

# Implementation of the knowledge economy paradigm in the strategy of national economy development\*

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**ABSTRACT.** This paper studies the knowledge economy paradigm and the factors of its influence on the development of national economies in the context of transformation of the global competitive environment. It has been methodologically identified the basic categories and concepts concerning the determination of key factors and parameters of modern economic systems. It has been proved through the example of South Korea that implementation of the knowledge economy paradigm in long-term strategies initiated and supported by the state provides new opportunities of socio-economic progress. The basic problems of innovation-driven development of Ukraine's economy through an assessment of its readiness to transition to the knowledge economy, compared with South Korea. The latter's experience, despite the objective limitations, is regarded as an example of strategic success in formation of a creative innovation system.

**KEYWORDS:** globalization, post-industrial economy, knowledge economy, national development strategy, innovation system, creative economy.

## Introduction

Emergence of the global economy as the reality of 21st century led to change in the paradigm of economic development. In the interconnected and equally polarized world of the uneven distribution of resources and wealth, the search for new sources of economic development is an integral part of national policies and global modeling.

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Almost all countries, including economic leaders, face the problem of ability to develop in the knowledge economy paradigm, while overcoming negative competitive impacts and adequately responding to the challenges of global crisis. In the U.S. where unique conditions for the full functioning of reproductive science and technology cycles in almost all sectors and industries due to the concentration of the world's most productive intellectual resource were created in 21st century, the problem of ensuring the innovation leadership and global competitiveness is continuously emerging full blown at the nationwide level. The EU experts also argue that the ensuring of well-established dynamics and competitiveness of the European economy would be made possible only in an environment where over the next few years a key priority of its development will be a so-called triangle of knowledge, i.e., creation, transfer and use of knowledge through research, education, vocational training and innovation<sup>2</sup>. The knowledge- and innovation-driven models of development at some point provided the competitiveness of «Asian tigers» – Japan, South Korea, Singapore, Taiwan, Hong Kong. The current strategies of Singapore («Intelligent Island»), South Korea («E-Korea»), China («Capture of 21st Century with Knowledge») are ambitions revealing and largely set a pace of economic development of the modern world and become innovation modulators of the global economy by transforming their economies from commodity production to intellectual and creative persistently.

The potential belonging to the innovation values of the knowledge economy in their strategies and development programs is declared by India, Brazil, Russia, the Czech Republic, Hungary, the Baltic States. However, to do this, as stressed by Tuyen, it is necessary to reform the economic system itself<sup>3</sup>, which, in our opinion, is extremely challenging and promising task for the above-mentioned countries. However, one cannot ignore the findings of Peter Drucker with regard to the thought that in the future there will not be any poor countries and will be only indifferent<sup>4</sup> when the underdevelopment will be determined by weak state governance<sup>5</sup>.

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<sup>2</sup> Innovations in Ukraine: the European experience and recommendations for Ukraine. — Volume 3. Innovations in Ukraine: Proposals for political actions: final version (draft of 19.10.2011). — K.: Phoenix, 2011. — p.76 .

<sup>3</sup> Tuyen, Thanh Nguyen. Knowledge Economy and Sustainable Economic Development: A Critical Review. — Walter de Gruyter GmbH & Co. KG, Berlin/ New York. — 2010 — [Electronic resource]. Access mode: <http://www.e-cademic.de/data/ebooks/extracts/9783598251818.pdf>

