining the integral index of national structural capital, its value was calculated for 26 countries for 2018-2020 and the dynamics for the period under study were shown.

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