

Intellectual Capital in the Structure of Global Economy

**OLHA LUKIANENKO,
IRYNA DVORNYK,
DMYTRO KOLECHKO¹**

ABSTRACT. The article explores the essence of intellectual capital in a post-industrial knowledge economy. Methodological identification of key concepts – intelligence, intellectual work, intellectual activity, intellectual product, intellectual property, intellectual resource, intellectual potential, intellectual capital – is carried out. The phenomenon of global intellectualization of economic development is investigated. The objective trends of the evolution of human capital into intellectual are shown. The place of intellectual property in the institutional environment of the knowledge economy is determined. An eclectic model characterizing the interconnection of human, social, network, and intellectual capitals is proposed; methods for quantifying the latter are presented. The defining role of the education sector in a post-industrial society is confirmed, the prerequisites and trends in the formation of the global educational services market are identified and its structural features are evaluated. The modern dilemmas of the development of science and education are identified and their multi-criteria evaluation is carried out. A model of the intellectualization of global economic development based on the methodological basis of the “triple helix” of Henry Itszkowitz is substantiated, in which universities, government and business on the one hand, interact with open science, education and innovation on the other. The transformation of universities as public institutions from traditional to research and entrepreneurial models is investigated. The global model of intellectualization of economic development based on open science, education, innovations is grounded. Their integrative role in the intellectual economy is illustrated.

KEYWORDS. Global economy, human capital, knowledge economy, intellectual capital, intellectual property, intellectual economy, research university, entrepreneurial university, open innovation.

Introduction

Under the influence of scientific and technological progress in the wake of universal globalization, informatization and digitalization of economic liberalization and democratization, individualization and humanization, the XXI century sees a qualitative transformation of conditions, factors and models of economic development and growth, where new types of production and exchange based on intelligence as a resource of V and VI technological paradigms that provide economic

*This article was translated from its original in Ukrainian

¹ **Lukianenko Olha** — Doctor of Economics, Associate Professor, Professor of the Department of International Management of the State Institution of Higher Education “Kyiv National Economic University named after Vadym Hetman”. Sphere of scientific interests: creative management, innovation, intellectual capital. E-mail: lukianenko@ukr.net.

Dvornyk Iryna — Head of the Department of Postgraduate and Doctoral Studies at the State Institution of Higher Education “Kyiv National Economic University named after Vadym Hetman”. Sphere of scientific interests: intellectual innovations in education, university education, entrepreneurial universities. E-mail: i_dvornik@ukr.net.

Kolechko Dmytro — Associate Professor of the Department of International Management the State Institution of Higher Education “Kyiv National Economic University named after Vadym Hetman”. Sphere of scientific interests: economy of the countries of Southeast Asia, transformation of financial markets. E-mail: kaf404-mm@ukr.net.

dynamics and social progress, become defining. In the institutional structure of the economy, intellectual property begins to play a leading role, encompassing objects, sources, processes and results of scientific and innovation activity. Embodied in intellectual property rights and properly quantified, intellectual resource finds real application in the market or in society, forming intellectual capital.

The study of its modern essence, structure and performance is of fundamental nature. Intellectual capital is becoming an organic component of not only micro-, but also macroeconomic institutional theories and strategies, significantly affecting the market and social behavior in a post-industrial knowledge economy. A special place in it is occupied by universities, which become centers for the formation of research and educational networks, institutions for generation of knowledge and reproduction of intellectual capital.

The globalization of intellectual resources, emergence of global markets for intellectual labor, rights and products of intellectual property has become the leading trend of economic and civilizational development. At the same time, there is a nonequivalent cross-country intellectual exchange, largely due to the oligopolization of markets in the scientific patent sphere, by a group of leading countries – technological leaders aggravating traditional issues and generating new problems, imbalances and asymmetries.

In general, in-depth study of the phenomenon of the emergence of a post-industrial knowledge economy, development of methodology and tools for assessing the intellectual potential of global economy subjects, ways and mechanisms of its capitalization for continuous technological and organizational modernization of micro-, macro- and global structures is needed. In the conditions of an obvious underestimation of the intellectual potential of Ukraine, production based on lower technological structures in the absence of proper innovative business motivation, economic and social progress in the format of knowledge economy is impossible.

The aim of the article is to confirm the hypothesis of the defining role of intellectual capital in the global economy of the XXI century. To achieve it, the following main tasks were identified: to identify the key concepts of the intellectual economy; to analyze the modern intellectual potential of Ukraine; to define the intellectual mission of universities. The subject of the study is the prerequisites, patterns and features of the intellectual capital formation and functioning.

Research interest has been increasingly concentrating on a comprehensive analysis of intellectual capital in the process of reorientation to new resources of economic development and social progress¹ (Table 1).

¹ Helbreit, Dzh. K. *Novoe yndustrialnoe obshchestvo. The New Industrial State (1967).* – AST, 2004.

Table 1 EVOLUTION OF MODERN INTELLECTUAL CAPITAL RESEARCH²

Feature	Stage		
	1	2	3
Period	1980 – 1990	1990 – 2004	2004 – ...
Theoretical base	Great (classical) theories	Dynamic theory of IC	Aggregated theory of IC
Main result	Outline of the framework and structure of IC	Classification of IC, its components, their taxonomy, and grouping of IC estimation approaches	Criticism of theories and models
	Emergence of new theoretical models	Emergence of new theoretical models, application of new and previous models	Application of new and previous models, emergence of new theoretical models
	Development of terminology	Development of terminology	Transformational refinement of terminology
Main object	Significance of IC to ensure sustainable competitive advantage	Measurement, management, reporting; Influence of IC on financial results	Critical study of IC practice; managerial aspects of IC; financial and non-financial aspects
	Corporations	Corporations, SMEs, international experience	All types of entities, not corporations only
Main developments	Practitioners	Researchers and practitioners	Practitioners, researchers, politicians
Research	Theoretical	Mainly descriptive	Growth of the value of the study of performance
Practical meaning	Creating directives and standards for identifying IC	Research hypothesis testing; disclosure and reporting	Practical application of IC; origin of experimentation with IC

The development of the theory of intellectual capital as a key category of the modern economy of knowledge, first of all, was carried out in the works of such Western scholars as L. Edvinson³, D. Duffy, M. Malone⁴, T. Stewart⁵, I. Hiroyaki, and others. Both the essence and

² Ilnytskyi, D. “Universytety v hlobalnii ekonomitsi znan”. *Mizhnarodna ekonomichna polityka* 1, no.22, (2015): 123-154. [In Russian].

