ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ

Х А Б А Р Ш Ы С Ы

ВЕСТНИК

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

THE BULLETIN

THE NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN

PUBLISHED SINCE 1944

1

JANUARY – FEBRUARY 2020

ALMATY, NAS RK

NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources CitationIndex, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

«Қазақстан Республикасы Ұлттық ғылым академиясының Хабаршысы».
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)
Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы»РҚБ (Алматы қ.).
Қазақстан республикасының Мәдениет пен ақпарат министрлігінің Ақпарат және мұрағат комитетінде 01.06.2006 ж. берілген **№5551-Ж** мерзімдік басылым тіркеуіне қойылу туралы куәлік.

Мерзімділігі: жылына 6 рет.
Тиражы: 2000 дана.

Редакцияның мекенжайы: 050010, Алматы қ., Шевченко көш., 28, 219 бөл., 220, тел.: 272-13-19, 272-13-18,
http://www.bulletin-science.kz/index.php/en/

Типографияның мекенжайы: «NurNaz GRACE», Алматы қ., Рысқұлов көш., 103.

«Вестник Национальной академии наук Республики Казахстан».
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)
Собственник: РОО «Национальная академия наук Республики Казахстан» (г. Алматы).
Свидетельство о постановке на учет периодического печатного издания в Комитете информации и архивов Министерства культуры и информации Республики Казахстан **№5551-Ж**, выданное 01.06.2006 г.

Периодичность: 6 раз в год.
Тираж: 2000 экземпляров.

Адрес редакции: 050010, г. Алматы, ул. Шевченко, 28, ком. 219, 220, тел. 272-13-19, 272-13-18.
www: nauka-nanrk.kz, bulletin-science.kz

Адрес типографии: «NurNazGRACE», г. Алматы, ул. Рыскулова, 103.

Bulletin of the National Academy of Sciences of the Republic of Kazakhstan.
ISSN 2518-1467 (Online),
ISSN 1991-3494 (Print)
Owner: RPA "National Academy of Sciences of the Republic of Kazakhstan" (Almaty).
The certificate of registration of a periodic printed publication in the Committee of Information and Archives of the Ministry of Culture and Information of the Republic of Kazakhstan N 5551-Ж, issued 01.06.2006.

Periodicity: 6 times a year.
Circulation: 2000 copies.

Editorial address: 28, Shevchenko str., of. 219, 220, Almaty, 050010, tel. 272-13-19, 272-13-18,
http://nauka-nanrk.kz /, http://bulletin-science.kz

Address of printing house: «NurNaz GRACE», 103, Ryskulov str, Almaty.

BULLETIN OF NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
ISSN 1991-3494
Volume 1, Number 383 (2020), 182 – 191 **https://doi.org/10.32014/2020.2518-1467.23**

UDC F20, F23.

I. Kalenyuk[1], O. Grishnova[2], L. Tsymbal[1], A. Djakona[3], E. Panchenko[1]

[1]Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine,
[2]Taras Shevchenko National University of Kyiv, Kyiv, Ukraine,
[3]ISMA University, Riga, Republic of Latvia.
E-mail: viktoryagmirya@ukr.net

FORMATION OF INTELLECTUAL CORPORATE CAPITAL: METHODS AND MODERN TRENDS

Abstract. The accumulated assets of intellectual capital serve as the basis for the formation of competitive advantages of TNCs in the global economy. The world leading corporations are diversifying methods of forming and attracting intellectual capital in terms of increased competition. The aim of the study is to identify modern features and methods of intellectual capital accumulation as the basis of competitive advantages of TNCs in the global environment. The findings imply that the basis of leadership and high competitiveness of TNCs are the accumulated assets of intellectual capital. The result of the study was the systematization and disclosure of the methods of accumulation of intellectual corporate capital. The current trends in the accumulation of intellectual capital assets by leading TNCs of the world are revealed. The accumulation of corporate intellectual capital of corporations is carried out on the basis of large-scale investment in assets: the development of corporate forms of personnel training, a tremendous increase in R&D expenses, the formation of distributed innovation networks and open innovation platforms, the introduction of the latest knowledge management mechanisms. The forms of attracting intellectual capital from outside are actively used: the search and attraction of talented and highly qualified human resources from other countries, the purchase of patents, technologies, management models, mergers and acquisitions of companies, etc. Transnational corporations are becoming the leading subjects of spending on science in the world: in the top ten countries they account for more than half of all R&D costs, and in the leading countries of the USA and China - up to 80%. The accumulation of corporate intellectual capital is characterized by tendencies in the formation of two powerful world leaders - the USA and China, increased competition, a sharp increase in R&D costs, regional and industry transformations. The world leaders in science spending are the corporate sector in the United States and China. The sectoral structure of the world's leading transnational corporations is changing: instead of oil and automobile, the top ten transnational corporations now mainly include computer and high-tech companies. Aggressive strategies for increasing intellectual assets are being implemented. An effective tool for accumulating intellectual assets is mergers and acquisitions. The leaders in the number of mergers and acquisitions are TNCs from leading countries: USA, China, United Kingdom, Germany and Japan. The formation of corporate intellectual capital is an important step in building an effective synergistic interaction of all the constituent triangles “business-education-science”. This triad is a key tool for the strategic development of the knowledge economy for any country in the world.

Key words: human capital, corporate universities, structural capital, organizational capital, R&D, M&A, outsourcing

Introduction. While the post-industrial paradigm of social development is under formation, knowledge emerges as the key resource, generation, spreading, and use of which is provided by various actors (such as state, educational institutions and scientific institutions, enterprises, personalities), among which the transnational corporations play a special role. The leading transnational corporations are the flagships of the global processes of intellectual capital build-up due to accumulating huge human capital resources such as highly skilled and motivated professionals, investing heavily in research and development, and ensuring the integration of scientific developments and practical solutions. TNC concentrate technological priorities, while development and implementation of the latest products, technologies, and business models is being developed, and integrated knowledge management systems are formed. The intellectual capital embodied in the knowledge, experience, and results of the creative work of highly skilled personnel becomes

a key asset in the formation of competitive advantages and high competitiveness of TNCs in the global economic environment.