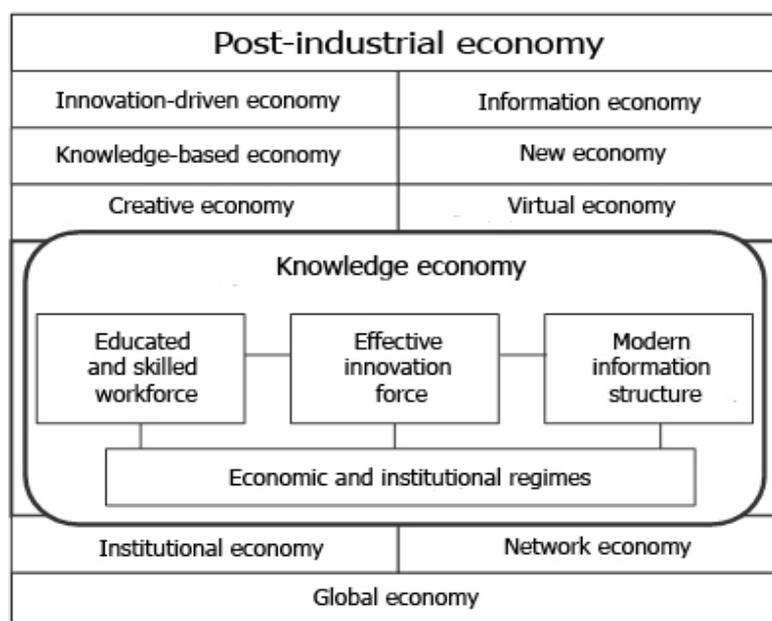
<sup>4</sup> Drucker, Peter. The Age of Discontinuity: Guidelines to Our Changing Society. — New York: Harper & Row. — 1969. — Pp. 394.

<sup>5</sup> Peter F. Drucker. Management. Challenges of 21st century: Transl. from English. — M.: publishing house Mann, Ivanov and Ferber, 2012. — 256 p.

The purpose of the paper is to substantiate the importance of combination of the intellectually creative potential of a society and the world's scientific and technological achievements for the effective implementation in the national economic development strategy of conceptual framework of the knowledge economy as a decisive factor for progress in the context of globalization. The South Korean model of transition to the knowledge economy, the country's strategic achievements and challenges emerging full blown in the context of globalization are described in this study. The conclusions are, according to the authors, relevant to Ukraine, which, being at the beginning of its transformation towards the knowledge economy, faces difficulties with the development of a modern economic development strategy. The main idea is to understand the opportunities and limitations of use of the Korean model of economic growth in policies of other countries, and of Ukraine in the first place.

**Methodological format of the study**

The modern economic theory experiences the transformation of established categories and concepts, the generation of new methodological approaches. While developing on the basis of post-industrialism and having a certain logical sequence, they form the living tissue of modern terminology with the knowledge economy concept in the center (Figure 1).



**Fig. 1. Methodological format of the knowledge economy genesis in 21st century**

The interpretation of knowledge as a separate essential element of economic activity is not comparatively new. Thus, in the early 20th century Joseph Schumpeter proposed the theory of «creative destruction» as a process of absolute transformation of the economy due to a combination of expertise and innovative processes<sup>6</sup>. Machlup first used the term «knowledge economy» in 1962 in his book «Production and Dissemination of Knowledge in the U.S.», where he referred to «knowledge» in the broad economic sense, noting that the allocation of resources in the areas of education and research activities is a major economic component, and the economy of education and the economy of research are the most dynamic new areas of economy specialization<sup>7</sup>.

In the context of evolution of competitive development sources, a plausible opinion is the one of Joseph Stiglitz with regard to that the knowledge and information are generated today just as easily as cars and steel were made hundreds of years ago, and such people as Bill Gates, knowing ways for production of knowledge and information, reap the fruits more effectively than others and become tycoons similarly to those who knew how to produce cars and steel a hundred of years ago<sup>8</sup>. He also stressed that knowledge should be recognized not only as a social but also a global public good and thus has collective responsibility of the international community for the creation and dissemination of knowledge for the benefit of development<sup>9</sup>.

In other words, today competitive advantages are forming in the area of generation of knowledge, which in turn is reflected in innovations. Thus, the modern human capital includes not just the ability to collect and accumulate information but also the skills to transform it into knowledge that can be applied to practical solution of strategic problems of economic development. Moreover, in the structure of economic relations in 21st century not just human capital, but the intellectual one which takes shape of intangible products and assets shall dominate. Thus, the transition from the industrial stage to the post-industrial information stage in the knowledge economy paradigm becomes point-blank.