³ Carol, Yeh-Yun Lin. *Leif Edvinsson National Intellectual Capital: A Comparison of 40 Countries*. Springer Science & Business Media, 2010.

⁴ Edvinsson, Leif and Michael S. Malone. *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*. Harpercollins, 1997.

⁵ Stiuart, T.A. *Yntellektualnyi kapital. Novyi ystochnyk bohatstva orhanyzatsyi* [Per. s anhl.]. M.: Pokolenye, 2007. [In Russian].

the structure and efficiency intellectual capital is explored primarily at the firm (organization) level.

A significant contribution to the methodological identification of intellectual capital was also made by domestic researchers — L. Antoniuk, V. Bazylevych, A. Halchynskyyi, O. Hrishnova, V. Ilin, D. Ilnytskyi, A. Kolot and others.

Thus, O. Hrishnova treats it as the intellectual ability of people in conjunction with the material and non-material means created by them, which are used in the process of intellectual activity by a person individually or within a specific team and increase labor efficiency and income⁶. V. Bazylevych and V. Ilin summarize the interrelated aspects of the analysis of intellectual capital: value, system, process, effective and emphasize the importance of the commercial use of intelligence⁷. Individual capital of individuals, firms and companies are distinguished in the research of both O. Hrishnova and V. Bazylevych and V. Ilin. The processes of knowledge generation, concentration of intellectual capital in universities were comprehensively investigated by D. Ilnytskyi⁸.

In general, the issue under study has an interdisciplinary character, since, being independent intangible assets, human, intellectual, network and social capitals have the specificity of formation and are realized in close relationship.

Methodological Format for the Study of Modern Economics

The unprecedented dynamics and new quality of scientific and technological progress, the transformation of knowledge development paradigms, actualization of the intangible value and intangible assets require rethinking of the key concepts of the intellectual economy on the basis of their system identification⁹ (Fig. 1).

⁶ Hrishnova, O.A. *Liudskyyi rozvytok: [navch.posib.]*. K.: KNEU, 2006. [In Ukrainian].

Hrishnova, O.A. "Liudskyyi, intelektualnyi i sotsialnyi kapital Ukrainy: sutnist, vzaiemozv'iazok, otsinka, napriamy rozvytku". *Sotsialno-trudovi vidnosyny: teoriia ta praktyka: Zb. nauk. Prats 1*, no.7 (2014): 34-42. [In Ukrainian].

⁷ Bazylevych, V.D. and V.V. Ilin. *Intelektualna vlasnist: kreatyvy metafizychnoho poshuku: [monohrafiia]*. K.: Znannia, 2008. [In Ukrainian].

⁸ Ilnytskyi, D. "Universytety v hlobalnii ekonomitsi znan". *Mizhnarodna ekonomichna polityka 1*, no.22, (2015): 123-154. [In Russian].

Ilnytskyi, D.O. *Hlobalna konkurentsia v naukovy-osvitnomu prostori: [monohrafiia]*. K.: KNEU, 2016. [In Ukrainian].

⁹ Hrynberh, R. "Hosudarstvo v ekonomyke znanyi". *Voprosy ekonomyky 10* (2008): 31. [In Russian].

Petty, R. and J. Guthrie. "Intellectual capital literature review: Measurement, reporting and management". *Journal of Intellectual Capital 1* no. 2. (2000): 155-176.

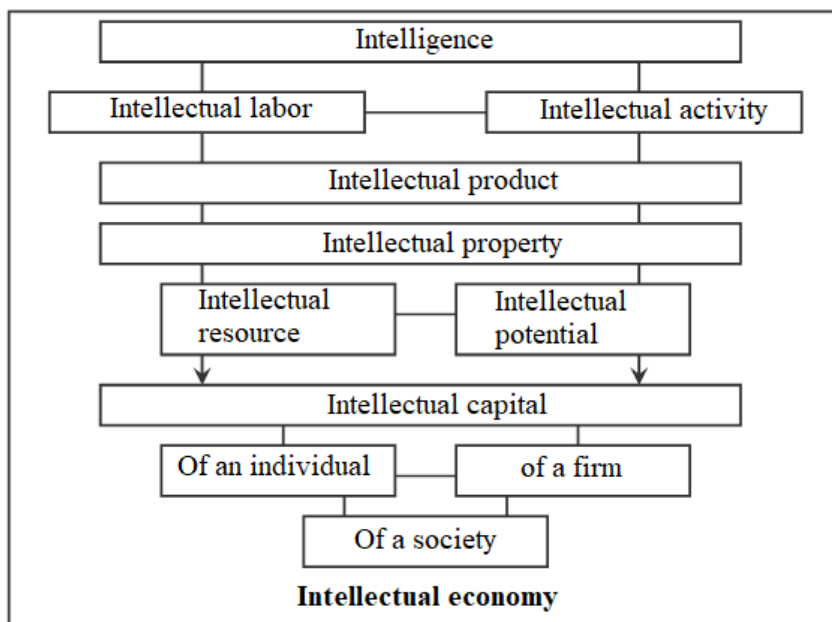


Fig. 1. Methodological Identification of Key Concepts of Intellectual Economy¹⁰

In modern studies, there are differences in the interpretation of intelligence¹¹, however, it can be argued that, in general, it represents mental energy embodied in knowledge, experience, information and intellectual property. In the context of the targeted organization of mental energy to create new values, the intellect becomes a means of production¹².

Intellectual work as a special type of human activity is reproductive or creatively productive, if an intellectual product that can be

¹⁰ Developed by the authors on the basis of: Bazylevych, V.D. and V.V. Ilin. *Intelektualna vlasnist: kreatyvny metafizychnoho poshuku: [monohrafiia]*. K.: Znannia, 2008. [In Ukrainian].

Hrishnova, O.A. *Liudskiy rozvytok: [navch.posib.]*. K.: KNEU, 2006. [In Ukrainian].

Hrishnova, O.A. "Liudskiy, intelektualnyi i sotsialnyi kapital Ukrainy: sutnist, vzaiemozv'язok, otsinka, napriamy rozvytku". *Sotsialno-trudovi vidnosyny: teoriia ta praktyka: Zb. nauk. Prats 1*, no.7 (2014): 34-42. [In Ukrainian].

Ilnytskyi, D. "Universytety v hlobalnii ekonomitsi znan". *Mizhnarodna ekonomichna polityka 1*, no.22, (2015): 123-154. [In Russian].

Ilnytskyi, D.O. *Hlobalna konkurentsia v naukovy-osvitnomu prostori: [monohrafiia]*. K.: KNEU, 2016. [In Ukrainian].