The rapid digitization and networking of the global economy transforms its configuration, factors, and instruments of functioning. Under these processes, the leading corporations have changed the composition (instead of petroleum and automotive top ten leading TNCs of the world there are mainly computer and high-tech companies), global value chains are formed, in which all processes of intellectual capital accumulation are accelerated, global instruments of search, engagement, and use of the human capital are activated.

Theoretical basis. The category "intellectual capital" does not have a clear definition in the scientific literature. The growth of its significance for the development of society and its individual subjects led to an increase in attention to this problem among scholars. The first began to explore the intellectual capital of the company and identified L. Edvinsson, M. Melon, A. Broking, T. Stewart, who had a unique experience in managing intellectual capital. L. Edvinsson considered the notion of intellectual capital identical with the concept of intangible assets and considered it as a necessary condition for the company's competitiveness (Edvinsson, 1999). Significantly different from the presented interpretation of intellectual capital thought A. Brooking, formed from the standpoint of practice, which actively uses in its activities the results of intellectual work. According to A.Brooking, intellectual capital is a term for identifying intangible assets without which the company can't exist and enhance competitive advantages (Brooking, 2009). In general, the approach to the definition of intellectual capital in terms of auditing, the need for accounting for intangible assets that are becoming more diverse (patents, know-how, brands, etc.) – R.Petty, J.Guthrie (Petty, 2000), G.Hamel, C.Prahalad (Prahalad, 2000), etc.

There is no unanimity in determining the structure of intellectual capital. Thus, according to L. Edvinsson, intellectual capital is the totality of human capital, structural capital and customer capital (Edvinsson, 1999), each of which can be borrowed or own. Brooking divides intellectual capital into four types of assets: market assets; 2) intellectual property assets; 3) human capital and 4) infrastructure assets. Stewart allocates human, structural capital and consumer capital. Famous Ukrainian scientist A. Chukhno also allocates human capital, structural capital and consumer capital. In accordance with the approach of D.L Volkov, T.A. Garanina (Volkov, 2006), the structure of the components of the intellectual capital of enterprises can be represented: human capital, organizational (structural) capital and capital relations.

The uncertainty of the structure of intellectual capital, the emergence of new important assets determines the relevance of the problem of assessing the assets of intellectual capital. This issue is also unclear. The systematization of many approaches to the assessment of intellectual capital has made it possible to distinguish the following main types: Intellectual Asset Valuation, Market Capitalization Methods, Return on Asset Methods - ROA, Value Added (EVA, VAIC, Calculated Intangible Value, etc.), Value Added Intellectual Coefficient (VAIC), Scorecard Methods - SC, Balanced Scorecard (BSC), Skandia Navigator Balanced ScoreCard, Value Chain Score Board, Business IQ), Intangible Asset Monitoring (IAM), Intellectual Capital Rating (IC Rating), Sei-Cho ™ and MAGIC, etc.). A. Pulik proposed method of evaluation based on the intellectual value added factor (VAIC ™) (Pulik, 2000) and used to evaluate to 30 companies from FTSE list. It allows assessing the contribution to the value of tangible and intangible assets. Further developed and supplemented this method by G. Laing, J. Dunn, S. Hughes-Lucas (Laing G., 2010), M. Chen (Chen, 2005). In the works of N. Salamundin, R. Bakar, M. Ibragim and F. Hassan we find the possibilities of evaluating the intangible assets of business structures and their activities in specific and regional capital markets (Salamudin, 2010).

Intellectual capital becomes a strategic asset, a decisive production factor in the condition of a knowledge economy. The theoretical aspects of the study of the essence of intellectual capital and its influence on the formation of the value of the company in the conditions of industrial revolution, we find in Edvinsson's work (Edvinsson, 1999). L.Antoniuk, I. Gernego and others research the possibilities of enterprise development on the basis of formation and use of intellectual capital, taking into account the general conditions of total intellectualization of production processes (Antoniuk et al., 2017).

Intellectual capital is considered as core source of companies' competitive advantages in modern economic environment. As M.Porter intellectual capital is important factor in the strategy of competitive forces (Porter, 1980). The authors of this study in previous papers examined the methodological approaches to assessing the use of intellectual capital of multi-level subjects are investigated in the works I.Kalenyuk, L.Tsymbal, E.Panchenko and A.Djakon (Kalenyuk et al., 2018). G.Hamel and C.Prahalad define the

methods and forms of forming the intellectual capital of corporations and the possibilities of its accumulation and use for ensuring competitiveness. They suggest that company' performance is droved by ability to identify and develop core competencies and capabilities (Prahalad, 2000). That's why the concept of learning organisation is widespread. It justifies the necessity for every company to study continuously (Senge, 1990).

Preservation and development of intellectual potential and formation of the human capital of a society are the main direction of development of any civilized country. It is seen as an important factor in socioeconomic development, solving global problems associated with the progressive development of a particular society. Due to this, in many countries the problem of intellectual potential growth is assigned to priority areas in the policy of states [32].

The well-known Swedish researcher K.Sveiby is considered to be the founder of Knowledge Management. He proved that the key element of business growth is not the production function, but the knowledge and creativity of the employees. His proposals for measuring capital knowledge (which includes customer capital, individual capital and structural capital) are fundamental to all knowledge-based companies (Sveiby, 1997). Together with changing the role of TNCs in the economic environment, the internal structure of corporations, which must adapt to market challenges, is also changing. Corporations are increasingly focusing on investing in human capital and defining it as a source of growth. The role of intellectual capital in creating value added was investigated by the P.Sullivan (Sullivan, 2000).

Despite the growing quantity of studies in this subject, there is no unambiguous interpretation of the intellectual capital, its essence and structure, so we need to analyse the newest processes of its accumulation and transformation into the competitive advantages of TNCs within the frame of countries Ukraine are in the context of seeking an innovative way for economic development, where the large business plays a key role in close interaction with science, education, and the state institutions.

The aim of the article is to identify modern features and methods of intellectual capital accumulation as the basis for the formation of TNCs' competitive advantages in the global environment.