According to the definition by the Organization for Economic Cooperation and Development (OECD), «The knowledge economy or the knowledge-based economy is the economy directly based on

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<sup>6</sup> Schumpeter, Joseph A. The Process of Creative Destruction. From Capitalism, Socialism and Democracy. — New York: Harper. — 1975 (Original publication 1942).

<sup>7</sup> Machlup, Fritz. The Production and Distribution of Knowledge in the United States. — Princeton: Princeton University Press. — 1962. — Pp. 460.

<sup>8</sup> Stiglitz, Joseph. Knowledge for Development: Economic Science, Economic Policy, and Economic Advice. — World Bank Conference on Development Economics. — Washington, D.C. — April 20–21. — 1998.

<sup>9</sup> Organization for Economic Cooperation and Development. The Knowledge-Based Economy. — OECD/GD (96)102. — Paris. — 1996.

the creation, distribution and use of knowledge and information»)<sup>10</sup>. Access to knowledge, innovation, communication in the modern conditions is not just an independent factor of development — it is decisive. The evaluation of phenomena of information, new and virtual economies is encouraged, which requires unbiased independent research, as in the depths of Internet not only «virtual economy» but also «virtual politics», «virtual diplomacy», «virtual culture», «virtual education» emerge. It becomes obvious that information globalism dominant in almost all the global markets leads to operating by its participants not only virtual assets and liabilities but also virtual knowledge in ever increasing amounts. Multimedia companies globally organized actually suppress through the influence of non-economic and non-coercive character immediately on people's mind the individuality and intellect, while ruthlessly exploiting them. The illusion of absence of limitations obvious for the traditional mind makes a human being more free with regard to realizing his potential, thereby increasing the social productivity. At the same time, the unprecedented online mass-media impact on the conscience made possible actually formalizes the most areas of life, imposes on the society the global pseudoculture standards. However, the realities of the information age stimulate the intellectual individualism, as the most creative part of the information values of civilization is not on physical media (hard disks, CD, web servers), but in the minds of people, their skills, talents, awareness and sensitivity to the creative self-development. In this context, the prospects of development are associated with the transformation of the innovation economy into the intellectual and creative one.

In general, the prerequisites of modern economic methodology are formed in the study of globalization, which in its unprecedented manifestation is a source and stimulant of competitive development and progress, being at the same time not linear and homogeneous, as its costs and benefits are unevenly, asynchronously and disproportionately distributed, especially in the cross-country terms.

The global economy which is emerging may be considered, on the one hand, as a subjectively, functionally and institutionally structured multilevel system which main integrating element is the global market. On the other hand, at present there is no question as to the universality and perfection of the system, but rather to: global availability of resources and innovations; global nature of factor mobility; global market unification and regulatory harmonization; global individualization and corporatization; regional and