¹¹ Sidenko, S. *Neekonomichni chynnyky svitovoho ekonomichnoho rozvytku: [monohrafiia]*. K.: Instytut svitovoi ekonomiky NAN Ukrainy, vydvo «Avrora-Print», 2011. [In Ukrainian].

¹² Stiuart, T.A. *Yntellektualnyi kapital. Novyi ystochnyk bohatstva orhanyzatsiy [Per. s anhl.]*. M.: Pokolenye, 2007. [In Russian].

commercialized directly or indirectly through design as rights to an object of intellectual property is produced.

Intellectual property plays almost the major role in the knowledge economy, acquiring an institutionalized character¹³. Based on the fact that the formation of an intellectual property institute reflects the evolution of the organizational and legal forms of scientific and technological progress and property relations, pricing and competition directly, we argue in favor of the methodological necessity and practical feasibility of systemic positioning of intellectual property in the institutional environment of the modern economy (Fig. 2).

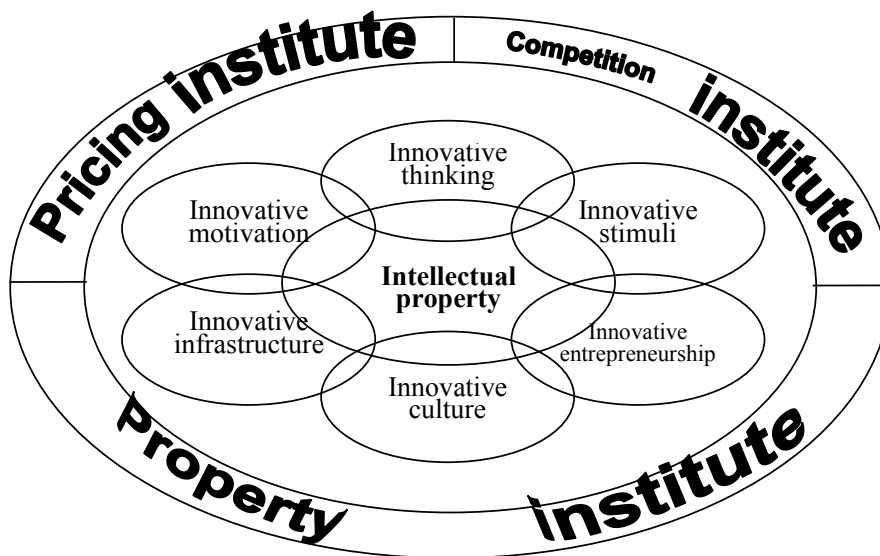


Fig. 2. Intellectual property in the institutional environment of knowledge economy¹⁴

Institute of intellectual property: provides for the exchange of an intellectual product between creators, intermediaries, end users; activates systemic scientific and technical research, intersubjective and intersectoral diffusion of innovations, cooperation between the subjects of the innovation process through technology transfer, integrates resources for joint research, promotes the development of new forms of patent-licensing cooperation of firms, and attracts consumers to the innovation process; expands the boundaries of national innovation

¹³ Bilenkyi, O.Yu., Stoliarchuk, Ya.M., Halenko, O.M. and V.M. Stoliarchuk. *Hlobalnyi rynok intelektualnoi vlasnosti: masshtaby, struktura, instytut: [monohrafiia]*. K.: KNEU. – Feniks, 2016. [In Ukrainian].

¹⁴ Developed by authors

systems by reflecting the latest scientific and technological achievements in the process of registering and protecting domain names on the Internet, operating electronic systems for submitting and processing patent applications, and creating modern infrastructure elements, spreading of audit and insurance mechanisms for intellectual property, development of various intermediary structures, integration into innovative systems of small and medium businesses; promotes the development of a system for financing innovation, streamlining the cost structure based on reimbursement and capitalization of innovation costs by selling intellectual property objects, selling intellectual property rights, concluding licensing agreements, attracting domestic and foreign investments, creating a favorable image of innovative formations, entanglement of relations on intellectual property with the latest innovative and economic relations¹⁵.

In accordance with modern principles and universal approaches, intellectual capital at micro level is formed by: human capital itself, embodied in the company's employees in the form of their experience, knowledge, skills, creativity, as well as common culture, commitment to the company's philosophy, its internal values; structural (organizational) capital in the form of patents, licenses, trademarks, organizational structures, databases, electronic networks, etc.; client (consumer) capital, including a system of tried and tested, reliable, long-term, trusting and mutually beneficial relations of an enterprise with its customers, buyers, as well as the company name and history of relationships with consumers¹⁶.

A separate problem, one that is more relevant than structural analysis, should be considered measurements (estimates)¹⁷ of intellectual capital, the primary cause of which is the need for external confirmation of its value. In modern practice, there are more than 40 methods of such assessment, which, according to the methodology of K. Swainby, are divided into four groups¹⁸: 1) market capitalization methods, envisaging calculation of the difference between the market capitalization of a company and the shareholders' equity. The resulting value is considered as the value of its intellectual capital or intangible assets (Tobin's coefficients); 2) direct intellectual capital methods, based on the

¹⁵ Bazylevych, V.D. and V.V. Ilin. *Intelektualna vlasnist: kreatyvny metafizychnoho poshuku: [monohrafiia]*. K.: Znannia, 2008. [In Ukrainian].

¹⁶ Ilnytskyi, D. "Universytety v hlobalnii ekonomitsi znan". *Mizhnarodna ekonomichna polityka* 1, no.22, (2015): 123-154. [In Russian].

Khodakivskyi, Ye.I., Yakobchuk, V.P., and I. L. Lytvynchuk. *Intelektualna vlasnist: ekonomiko-pravovi aspekty [tekst]: navch. Posib.* K.: Tsentri uchbovoi literatury, 2014. [In Ukrainian].

¹⁷ Marr, B. and J. Chatzke. "Intellectual capital at the crossroads: managing, measuring and reporting of IC". *Journal o Intellectual Capital* 5, No. 2. (2004): 224-229.