The content of this study, scientific conclusions and recommendations are based on the broad application of the systematic approach to the study of phenomena. The proposed work demonstrates a thorough study of the scientific works of domestic and foreign scholars on the conditions for the formation of corporate intellectual capital. To achieve the research goal, the following methods have been used: review of scientific literature, quantitative empirical research, performed to identify current trends of a specific scientific problem. Methods of descriptive statistical analysis and visualization were used to obtain the results of the study. The article uses the methodology of comparative analysis and evaluation of the dynamics of the main indicators of innovation activity of the leading transnational corporations of the world.

Results. The intellectual corporate capital (including transnational corporations) has the following structure: 1) the human capital (the people with such cumulative features as experience, skills, trades, scientific achievements); 2) the structural capital (the intangible resources such as intellectual property and client's capital); 3) the organizational capital (the management capital such as a company's management system, communication capital, corporate culture, intellectual products (services) that are obtained as the result of using intellectual capital management).

Formation of intellectual corporate capital may occur as follows below: first, by the internal way, when the corporate capital is formed by formation and use of own capital; second, by the external way, when the intellectual capital from external sources is involved; and third, using both mixed forms. The capital is formed by own efforts through the system of corporate universities, research centres, and science institutes. The capital is involved from external sources due to involvement, leasing, outsourcing of highly qualified personnel, purchase and lease of various intellectual property objects (such as patents, licenses, know-how, technologies, etc.). The modern practice is described by new forms of the intellectual corporate capital generation emerging through interaction: such as formation of research networks, open innovation platforms, etc.

Each intellectual capital component plays an important and specific role in the formation of the company's total intellectual capital: the human resources such as intellectual stuff, the structural assets as the result of intellectual activity, the organizational assets as a set of relationships to ensure synergy of all components. It is the organizational capital that represents the totality of relations in the intellectual resources management: all successive processes of generation, accumulation, and use of all types of intellectual

property. The key goal is to increase the knowledge share at all stages of value added creating, which is the most important prerequisite for transnational companies to ensure their economic power, to form competitive advantages, and to achieve the high competitiveness.

The TNCs' human capital formation occurs both through the accumulation of own capital and its involvement from the outer sources. The own human capital is formed in corporate universities and training centres within their training and retraining system. The TNCs' powerful training centres (or corporate universities) are becoming increasingly large in scale, and thus become an alternative form of training for highly skilled personnel. The growth of corporate spending on staff training is a constant feature of modern business.

The development of such processes as digitalization, networking, and globalization brings new changes and trends into the corporate training systems. While the global audience of corporate training systems expands, the physical form, the general mission, and the education technology change. The functions of corporate universities are not limited to education, but they rather become true aggregators of development and play a key role in the overall chain of value increment, knowledge, and intellectual capital.

Large companies use a wide range of forms of involving human capital: search of human resources from abroad (international migration, both labour and educational), hiring of employees, outsourcing, leasing, etc. The methods and techniques for finding talented and promising professionals relate not only to trained employees, but also to talented youth by holding academic competitions or contests (CFAs), through diverse cooperation with students and graduates, expanding certification programs (CIMA), and by involving foreign youth to study.

In modern conditions the volumes of outsourcing dynamically increase. Thus, just in 2013, more than 2 million working places were involved in outsourcing in the global economy. The outsourcing companies cover 43% of IT services market, 12% of call-centre services, 38% of research, 15% of personnel consulting, and 8% of staff training (Salamudin, 2010). Outsourcing costs depend on a company's size. Thus, the large companies use outsourcing services at most spending more than 7% of their budget, while the average companies spend 4.6%, and small companies spend 6.1%. There is a separate Knowledge process outsourcing segment, which focuses on information and knowledge, and is an integral part of the value added chain (IT-outsoursing).

In the modern world, the speed of doing business is a key element of success. Therefore, the active use of outsourcing, even in the company's daily business, leads to acceleration of all transactions, growth of the global economy, and deepening globalization of the entrepreneurial activity.

The transnational corporations are powerful players in R & D funding, accounting for almost half of global R & D spending goes from TNCs and 2/3 goes from private funding (Occasional note, 2018). The fulfilment of R & D on government orders, especially in the defence sector, is a common practice: (2011: Lockheed Martin Corp. (USA) got a contract worth $ 789.8 million with the U.S. government in order to create a defence system for the Missile Defence Agency; 2012-2016 - Lockheed Martin Corp. and Space System (US) got $ 238 million contract with the U.S. Department of Defence for space vehicle production (18)); innovative products development (2007, Rosnano, Sovcomflot, United Aircraft Corporation (Russia), a contract worth $ 8.2 billion for nanotechnology projects).

The analysis results confirmed the spin-off increase in the cost of transnational companies in the world for R & D, whose leadership is becoming a dominant component of international competitiveness. In the global scope, according to absolute figures, the largest spending on R & D is provided by the U.S. corporate sector, followed by China. By relative indicators (the share of business in the total spending structure on R & D), the highest level (78.2%) is in South Korea, the second place is for Japan (77.8%). The TNCs' main R & D centers are in the EU, in the USA. and in some Asian countries (see figure 1).

Along with the United States, China becomes the centrepiece of business science, which accounts for 77.3% of all country's R & D expenditures, while total expenses of the U.S. and China companies are up to $ 627.18 billion that is by 40% more than the costs spent by the companies from other 8 countries of the TOP-10 countries in terms of the R & D expenditures. Overall, in all the TOP 10 countries, the level of corporate costs on R & D is more than 50% of the country's total R & D expenditures that is indicating on close ties in the business science system and high levels of business involvement into the global chains of accumulation of intellectual capital. The global R & D expenditures are gradually increasing from 1.08% of global GDP in 2001 to 1.15% of global GDP in 2011 (UNESCO, 2016).