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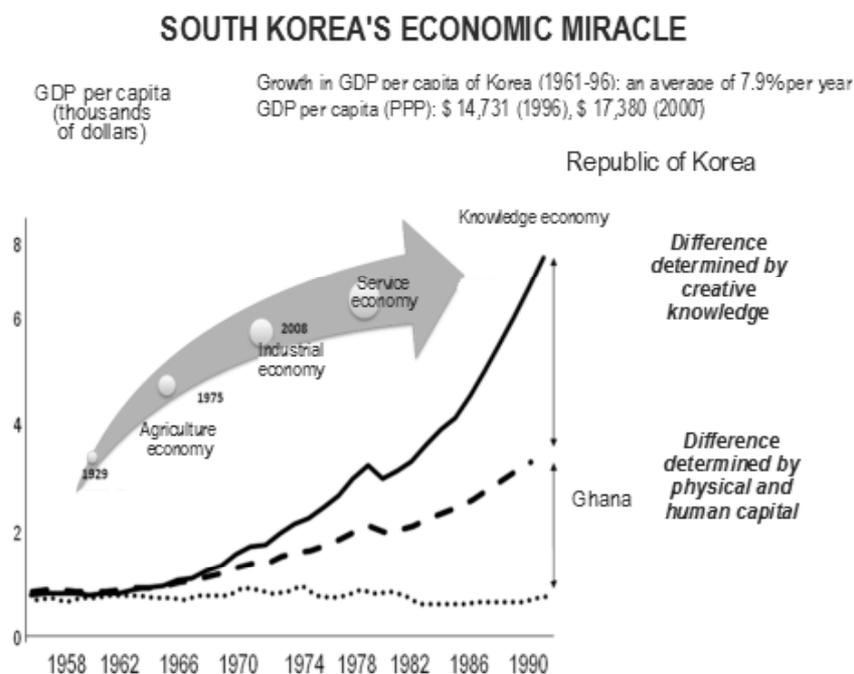
<sup>10</sup> Organization for Economic Cooperation and Development. The Knowledge-Based Economy. — OECD/GD (96)102. — Paris. — 1996.

continental consolidation; synchronization of rates and levels of economic development in a cyclic crisis presence; global sociolization and politicization of economic relations. In the structure of multi-mode and mixed global economy of early 21st century there are segments of pre-industrialism, industrialism and post-industrialism, enclaves of information, new, virtual, innovation, intellectual and creative economies.

In the situation where knowledge has become a key factor of economic growth and progress, economists have to explore new ways for most of their incorporation into innovative theories, models and practices.

### Experience of South Korea

Today, South Korea is one of the most successful examples of applying the knowledge economy paradigm to its development strategy. Forty years ago, its level of per capita income was almost the same as in Ghana, and in early 1990s, it exceeded the latter's six times (Figure 2).



**Fig. 2. Retrospective view of South Korea motion to the knowledge economy<sup>11</sup>**

<sup>11</sup> Based on a database of the World Bank and the World Bank's Development Program «Knowledge for Development (1998/99)». — [Electronic resource]. — Access mode: <http://go.worldbank.org/AW9KZWJB10>

A special role in reaching the knowledge economy and transformation into the creative economy was played by the innovation system of South Korea, developed through the specialized public policy. It moved in its evolution from a model of catching up to the model of economic development, based on knowledge. When the government in 1980 first launched the National Research Program (NRP) with focus on promoting R&D works, its main goal was to catch up with developing countries and to absorb foreign advanced technology. Projects of innovative development of the public and private sectors were largely focused on short-term technological development due to absorbing or copying others' knowledge. The accumulation of financial resources and organizational experience in favorable external market conditions of early 1990s enabled the government of Korea to dramatically shift its innovation policy from simple copying of others' technologies to designing and manufacturing of their major components along with the creation of infrastructure facilities for the development of knowledge-intensive industries in long-range outlook<sup>12</sup>.

It should be noted that the Government of Korea has always encouraged investment in scientific and technological development, but its role has changed qualitatively in the new innovative architecture: the state has less directly interfered in the private sector efforts to stimulate individual creativity and entrepreneurial spirit. This was due to the process of appropriate institutionalization (Table 1).

*Table 1. Institutional diversification of scientific and technological development of Korea*<sup>13</sup>