¹⁸ Kuznetsov, V.Y. and E. V. "Kniazeva. Metody otsenky yntellektualnogo kapytala". *Voprosy ekonomicheskikh nauk* 1. (2016): 18-21. [In Russian].

identification and monetary value of individual assets or individual components of intellectual capital. Having evaluated the individual components of intellectual capital or even individual assets, the integral assessment of the company's intellectual capital is derived; 3) return on assets methods are based on an approach where the ratio of the average income of a company to the reimbursement of expenses over a certain period to the company's tangible assets (the company's ROA) is compared with that for the industry as a whole. To calculate the average additional profit from intellectual capital, the resulting difference is multiplied by the company's tangible assets. Then, one can determine the value of the company's intellectual capital by direct capitalization or discounting of the received cash flow; 4) scorecard methods – various components of intangible assets or intellectual capital are identified, indicators and indices in the form of scoring or as graphs are generated and added. The use of SC-methods does not provide for the monetary valuation of intellectual capital.

Comprehensively and structurally, intellectual capital is globally and comparatively evaluated by the methods of international organizations¹⁹. In general, it is advisable to explore and evaluate intellectual capital at individual, collective, corporate (organizational), local-territorial, national, regional, international and global levels.

Modern methodological format involves the study of intellectual capital in conjunction with the human and social²⁰. According to F. Fukuyama, social capital is the creative potential of society, which is formed as a result of the existing trust between its members and is based on the adoption of informal values and norms shared by certain groups of people who have the possibility of stable communication and cooperation (constructivism and mutual respect, honesty, reliability in fulfilling commitments, pluralism and tolerance, common vision, etc.). O. Hrishnova also defines social capital (SC) as a special form of capital existing in such elements of social organization as social networks, social norms and trust creating the conditions for coordination and cooperation for mutual benefit. At the same

¹⁹ “KEI and KI Indexes (KAM 2012)”. http://info.-worldbank.org/etools/kam2/KAM_page5.asp

“Reporting intellectual capital to augment Research, Development and Innovation in SMEs”. *Report to the Commission of the High Level Expert Group on RICARDIS. Luxembourg: Office for Official Publications of the European Communities, 2006.*

“Supporting Investment in Knowledge Capital, Growth and Innovation: OECD 2013”. www.oecdilibrary.org/industry-and-services/supporting-investment-in-knowledge-capital-growth-and-innovation_9789264193307-en

“The Human Capital Report 2013”. <http://reports.weforum.org/human-capital-index-2013>

²⁰ Fukuiama, F. *Velykyi razryv. Per. s anhl. pod obshch. red. A. V. Aleksandrovoi.* .M.: OOO «Yzdatelstvo AST», 2003. [In Russian].

Yasyn, E. “Modernyzatsiya y obshchestvo”. *Voprosy ekonomyky* 7 (2007): 16-30. [In Russian].

time, intellectual capital and social interaction, being objects of independent analysis, characterize national (public) human capital²¹.

In general, social capital, representing the actual economic value (F. Fukuyama), multiplies the return on investment in physical and human capitals (R. Putnam), mobilizes the moral and psychological resource of development (A. Halchynskiyi). S. Yusuf notes that human capital becomes more creative, uniting into network capital (wikicapital), creating local and global teams and partnerships, associations and communities. Association promotes exchange of knowledge, coordinates the union of talent with different views and attitudes from different areas of knowledge²². A. Halchynskiyi argues that the network organization of the relevant relationships becomes an adequate form of social capital approval, where informal norms of self-organization through multi-level network mechanisms operate directly in the field of economics²³.

Based on the analysis of modern methodological approaches, we propose a structural and logical scheme (Fig. 3) integrating human (H), intellectual (I), social (S) and network (N) capital in interconnected segments of the global economy (knowledge, intellectual, social and network).

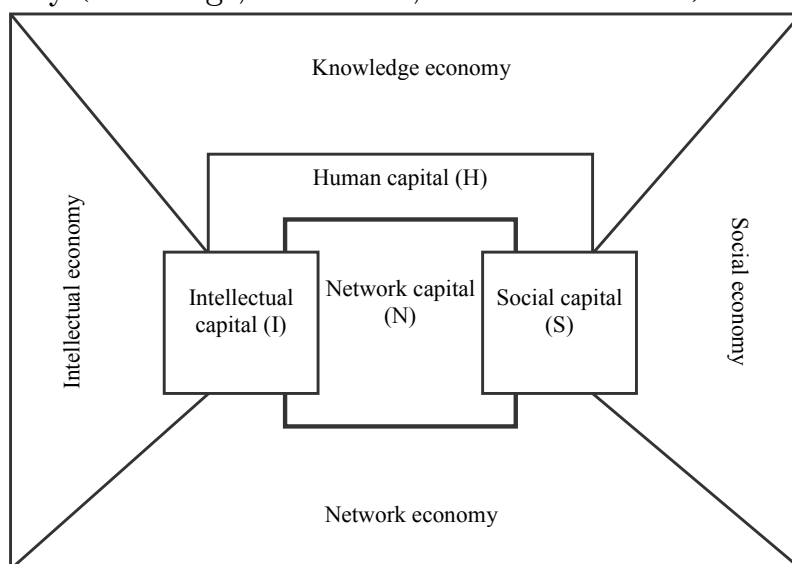


Fig. 3. Eclectic macroeconomic model “HISN”

²¹ Hrishnova, O.A. “Liudskiyi, intelektualnyi i sotsialnyi kapital Ukrainy: sutnist, vzaiemozv’iazok, otsinka, napriamy rozvytku”. *Sotsialno-trudovi vidnosyny: teoriia ta praktyka: Zb. nauk. Prats 1*, no.7 (2014): 34-42. [In Ukrainian].

²² Halchynskiyi, A. *Ekonomichna metodolohiia. Lohika onovlennia: [kurs leksii]*. ADEF-Ukraina, 2010. [In Ukrainian].

²³ Halchynskiyi, A. *Ekonomichna metodolohiia. Lohika onovlennia: [kurs leksii]*. ADEF-Ukraina, 2010. [In Ukrainian].

Intellectual Potential of Ukraine

Generation, concentration and productivity of intellectual capital have specific country and regional conditions.

Today, Ukraine continues to maintain a significant innovative potential, primarily due to the high level of basic research, development inertia as a high-tech post-Soviet enclave. Ukraine remains among the world leaders in such areas of fundamental science as physics, mathematics, computer science, chemistry, physiology, medicine; has pioneering and applied developments in the field of laser, cryogenic, aerospace engineering, communications and telecommunications, software products; it is among the eight countries with the necessary scientific and technical potential for the creation of aerospace equipment, and among the ten largest shipbuilding countries in the world.

In Ukraine, the indicator of the higher education incidence is 38% which is high at the global level – compared to the United States (38.6%), Israel (42.4%) and Canada (43.9%). Under Universitas 21, the Ukrainian system of higher education managed to outrun the Czech Republic, Poland, Slovenia, Russia, Italy.