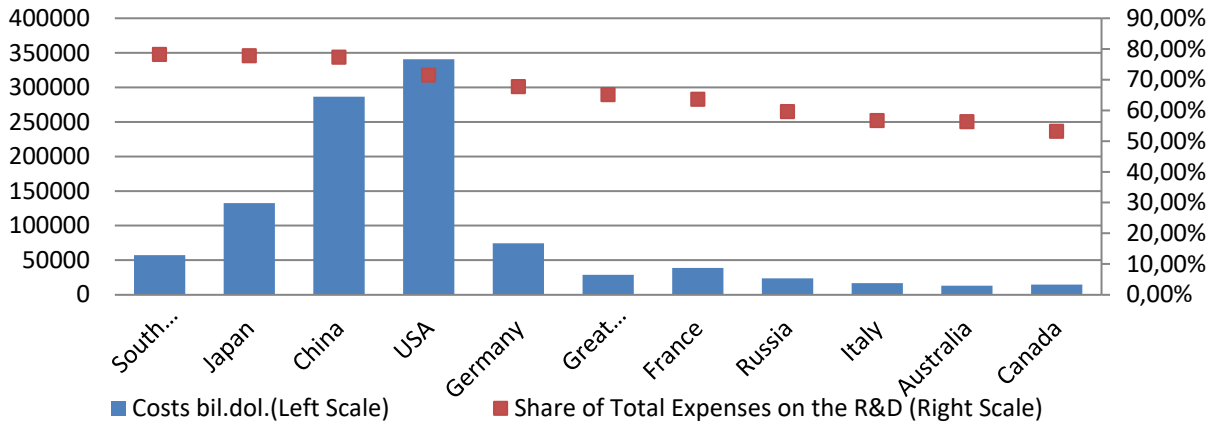

Figure 1 – Expenses of the business sector in the DIR in the leading countries, billion dollars. and% (2016).
Source: built according to UNESCO

Among the leading companies with a high level of R & D costs, there are dominant the U.S. parent companies. Therefore, of the 25 companies, 15 are from U.S., 7 are from the European Union. and 3 are from Asia. By sectoral distribution, TOP-25 includes 8 companies in the pharmaceutical sector, 6 automotive companies, and 5 work in the software sector. Overall, top 10 companies have invested in research and development of more than $ 120 billion (Intellectual Capital Index, 2016).

The dominant positions in the global technology market are kept by TNCs from the USA, among other leading countries are such as the EU, China, Japan, India, and others. To date, the TNCs account for 40% of the world's cost of developing the latest technologies; 38% of the patents for new technologies are received in industrialized countries; 37% of scientists; 35% of global scientific works. Now, in the U.S., there work 70% of Nobel laureates scientists; 66% of scientific papers authors of the, which are most actively cited worldwide; 75% of the universities are among the top 20 universities in the world. The largest quantity of leading companies by amount of their own patents is also located in the United States. Among the main holders of patents there are the companies with a high level of R & D costs and internationalization of activities, since the registration of patents is an eloquent result of the R & D work for a company itself, as well as cooperation with other enterprises.

The analysis made it possible to conclude that the companies that make the largest investments in R & D are described by high indicators of patent activity, profit, growth of capitalization, brand prospects, etc. (table 1).

Table 1 – Indicators of performance of TOP-10 companies in terms of expenses for R&D

№	Company	Expenses for R&D, billions of dollars	Costs, billion dollars	Intensity R&D, %	Patent activity	Capitalization growth rates	Index FutureBrand	
							PwS	change by 2016
1	Amazon.com. Inc.	16,1	136,0	11,8	1,960	+56%	4	21(-13)
2	Alphabet Inc.	13,9	90,3	15,5	3,065	-	2	31(-10)
3	Intel Corporation	12,7	59,4	21,5	3,726	+3,9%	21	16(-4)
4	Samsung Electronics Co., Ltd.	12,7	167,7	7,6	5,810	+8%	14	9(-6)
5	Volkswagen Aktiengesellschaft	12,1	229,4	5,3	-	+6%	93	54(-21)
6	Microsoft Corporation	12,0	85,3	14,1	2,601	+16%	3	12(-10)
7	Roche Holding AG	11,4	51,8	21,9	-	+55,3%	35	77(-17)
8	Merk&Co., Inc	10,1	39,8	25,4		-	55	69(+8)
9	Apple Inc.	10,0	215,6	4,7	2,225	+16%	1	4(-3)
10	Novartis AG	9,6	49,4	19,4		+8,1%	27	61(+10)

Source: built by the author on the basis of: Intellectual Capital Index, The Future Brand index

An effective method for involving intellectual capital from external sources is mergers and acquisitions (M & A), which allows the company to immediately engage in intellectual capital without funding for R & D. It allows customers to meet their immediate needs, to invest in high-tech companies that offer new solutions to existing problems (improved products, improved customer experience, new infrastructure solutions, etc.). Mainly. the companies from the leading countries (USA, China, EU, Japan) are leaders in the field of mergers and acquisitions (M&A). Overall, 22% of all deals are made in the U.S., 15% belongs to China, 7% - in Great Britain, 6% - in Germany, and 4% in Japan. Together, these countries hold 54% of the quantity of global deals. In total, the developed countries account for the most expensive transaction costs (Global M&A, 2018).

TNCs are practicing the purchase of small companies that develop and implement innovative products. Thus, all of the R&D costs lie on the small companies, and TNCs only benefit from the active implementtation of redeemed technologies. In developing and delivering innovations on the market, significant investments that small companies often do not own are required. Thus, in 2010, Intel Corporation used the development of Nvidia chips, the controlling stake of which was redeemed on the eve (Twelve, 2010). Another way to implement an innovation is to create strategic alliances that are designed to aggregate all the knowledge gained in several companies for a specific type of product (i.e. Hitachi (Japan) and Texas Instruments (USA) for the development of RAM, Toshiba (Japan) - IBM (USA), Fujitsu (Japan) - AMD (USA), Sharp (Japan) - Intel (USA) to develop processors).

Total value of the intellectual capital, according to Dow Jones Industrial Average (DJIA), is now more than $ 4.4 trillion that is an increase of more than $ 300 billion as compared with 2015. The top five companies include the most value-rich companies with powerful intellectual capital, such as Pfizer, Boeing, Apple, Visa, and Johnson & Johnson (table 2).