Ukraine's rating position on intellectual capital (70th among 124 countries) is determined not by its weak intellectual potential, but by low indicators of the level of technology development by firms (85th place), capacity for innovation (87th place), attraction of talents (110th place), talent retainment (117 place), protection of intellectual property (120 place).

The share of innovative industrial products sold is only 3-5% in the total volume, Ukrainian high-tech exports amounts to 4-5 billion USD per year, although it is potentially estimated at the level of 10-15 billion USD, or 0.3-0, 5% of world exports²⁴. Unlike developed countries, in which 85-90% of GDP growth is provided by the production and export of high-tech products, Ukraine's share in the high-tech market is estimated at 2.5–3 trillion USD, yet comprises about 0.05–0.1%²⁵.

Ukraine's participation in the international exchange of technologies is insignificant, as evidenced by the dynamics of incomes of domestic licensors from the sale of rights for the use of industrial property objects abroad, where the volume of royalties they received from exporting licenses and other services related to the use of intellectual property was 0, 1-0 , 5% of total exports of services. It is revealing that the volume of payments of domestic business entities for the acquisition of license rights

²⁴ Breus, S.V. “Analiz stanu i perspektyvy eksportu vysokotekhnolohichnoi produktsii promyslovosti Ukrainy”. *Stratehichni priorytety 1* (2010): 16-22. [In Ukrainian].

²⁵ Mazaraki, A.A. ed., Melnyk, T.M., Yukhymenko, V.V., Kostiuchenko, V.M. and L.P. Kudyрко [ta in.]. *Innovatsiyni potentsial Ukrainy: [monohrafiia]*. K.: NTEU, 2012. [In Ukrainian].

reaches up to 70% of the total import of services, that is, an obvious asymmetry is apparent.

As for the patent and licensing activities of Ukraine, its scale is characterized by a rather uneven dynamics both by years and by spheres and sectors of the national economy. In general, Ukraine has a low position in international ratings in most indices, despite its significant potential in the field of intellectual property.

Ukraine's international position in terms of intellectual property protection (125th place) is the worst among the EU and CIS countries. In addition to the violation of intellectual property rights and license agreements, the so-called "piracy" is one of the main problems, which, in our opinion, requires special studies, quantitative and qualitative assessments of a predominantly legal nature. At the same time, from an economic point of view, inadequate protection of intellectual property rights in Ukraine contributes to the growth of lagging risks in high-tech sectors of the economy and can inhibit economic development and social progress.

In international comparative terms, the degree of effectiveness of the system for protecting intellectual property rights is characterized by the international property rights index, rule of law index, knowledge economy index and global innovation index (INSEAD) (Table 2).

In our opinion, there are the following systemic reasons for a qualitative plan that holds back innovation progress:

- low level of patenting of domestic inventions in foreign and international patent organizations;
- predominantly shadow economic turnover of intellectual property;
- lack of effective mechanisms and a culture of commercialization of innovations for low demand for innovative products from the industrial sector;
- one-sided and nonequivalent international scientific and technological exchange, especially in the field of technology transfer;
- no national venture capital market and competition in science and innovative entrepreneurship;
- insufficient investment activity of banks and other financial institutions of Ukraine in the innovation sphere;
- lack of a functionally complete system of specialized market institutions and tools for innovation development, etc.

The experience of Ukraine shows that even a significant intellectual potential of the nation does not guarantee innovative progress, if it is not embodied in the intellectual capital. This requires the formation of motivations and practical actions on the transition to a knowledge economy, the creation of not only appropriate scientific and technological, but also micro- and macroeconomic conditions.

Table 2 COMPETITIVE POSITIONS OF UKRAINE IN SELECTED INTERNATIONAL RANKINGS, 2016²⁶

Country position on IP rights index	International property rights index				Country position on global innovation index	Global Innovation Index (INSEAD)				Country position on human capital development index (Human Capital Index)	General index	Country position on the rule of law index	Rule of Law Index (0-1)
	General (1-10)	Legal	Tangible	Intellectual		Input subindex	Output subindex	Efficiency factor	GII (0-100)				Average rating (factors 1-8, 0.00-1.00 points)
Finland (1)	8,4	8,9	7,7	8,6	Switzerland (1)	68,4	64,2	1,01	68,2	Finland (1)	85,86	Denmark	0,89
New Zealand (2)	8,3	9,0	7,9	7,9	Sweden (2)	68,8	58,7	0,9	62,4	Norway (2)	84,64	Norway	0,88
Luxembourg (3)	8,3	8,6	7,8	8,3	UK (3)	67,5	56,3	0,8	62,4	Switzerland (3)	84,61	Finland	0,87
Norway (4)	8,3	8,7	7,9	8,1	CIIA (4)	68,7	54,1	0,8	60,1	Japan (4)	83,44	Sweden	0,86
Switzerland (5)	8,2	8,7	7,6	8,3	Finland (5)	68,5	51,3	0,7	60,0	Switzerland (5)	83,29	Netherlands	0,86
Japan (8)	8,1	8,1	7,6	8,6	Germany (10)	61,9	54,0	0,9	57,1	USA (24)	80,63	Germany	0,89
USA (15)	7,7	7,3	7,3	8,6	Japan (16)	66,0	43,0	0,7	54,0	Luxembourg (22)	79,28	Russia	0,49
Estonia (25)	6,8	7,4	6,8	6,2	Estonia (24)	54,2	49,3	0,9	52,8	Estonia (15)	78,86	Estonia	0,79
Hungary (49)	5,7	5,5	5,1	6,4	Hungary (33)	53,1	48,0	0,9	47,5	Hungary (33)	78,42	Hungary	0,57
Poland (43)	5,9	6,2	5,7	5,9	Poland (39)	48,9	40,5	0,8	43,0	Poland (30)	77,34	Poland	0,71
China (55)	5,4	4,4	6,5	5,3	China (25)	48,7	31,7	0,7	40,2	China (71)	76,36	China	0,48
Ukraine (115)	3,9	2,4	5,1	4,3	Ukraine (56)	38,9	32,5	0,8	36,5	Ukraine (26)	67,81	Ukraine	0,45

²⁶ Compiled by authors from: "Human Capital Report 2016". <http://reports.weforum.org/human-capital-report-2016/>

"The Global Innovation Index 2016. The Human Factor in Innovation". http://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2016.pdf

"The International Property Rights Index 2016" <http://internationalpropertyrightsindex.org/ipri2016>

"The Rule of Law Index 2016" <http://worldjusticeproject.org/rule-of-law-index>

Intelligent Mission of Universities

In the knowledge economy, education is becoming key, and today the global education industry, with only the cost of national education systems, is the second largest global market after health care. The total expenditure on education in 2012-2017 is estimated at 5-7 trillion US dollars.

The most dynamic and internationalized is the higher education sector with annual sales of more than 300 billion US dollars and a population of about 15 million people²⁷, and the leading trend of its development is globalization (Fig. 4).

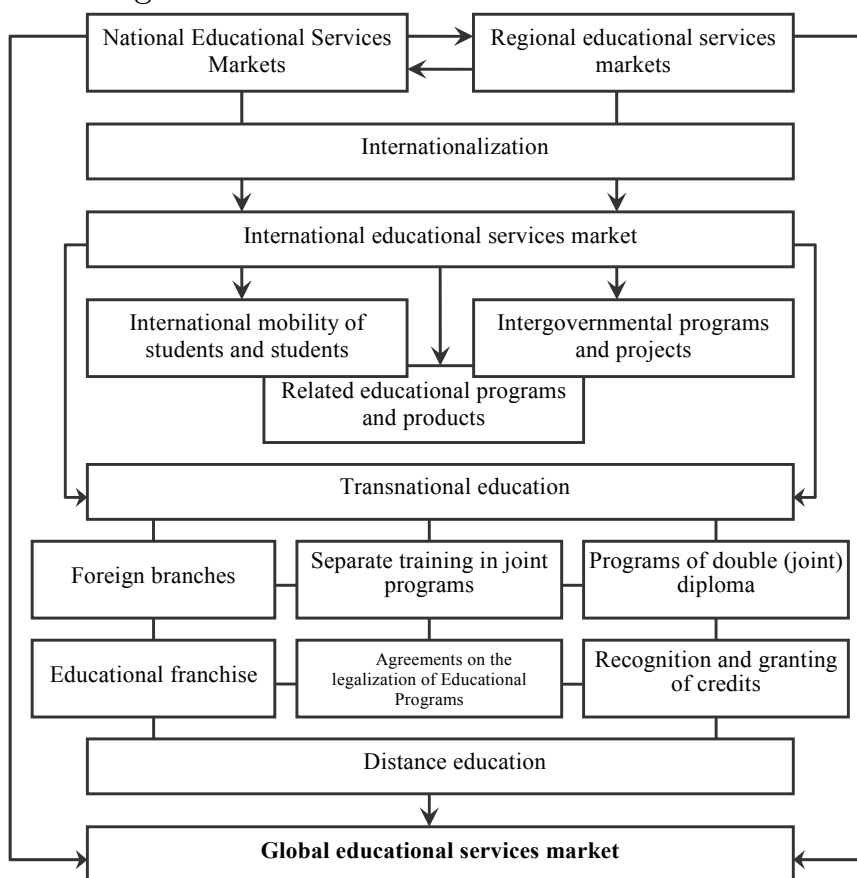


Fig. 4. Formation of the global market for educational services²⁸

²⁷ Halychyn, V.A. *Mezhdunarodnyi rynek obrazovatelnykh usluh: osnovnye kharakterystyky y tendentsyy razvytyia*. M.: Yzdat. dom «Delo» RANKhyHS, 2015. [In Russian].

²⁸ Developed by authors

The transformation of the international educational market to the global market occurs as a result of the continuous spread of three interrelated trends: formation of global consumer demand for educational services, due to global informatization; emergence of a global labor market; cross-cultural unification in all spheres of activity, an unprecedentedly growing international mobility of students, graduate students, doctoral students, teachers, educational programs.

Universities play an integrative role in the formation and development of post-industrial societies, since it is in their walls intellectual capital is concentrated, ideas are generated, research and development are organized and carried out, progressive forms of educational innovation activity are developed with direct, large-scale and dynamic transfer of knowledge.

American researcher Henry Itszkowitz puts universities first in the “triple helix” of innovation progress (universities – industry – government regulation)²⁹. The idea of a “knowledge triangle”, including the public and private sectors and the knowledge sector³⁰, and in the innovation agenda of the European Union, education, research and innovation are determined by key factors of competitive development.

The modern mission of universities is not only to accumulate and spread knowledge, but also to be obligatory in the conduct of applied research and its commercialization, inherent primarily in research universities³¹.

The global economization of knowledge leads to close interaction between universities and business, since it is able to provide adequate financing for the production of intellectual products and their large-scale commercialization. What is important here is the binding universal long-term trends. For business, innovation, corporatization, transnationalization, socialization, and for universities, respectively, intellectualization, professionalization, international mobility, humanization. It is they, as the successful practice of cooperation shows, which are the fundamental basis of the strategic partnership of universities with businesses. In the conditions of inadequate public

²⁹ Etzkowitz, H. “The Triple Helix”. *University-IndustryGovernment. Innovation in Action*. N.Y., 2008.

³⁰ Lansu, A., Boon, J. and Sloep P.B. Rietje van Dam-Mieras. “Changing professional demands in sustainable regional development: a curriculum design process to meet transboundary competence”. *Journal of Cleaner Production* 49 (2013): 123-133.

³¹ Ilnytskyi, D.O. *Hlobalna konkurentsia v nauково-osvitnomu prostori: [monohrafiia]*. K.: KNEU, 2016. [In Ukrainian].

Schramm, C.J., Crow M., Merten A.G. et.al. *The Future of the Research University. Meeting the Global Challenges of the 21st Century*, June 1, 2008. <http://ssrn.com/abstract=1352645>.

Vest, C.M. *The American Research University from World War II to World Wide Web: Governments, the Private Sector, and the Emerging MetaUniversity*. Berkeley: University of California Press, 2007.

funding and expansion of business areas, the phenomenon of entrepreneurial universities is emerging, where a university becomes not just a participant in science and technology parks, but serves as an organizational facility and center, as it combines research, R&D, commercial realization of their results technology areas³². This, as a rule, is accompanied by an incubation effect, which qualitatively changes the structure of traditional innovation processes.

The defining characteristics of universities with this status are: capitalization of scientific discoveries, close interaction with business structures and the state, independence in determining development strategies, hybridization of organizational structure, introspectiveness as a continuous process of renewal³³. Firstly, the constant diversification of university activities and the resource base; secondly, cooperation with business and government; thirdly, the formation of an integrated entrepreneurial culture based on the effective stimulation of innovation, etc. become necessary.