Table 2 – Index of Intellectual Capital DJIA, 2016 (Intellectual Capital Index, The Future Brand index)

The company name	Rank		The cost of an enterprise Billion dollar	Intellectual capital Billion dollar	Intellectual capital index	
	2016	2015			2016	2015
Pfizer	1	2	221,390	245,411	1.11	1.04
Boeing	2	1	95,978	103,042	1.07	1.04
Apple	3	3	489,153	509,067	1.04	1.04
Visa	4	6	210,562	209,687	1.00	0.98
Johnson&Johnson	5	7	296,977	291,021	0.98	0.98
UnitedHealth	6	5	174,021	170,306	0.98	0.98
Procter&Gamble	7	8	243,234	236,878	0.97	0.97
United Tecnologies	8	4	105,427	102,257	0.97	1.01
Microsoft	9	9	373,891	349,143	0.93	0.93
3M	10	11	115,272	107,571	0.93	0.91
DuPont	11	10	65,987	66,066	0.93	0.93
Merck	12	13	172,276	156,934	0.91	0.89
Nike	13	12	89,478	81,034	0.91	0.91
IBM	14	15	205,303	179,522	0.87	0.86
Home Depot	15	14	189,143	164,171	0.87	0.86

The value of intellectual capital in individual companies is significantly higher than the cost of the companies themselves, in particular, for such leading companies as Pfizer, Boeing, and Apple. Overall, given the company's aggregate value, these amounts are quite significant. Having analysed the indicators in Table 2, we can note that the value of transnational companies' intellectual capital of included in this rating is not less than 50% of the company's value itself, which confirms the prominent role of intellectual capital itself in the formation of competitiveness factors (figure 2).

The highest rates in the company of Visa and its indicators are more than 3 times higher than those of follow-up companies. In general, analyzing indicators, it should be noted that the performance of selected

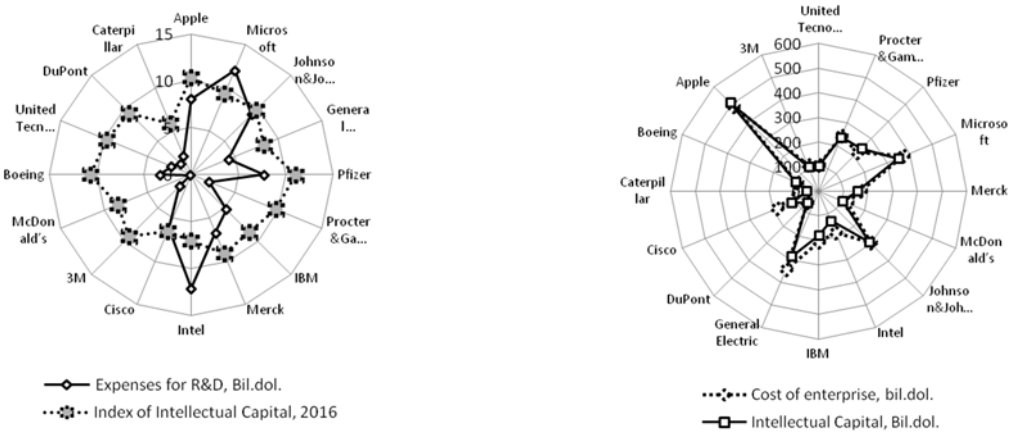

Figure 2 – Top 10 companies at the cost of intellectual capital. *Source: Calculated based on company data*

companies is rather high, despite the lag behind the leader of the company. Intellectual capital of the company includes actually the intangible assets of the company that exceed its financial value and in the amount include both the intellectual potential and the intellectual results of intellectual activity.

According to analysts, in 2016, the total value of the intellectual capital of these companies amounted to 4.4 trillion. dollars, while the division into spheres of activity is quite significant and the largest share falls on technology (figure 3).

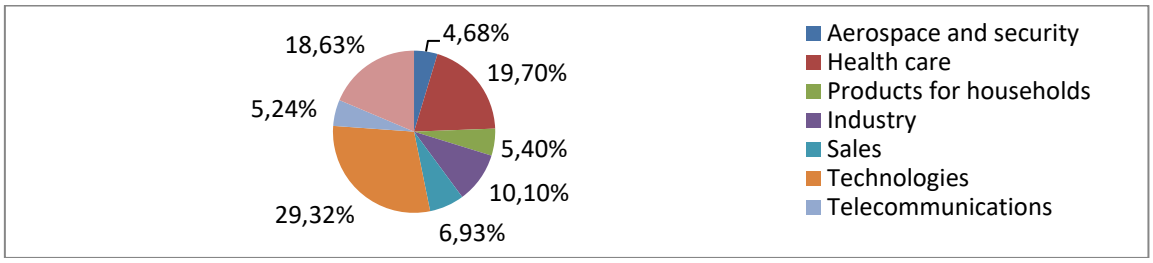

Figure 3 – Share with 4.4 trillion. dollars intellectual capital by type of activity (Intellectual Capital Index)

Involvement of foreign companies and stimulation of their innovation activity is an effective instrument for increasing the economic potential of the country in the world. This is confirmed by the experience of Ireland, Singapore, Finland, Israel, and other countries. The most evident are Israel's successful efforts to create a supportive environment for innovation: a reduced tax scheme for the companies that open their own R&D centres in Israel or invest in Israeli centres abroad; promotion of high-skilled personnel migration; the development of technologies and infrastructure, the involvement of business in the ICT development due to co-financing by the state of important projects (up to 50% of programs' costs in nanotechnology and biotechnology; for depressed or underdeveloped regions this figure rose by 10%, and for companies working in the research with companies from other countries it rose up to 50%, and it rose up to 75% for small and medium enterprises that participated in the 7th Framework Program of the EU).