Such transformation of a university as a public institution, in our opinion, can have both positive consequences, above all for the universities themselves, in terms of enhancing their market-oriented scientific activities, and consequently, greater financial autonomy, as well as repercussions, since excessive commercialization will cause defamation of fundamental research requiring long-term investments with unobvious business results. At the same time, fundamental science not only generates fundamentally new knowledge, which becomes the basis of breakthrough innovations, but also ensures the proper quality of perspective-oriented university education. In this context, it is indicative that in the United States, the state remains financial support for basic research, while focusing business on applied research and technological development. In the EU, the European Research Council has been established for carrying out priority funding of basic sciences. The share of state funding of basic research in South Korea, Malaysia, South America, and Russia is constantly growing. In countries with insufficient funding, the basic sciences can expect the decline of many scientific schools, intellectual outflow to other, more profitable fields of activity and abroad. In general, destructives of a systemic nature in the direction of intellectual degradation of society and technological regress also become possible.

³² Yvanov, N.P. "Sotsyalnyi kontekst ynnovatsyonnoho razvytyia". *Myrovaia ekonomyka y mezhdunarodnye otnosheniya* 5 (2013):17—30. [In Russian].

³³ Yvanov, N.P. "Sotsyalnyi kontekst ynnovatsyonnoho razvytyia". *Myrovaia ekonomyka y mezhdunarodnye otnosheniya* 5 (2013):17—30. [In Russian].

In the field of science and education, dilemmas, universal for all countries, that acquire global features remain relevant: between basic and applied research; between research individualism and scientific collectivism; between science in the interests of social progress and science to increase business profitability; between the increasingly globalized science and education and the predominantly national nature of their funding and organization; between unprecedented global academic mobility and national protectionism in this area (Table 3).

Table 3 **MODERN DILEMMAS IN THE DEVELOPMENT OF SCIENCE AND EDUCATION**

Criteria	Dilemmas	
Motivation and target orientation	Generating new knowledge	Production of knowledge for the market
Spatial organization	Local (regional, national) research organization	Participation in international networks
Priority of the innovation cycle stages	Fundamental research	Applied research
Subjectivity of intellectualization	Research individualism	Scientific collectivism
Status	Academic image	Formalization and commercialization
Incentives	Predominantly moral	Predominantly tangible
Value and useful result	Science for the sake of social progress	Science as a factor for highly profitable business

To solve these dilemmas and more local problems of the development of science and education, interdisciplinary fundamental and applied research is needed.

In our opinion, the fact that today, the model of “open innovation”, which proved its effectiveness in the 2000ies, due to affordable and high-quality online communication, is complemented by new important components, namely, “open science” and “open” education is fundamentally important (Fig. 5).

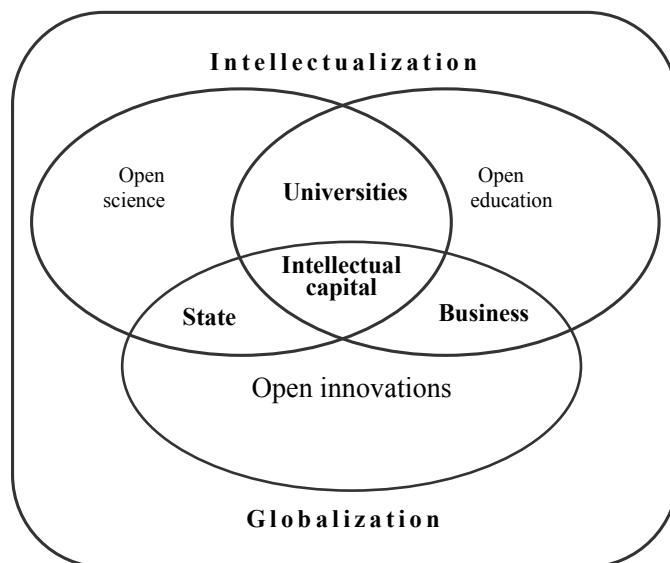


Fig. 5. Model of Global Economic Development Intellectualization

Thus, a qualitatively new model of global intellectualization is being formed, both in nature and in structural organization, allowing to generate synergetic effects, contributing to economic and social progress.

Conclusion

The competitive success of countries in the global market, their technological and social progress is determined by the ability to develop personal, corporate and national intellectual capital. The basis of a market economy is intellectual property, which is used in almost all activities of business entities and is an inexhaustible resource of development, unlike natural and material resources. The interaction of intellectual, human and social capitals on a modern information and communication basis dynamizes the development of new, most efficient sectors of the global economy, creates prerequisites for the formation of network capital.

Ukraine has a high intellectual potential in international rankings, nevertheless, the innovative ability of its economy is insufficient in a situation where price-based resource competition dominates and non-technological competitive advantages are mainly used. Intellectual property remains the most undervalued asset. Internal and external political and economic reasons restrain the innovative dynamics of the national economy and limit the possibilities for the effective realization

of the intellectual potential. It is advisable to focus on the zero option importance of combining the intellectual and creative potential of society and world scientific and technological achievements for the effective implementation of the conceptual foundations of the knowledge economy as a defining factor for progress in the context of globalization in the strategy of national economic development. State legal, financial, fiscal, informational, organizational support for science, education and innovation, as well as institutional measures for the formation of a globally integrated innovation system of Ukraine, are mandatory.

In the intellectual paradigm of global development, world-class universities play a defining role in generating knowledge, innovation and information, fulfilling a global social and intellectual mission. In the context of global competition in the scientific and educational sphere, a targeted increase in funding for basic and applied science from diversified sources is provided by business universities in the process of organic interaction with enterprises based on strategic partnership.

Concentration of intellectual capital in universities with the support of government and business based on the symbiosis of open science, education and innovation can accelerate technological, economic and social progress. The ambiguity and contradictory prospects of globalization require new interdisciplinary ideas and research in the system of intellectual landmarks, values and imperatives. Global digitization of the economy, business and society is not only an urgent, but also a very complex scientific issue requiring such research.

References

1. "Human Capital Report 2016". <http://reports.weforum.org/human-capital-report-2016/>
2. "KEI and KI Indexes (KAM 2012)". http://info.worldbank.org/etools/kam2/KAM_page5.asp
3. "Reporting intellectual capital to augment Research, Development and Innovation in SMEs". *Report to the Commission of the High Level Expert Group on RICARDIS. Luxembourg: Office for Official Publications of the European Communities*, 2006.
4. "Supporting Investment in Knowledge Capital, Growth and Innovation: OECD 2013". www.oecdilibrary.org/industry-and-services/supporting-investment-in-knowledge-capital-growth-and-innovation_9789264193307-en
5. "The Global Innovation Index 2016. The Human Factor in Innovation". http://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2016.pdf
6. "The Human Capital Report 2013". <http://reports.weforum.org/human-capital-index-2013>

7. “The International Property Rights Index 2016” <http://internationalpropertyrightsindex.org/ipri2016>
8. “The Rule of Law Index 2016” <http://worldjusticeproject.org/rule-of-law-index>
9. Alekseenkova, E.S. “Kohnytyvnye mekhanyzmy yntehratsyy sotsialnykh setei”. *Polytycheskye yssledovaniya* 3 (2007): 92-114. [In Russian].
10. Bazylevych, V.D. and V.V. Ilin. *Intelektualna vlasnist: kreatyvny metafizychnoho poshuku: [monohrafiia]*. K.: Znannia, 2008. [In Ukrainian].
11. Bilenkyi, O.Yu., Stoliarchuk, Ya.M., Halenko, O.M. and V.M. Stoliarchuk. *Hlobalnyi rynek intelektualnoi vlasnosti: masshtaby, struktura, instytuty: [monohrafiia]*. K.: KNEU. – Feniks, 2016. [In Ukrainian].
12. Breus, S.V. “Analiz stanu i perspektyvy eksportu vysokotekhnolohichnoi produktsii promyslovosti Ukrainy”. *Stratehichni priorityty* 1 (2010): 16-22. [In Ukrainian].
13. Carol, Yeh-Yun Lin. *Leif Edvinsson National Intellectual Capital: A Comparison of 40 Countries*. Springer Science & Business Media, 2010.
14. Edvinsson, Leif and Michael S. Malone. *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*. Harpercollins, 1997.
15. Etzkowitz, H. “The Triple Helix”. *University-IndustryGovernment. Innovation in Action*. N.Y., 2008.
16. Fukuiama, F. *Velykyi razryv. Per. s anhl. pod obshch. red. A. V. Aleksandrovoi*. M.: OOO «Yzdatelstvo AST», 2003. [In Russian].
17. Halchynskyi, A. *Ekonomichna metodolohiia. Lohika onovlennia: [kurs lektsii]*. ADEF-Ukraina, 2010. [In Ukrainian].
18. Halychyn, V.A. *Mezhdunarodnyi rynek obrazovatelnykh usluh: osnovnye kharakterystyky y tendentsyy rozvytyia*. M.: Yzdat. dom «Delo» RANKhyHS, 2015. [In Russian].
19. Helbreit, Dzh. K. *Novoe yndustrialnoe obshchestvo. The New Industrial State (1967)*. – AST, 2004. – 608 s.)
20. Hrishnova, O.A. “Liudskyi, intelektualnyi i sotsialnyi kapital Ukrainy: sutnist, vzaiemozv’iazok, otsinka, napriamy rozvytku”. *Sotsialno-trudovi vidnosyny: teoriia ta praktyka: Zb. nauk. Prats* 1, no.7 (2014): 34-42. [In Ukrainian].
21. Hrishnova, O.A. *Liudskyi rozvytok: [navch.posib.]*. K.: KNEU, 2006. [In Ukrainian].
22. Hrynberh, R. “Hosudarstvo v ekonomyke znanyi”. *Voprosy ekonomyky* 10 (2008): 31. [In Russian].
23. Ilnytskyi, D. “Universytety v hlobalnii ekonomitsi znan”. *Mizhnarodna ekonomichna polityka* 1, no.22, (2015): 123-154. [In Russian].
24. Ilnytskyi, D.O. *Hlobalna konkurentsiiia v naukovy-osvitnomu prostori: [monohrafiia]*. K.: KNEU, 2016. [In Ukrainian].

25. *Interviews with CEOs*. Boston: Harvard Business School Publishing, 2000: 111–116.
26. Khodakivskyi, Ye.I., Yakobchuk, V.P., and I. L. Lytvynchuk. *Intelektualna vlasnist: ekonomiko-pravovi aspekty [tekst]: navch. Posib*. K.: Tsentr uchbovoi literatury, 2014. [In Ukrainian].
27. Kuznetsov, V.Y. and E. V. “Kniazeva. Metody otsenky yntellektualnoho kapytala”. *Voprosy ekonomicheskikh nauk* 1. (2016): 18-21. [In Russian].
28. Lansu, A., Boon, J. and Sloep P.B. Rietje van Dam-Mieras. “Changing professional demands in sustainable regional development: a curriculum design process to meet transboundary competence”. *Journal of Cleaner Production* 49 (2013): 123-133.
29. Marr, B. and J. Chatzke. “Intellectual capital at the crossroads: managing, measuring and reporting of IC”. *Journal of Intellectual Capital* 5, No. 2. (2004): 224-229.
30. Mazaraki, A.A. ed., Melnyk, T.M., Yukhymenko, V.V., Kostyuchenko, V.M. and L.P. Kudyrko [ta in.]. *Innovatsiyni potentsial Ukrainy: [monohrafiia]*. K.: NTEU, 2012. [In Ukrainian].
31. Petty, R. and J. Guthrie. “Intellectual capital literature review: Measurement, reporting and management”. *Journal of Intellectual Capital* 1 no. 2. (2000): 155-176.
32. Schramm, C.J., Crow M., Merten A.G. et.al. The Future of the Research University. Meeting the Global Challenges of the 21st Century, June 1, 2008. <http://ssrn.com/abstract=1352645>.
33. Sidenko, S. *Neekonomichni chynnyky svitovoho ekonomichnoho rozvytku: [monohrafiia]*. K.: Instytut svitovoi ekonomiky NAN Ukrainy, vydvo «Avrora-Print», 2011. [In Ukrainian].
34. Stiuart, T.A. *Yntellektualnyi kapytal. Novyi ystochnyk bohatstva orhanyzatsyi* [Per. s anhl.]. M.: Pokolenye, 2007. [In Russian].
35. Vest, C.M. *The American Research University from World War II to World Wide Web: Governments, the Private Sector, and the Emerging MetaUniversity*. Berkeley: University of California Press, 2007.
36. Yasyn, E. “Modernyzatsiia y obshchestvo”. *Voprosy ekonomiky* 7 (2007): 16-30. [In Russian].
37. Yvanov, N.P. “Sotsyalnyi kontekst ynnovatsionnoho rozvytyia”. *Myrovaia ekonomika y mezhdunarodnye otnosheniia* 5 (2013):17–30. [In Russian].

The article was received by the editorial board on 27.03.2018