Formation of corporate intellectual capital in Ukraine requires specific instruments. First of all, it concerns not only high-tech activities, but also an increase in the technification level of low-tech sectors of economy, which is generally a global trend. In order to intensify economic activity in Ukraine, it is necessary to concentrate efforts on the formation of innovation infrastructure and the involvement of precisely those stages of production, in which value added is formed significant amount. It is necessary to encourage foreign companies to open their own research centres in Ukraine through a system of tax, credit, and institutional instruments. The State's support for innovation is necessary at the very initial stages of creating business incubators or innovative hubs; the State's partial participation in the financing or a partial reimbursing of the costs (in some countries it amounts to up to 85%). The State's support is needed both for involving foreign multinational companies and for the development of Ukrainian business activity. Accumulation of the companies' intellectual capital and their effective realization allows to access external resources, including through such instruments as mergers, acquisitions, alliances, purchases of companies, etc. An

effective measure is to reduce tax rates for the enterprises operating in high technology sector or other priority sectors (for example, to stimulate agricultural products processing, production of goods with a higher value added).

Discussion and conclusions. The problem of intellectual capital is one of the most urgent in modern scientific research. Intellectual capital is a key tool for achieving the competitiveness of TNCs in the global environment.The TNKs realize aggressive strategies in order to increase investment in the intellectual sphere, to search and use of human capital, creation and implementation of technological innovations, providing the technical basis for the society's progress.

There are no unities in understanding the essence of intellectual capital, its relationship with human capital, the definition of the essence of organizational and structural capital. The author's approach to the definition of the essence and structure of intellectual capital allowed to construct the logic of the study of ways of its accumulation within modern TNCs.

The modern practice of accumulating intellectual capital assets within the leading TNCs dynamically changes. Along with its own research activities, the search and training of personnel, the following forms are developed: creation of joint research platforms, joint patent portfolios, formation of distributed networks for cooperation between corporations. All these problems need further study.

The TNCs' human capital formation occurs both through the accumulation of own capital (corporate universities) and its involvement from the outer sources (search of human resources from abroad (international migration, both labour and educational), hiring of employees, outsourcing).

The transnational corporations are becoming powerful actors in the R&D worldwide. As a result of fierce competition in the global environment, the new centres of formation and accumulation of intellectual capital are formed. They are described by a high level of expenditures on R & D both in absolute and relative terms.

The USA corporate sector is a global leader, while China is in the second place. Overall, for all countries included in the top ten world leaders list, the level of corporate expenditures on research is more than half the country's total expenditure on R & D.

An effective instrument for involving intellectual capital from external sources of mergers and acquisitions (M&A) is also activated. It allows to immediately involving intellectual capital without R & D funding. Moreover, the composition of the leading countries that are the main M & A subjects is similar: the USA, China, the Great Britain, Germany, and Japan, which account for more than half of all global deals.

In addition, the problem of accumulating its own intellectual corporate capital and its effective inclusion in the processes of strategic development of the national economy is extremely topical. The formation of intellectual corporate capital is important for every country in the world, because it promotes building of effective synergies between all constituent elements in the triangle "business-education - science".

И. Каленюк[1], Е. Гришнова[2], Л. Цымбал[1], А. Дьякона[3], Э. Панченко[1]

[1]Вадим Гетман атындағы Киев ұлттық экономикалық университеті, Киев, Украина;
[2]Тарас Шевченко атындағы Киев ұлттық университеті, Киев, Украина;
[3]ISMA университеті, Рига, Латвия Республикасы

ЗИЯТКЕРЛІК КОРПОРАТИВТІК КАПИТАЛЫН ҚАЛЫПТАСТЫРУ: ӘДІСТЕР МЕН ЗАМАНАУИ ҮРДІСТЕР

И. Каленюк[1], Е. Гришнова[2], Л. Цымбал[1], А. Дьякона[3], Э. Панченко[1]

[1]Киевский национальный экономический университет имени Вадима Гетмана, Киев, Украина;
[2]Киевский национальный университет имени Тараса Шевченко, Киев, Украина;
[3]Университет ISMA, Рига, Латвийская Республика

ФОРМИРОВАНИЕ ИНТЕЛЛЕКТУАЛЬНОГО КОРПОРАТИВНОГО КАПИТАЛА: МЕТОДЫ И СОВРЕМЕННЫЕ ТЕНДЕНЦИИ

Аннотация. Накопленные активы интеллектуального капитала служат основой для формирования конкурентных преимуществ ТНК в мировой экономике. Ведущие мировые корпорации диверсифицируют методы формирования и привлечения интеллектуального капитала в условиях усиления конкуренции. **Целью исследования** является выявление современных особенностей и методов накопления интеллектуального капитала

как основы конкурентных преимуществ ТНК в глобальной среде. Полученные данные свидетельствуют о том, что основой лидерства и высокой конкурентоспособности ТНК являются накопленные активы интеллектуального капитала. **Результатом** исследования стала систематизация и раскрытие методов накопления и привлечения интеллектуального корпоративного капитала. Выявлены современные тенденции аккумуляции активов интеллектуального капитала ведущими ТНК мира. Накопление собственного интеллектуального капитала корпораций осуществляется на основе масштабного инвестирования в его активы: развитие корпоративных форм обучения персонала, колоссальное возрастание расходов на НИОКР, формирование распределенных инновационных сетей и платформ открытых инноваций, внедрение новейших механизмов управления знаниями. Активно используются формы привлечения интеллектуального капитала извне. Основными источниками являются: поиск и привлечение талантливых и высококвалифицированных человеческих ресурсов из других стран; покупка перспективных патентов, новейших технологий, моделей управления; слияния и поглощения компаний, и т. п. Транснациональные корпорации становятся ведущими субъектами расходов на науку в мире. В десяти ведущих странах они составляют больше половины всех национальных расходов на НИОКР, а в странах-лидерах США и Китае – до 80%. Накопление активов корпоративного интеллектуального капитала характеризуется следующими тенденциями:

- на глобальном уровне выделяются два мощных мировых лидера – США и Китай;
- происходит колоссальное обострение конкуренции за ресурсы и лидерство между странами и субъектами мировой экономики; стремительно растут затраты на научные исследования и разработки; динамично трансформируется региональная и отраслевая структура глобального экономического пространства.

В мировой практике действенным механизмом наращивания экономического потенциала страны является привлечение иностранных компаний и стимулирования их инновационной деятельности, что подтверждается опытом Ирландии, Сингапура, Финляндии, Израиля и других стран. Успешны усилия Израиля в формировании благоприятной среды для инноваций: программа пониженного налогообложения для предприятий, открывают собственные исследовательские центры в Израиле или инвестируют в израильские центры; содействие миграции высококвалифицированного персонала; развитие технологий и инфраструктуры, привлечение бизнеса в развитие ИКТ через софинансирование государством важных проектов.

Мировыми лидерами по расходам на науку является корпоративный сектор США и Китая. Меняется отраслевая структура ведущих мировых ТНК: вместо нефтяной и автомобильной в десятку ведущих ТНК теперь в основном входят компьютерные и высокотехнологичные компании. Реализуются агрессивные стратегии наращивания интеллектуальных активов. Эффективным инструментом наращивания интеллектуальных активов являются слияния и поглощения компаний. Лидерами по количеству слияний и поглощения являются ТНК ведущих стран: США, Китай, Великобритании, Германии и Японии. Формирование корпоративного интеллектуального капитала является важным шагом в построении эффективного синергетического взаимодействия всех составляющих треугольников «бизнес-образование-наука». Эта триада является ключевым инструментом стратегического развития экономики знаний для любой страны мира.

Формирование корпоративного интеллектуального капитала в Украине требует конкретных механизмов. В первую очередь это касается не только высокотехнологической деятельности, но и повышение уровня технологизации низкотехнологических секторов экономики, что в целом является глобальным трендом. Для активизации экономической деятельности в Украине стоит сконцентрировать усилия на формировании инновационной инфраструктуры и привлечении именно тех этапов производства, на которых формируется значительный объем добавленной стоимости. Необходимо стимулировать иностранные компании открывать в Украине собственные исследовательские центры через систему налоговых, кредитных и институциональных инструментов.

Ключевые слова: человеческий капитал, корпоративные университеты, структурный капитал, организационный капитал, НИОКР, слияния и поглощения, аутсорсинг.

Information about authors:

Kalenyuk I., Doctor of Science (Economics), Professor, Director, Research Institute of Economic Development Studies, Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine; https://orcid.org/0000-0003-1807-2849

Grishnova E., Doctor of Science (Economics), Professor, Department of Enterprise Economics, Taras Shevchenko National University of Kyiv, Kyiv, Ukraine; https://orcid.org/0000-0002-4178-1662

Tsymbal L., PhD, assoc.prof., Department of International Economics, Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine; https://orcid.org/0000-0002-0873-9227

Djakona A., PhD, Vice-rector for Innovations and Development, ISMA University, Riga, Latvia; https://orcid.org/0000-0002-4089-9335

Panchenko E., PhD Student, Department of International Management, Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine; https://orcid.org/0000-0001-8086-6717

REFERENCES

[1] 200 the biggest companies of Ukraine 2017. URL: https://biz.censor.net.ua/resonance/3084420/200_nayiblshih_kompanyi_ukrani_2017_roku (accessed 16/10/2018) (In Ukr.).

[2] 2016 Intellectual Capital Index. URL: https://talentgrowthadvisors.com/our-big-idea/ici https://talentgrowthadvisors.com/our-big-idea/ici/djia-2016-ici (accessed 17/10/2018) (In Ukr.).

[3] Antoniuk L., Gernego I., Dyba V., Polishchuk Y. and Sybirianska Y. (2017). Barriers and opportunities for hi-tech innovative small and medium enterprises development in the 4th industrial revolution era. Problems and Perspectives in Management, 15(4), 100-113. (In Ukr.).

[4] Brooking A. (2009) Yntellektualnui kapytal: Kliuch k uspekhu v novom tusiacheletyy [Intellectual Capital: The Key to Success in the New Millennium]. СПб.: Питер. 288 p. (In Russ.)

[5] Chen M.-C. (2005) An Empirical Investigation of the Relationship between Intellectual Capital and Firms' Market Value and Financial Performance. Journal of Intellectual Capital. Vol. 6. N 2. P. 159–176 (in Eng.).

[6] Chukhno A. (2002) Intelektualnyi kapital: sutnist, formy i zakonomirnosti rozvytku. [Intellectual capital: the essence, forms and patterns of development] *Ukraine economy*. N 1. P. 16-27. (in Ukr.).

[7] Edvinsson L. (1999) Yntellektualnыi kapytal. Opredelenye ystynnoi stoymosty kompanyy. Novaia yndustryalnaia volna na Zapade: antolohiia. [Intellectual capital. Determination of the true value of the company. New industrial wave in the West: an anthology.] M.: Academia. 640 p. (in Russ.).

[8] FT Global 500 2018. URL: http://www.ft.com/intl/indepth/ft500 (accessed 11/10/2018). (in Eng.)

[9] Global M&A Review 2018. URL: http://mandaportal.com/getattachment/678cf4f5-b1f0-4d74-88ba-fae90cfcf322/Global-M-A-Review,-H1-2018 (accessed 20/10/2018) (in Eng.)

[10] How much does your country invest in R&D? URL: http://uis.unesco.org/apps/visualisations/research-and-development-spending/ (accessed 11/10/2018) (in Eng.)

[11] Intellectual Capital Index. URL: https://talentgrowthadvisors.com/our-big-idea/ici (accessed 17/10/2018) [In Ukrainian]

[12] IT-outsoursing. URL: https://www.slideshare.net/joydipghosh53/it-outsourcing-infographic-45013815 (accessed 16/10/2018) (in Eng.).

[13] Kalenyuk I., Tsymbal L., Djakona A., Panchenko E. (2018) Assessment of intellectual leadership under global competition. *Problems and Perspectives in Management.* N 4. Vol. 16. P. 212-223. DOI: http://dx.doi.org/10.21511/ppm.16(4) (in Ukr.).

[14] Laing G. (2010) Applying the VAIC model to Australian Hotels [Text] / Laing G., Dunn J., Hughes-Lucas S. // Journal of Intellectual Capital. Vol. 11. N 3. P. 269-283. (in Eng.)

[15] Lockheed Martin. Awarded $789.8 Million THAAD Production Contract. URL: http://www.lockheedmartin.com (accessed 17/10/2018) (in Eng.).

[16] Lytovchenko I.M. (2017) Korporatyvna osvita v Ukraini yak nevidkladna vymoha chasu. [Corporate education in Ukraine as an urgent requirement of time.] *Pedagogical science.* N LXXVI. 1. P. 49-53. (in Ukr.).

[17] Molodchyk M.A. (2012) *Intellektualnui kapytal kompanyy: dyahnostyka y podkhodu k upravlenyiu.* Perm'. 219 p.

[18] Occasional Note. UNCTAD Survey on the Internationalization of R&D. *United Nations Conference on Trade and Development.* URL: http://www.unctad.org (accessed 16/10/2018) (in Eng.).

[19] Petty R., Guthrie J. (2000) Intellectual Capital Literature Review. Measurement, reporting and management. *Journal of Intellectual Capital*. N 2. P. 155-176. (in Eng.).

[20] Prahalad C.K., Hamel G. (2000) The core competence of the corporation. *Journal of Intellectual Capital.* N 4. P. 312-327 (in Eng.).

[21] Pulic A. (2000a) VAIC – An Accounting Tool for IC Management. URL: www.vaic-on.net/start.htm (accessed 16/10/2018) (in Eng.).

[22] Pulic A. (2000b) MVA and VAIC™ Analysis of Randomly Selected Companies from FTSE 250. Austrian Intellectual Capital Research Center, Graz-London.. April. URL: www.vaic-on.net/start.htm (accessed 16/10/2018) (in Eng.).

[23] Senge, P.M. (1990) *The Fifth Discipline: The Art and Practice Of The Learning Organization,* Currency Doubleday, New York. (in Eng.).

[24] Stewart, Thomas A. (1997) Intellectual Capital: The New Wealth of Organizations, Nicholas Brealey Publishing, Business Digest, New York. (accessed 16/10/2018) (in Eng.).

[25] Sullivan P.H. (2000) Value-Driven Intellectual Capital: How to Convert Intangible Corporate Assets into Market Value; Wiley. (accessed 16/10/2018) (in Eng.).

[26] Sveiby, K. E. (1997). *The new organizational wealth: Managing & measuring knowledge-based assets*. San Francisco: Berrett-Koehler Publishers. (accessed 16/10/2018) (in Eng.).

[27] The 2017 Global Innovation 1000 study. Investigating trends at the world's 1000 largest corporate R&D spenders. 2017. URL: https://www.strategyand.pwc.com/innovation1000 (accessed 16/10/2018) (in Eng.).

[28] The Future Brand index. URL: https://www.rankingthebrands.com/PDF/FutureBrand%20Index%202018.pdf (accessed 16/10/2018) (in Eng.).

[29] L.Cuyvers, F.De Beule (2007) Transnational Corporations and Economic Development: From Internationalization to Globalization. England; N.Y.: Palgrave Macmillan. 558 p. (in Eng.).

[30] Twelve Huge M&A Deals For 2010: The Stuff That Dreams Are Made off. URL: http://247wallst.com/2009/12/14/twelve-huge-ma-deals-for-2010-the-stuff-that-dreams-are-made-of/(accessed 16/10/2018) (in Eng.).

[31] Unesco Science Report Towards 2030. (2016). URL: http://unesdoc.unesco.org/images/0023/002354/235406e.pdf. (accessed 16/10/2018) (in Eng.).

[32] Sanalieva L.K., Kengzhegalieva G.B., Idelbayeva A.S., Niyazbekova Sh.U. (2018) Investigation of modern economic mechanisms for construction of the intellectual potential of the country as a moving factor of innovative economic development. Bulletin of National Academy of sciences of the Republic of Kazakhstan, 5 (375): 144–149 (in Eng.).

Publication Ethics and Publication Malpractice in the journals of the National Academy of Sciences of the Republic of Kazakhstan

For information on Ethics in publishing and Ethical guidelines for journal publication see http://www.elsevier.com/publishingethics and http://www.elsevier.com/journal-authors/ethics.

Submission of an article to the National Academy of Sciences of the Republic of Kazakhstan implies that the described work has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see http://www.elsevier.com/postingpolicy), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. In particular, translations into English of papers already published in another language are not accepted.

No other forms of scientific misconduct are allowed, such as plagiarism, falsification, fraudulent data, incorrect interpretation of other works, incorrect citations, etc. The National Academy of Sciences of the Republic of Kazakhstan follows the Code of Conduct of the Committee on Publication Ethics (COPE), and follows the COPE Flowcharts for Resolving Cases of Suspected Misconduct (http://publicationethics.org/files/u2/New_Code.pdf). To verify originality, your article may be checked by the Cross Check originality detection service http://www.elsevier.com/editors/plagdetect.

The authors are obliged to participate in peer review process and be ready to provide corrections, clarifications, retractions and apologies when needed. All authors of a paper should have significantly contributed to the research.

The reviewers should provide objective judgments and should point out relevant published works which are not yet cited. Reviewed articles should be treated confidentially. The reviewers will be chosen in such a way that there is no conflict of interests with respect to the research, the authors and/or the research funders.

The editors have complete responsibility and authority to reject or accept a paper, and they will only accept a paper when reasonably certain. They will preserve anonymity of reviewers and promote publication of corrections, clarifications, retractions and apologies when needed. The acceptance of a paper automatically implies the copyright transfer to the National Academy of Sciences of the Republic of Kazakhstan.

The Editorial Board of the National Academy of Sciences of the Republic of Kazakhstan will monitor and safeguard publishing ethics.

Правила оформления статьи для публикации в журнале смотреть на сайте:

www:nauka-nanrk.kz

ISSN 2518-1467 (Online), ISSN 1991-3494 (Print)

http://www.bulletin-science.kz/index.php/en/

Редакторы *М. С. Ахметова, Т. А. Апендиев, Д. С. Аленов*
Верстка на компьютере *Д. А. Абдрахимовой*

Подписано в печать 10.02.2020.
Формат 60x881/8. Бумага офсетная. Печать – ризограф.
19,5 п.л. Тираж 500. Заказ 1.