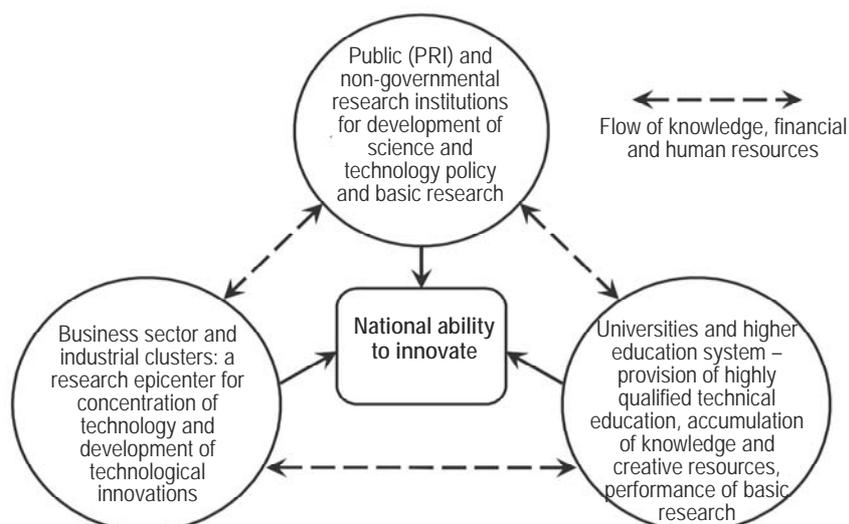
Ministries	Years	Innovation program	Managing institutions
Ministry of Science and Technology	1982	Special Research Program	Korean Institute of Evaluation and Planning of Science and Technology (KIEPST); Korea Science and Engineering Foundation
Ministry of Commerce, Industry and Energy	1987-1988	Technical Program of Industrial Base Development; Program of Alternative Energy Development	Korean Institute of Evaluation and Planning of Science and Technology (KIEPST)

<sup>12</sup> Dahlman, Carl and Thomas Andersson. Korea and the Knowledge-Based Economy: Making the Transition. — World Bank Publications // International Bank for Reconstruction and Development. — World Bank 2000. — Pp. 152

<sup>13</sup> Based on the information of the Ministry of Knowledge Economy of South Korea. [Electronic resource]. — Access mode: <http://www.mke.go.kr/language/eng/index.jsp> and the Ministry of Education, Science and Technology of South Korea. [Electronic resource]. — Access mode: <http://www.moe.go.kr/main.do>

Ministries	Years	Innovation program	Managing institutions
Ministry of Information and Communications	1989	Program of Information and Communication Technology Development (ICT)	Institute of Evaluation of Information Technology (KIEIT)
Ministry of Construction and Transport	1994	Program of Building Technology Development	Korean Institute of Construction Technology (KICT)
Transformation of Ministry of Science and Technology of Ministry of Education, Science and Technology	2008	Main Research Projects; Special Projects of Basic Research Support; Project of Support and Promotion of Creative Research; Main Research Center of Scientific Medicine and Engineering	National Research Center
Ministry of Knowledge Economy	2008	Creation of scientific and research network for acceleration of information commercialization and exchange; rationalization of research procedures; cooperation with universities, corporations and institutions that carry out research work; research outsourcing and involvement of major associations and academic groups in large scale R&D projects; strengthening of global cooperation through joint technological developments, expanding of financial support to development and commercialization of technologies; increase in a level of creativity and ability for innovation of large corporations, support to private investment in R&D; encouragement of individual creativity and entrepreneurial talent to meet the needs of the knowledge economy	Korean Institute of Technology Development (KITD)

The interests of Korean government and private institutions are increasingly aiming at creating the fundamental technologies and their commercialization according to the knowledge economy paradigm. All PRI focus on designing the key elements of such economy according to the global requirements. Universities begin to play an important role in conducting the technical research as a result of special academic awards for innovative work, and private entities become aware of the need to develop new technologies in all sectors of the economy. Once again, the Korean government made considerable efforts to create the efficient innovation system, which gave considerable actual results (Table 2).



**Fig. 3. Concept of innovation system in Korea<sup>14</sup>**

**Table 2. Key indicators of the research activities of Korea in 1995—2010<sup>15</sup>**

	1995	2000	2005	2008	2010
Gross domestic outlays for R&D as % of GDP	2,3	2,3	2,79	2,9	3,74
Basic costs of research as % of GDP	0,29	0,29	0,43	0,54	0,68
Number of researchers per 1000 persons of manpower	4,82	4,9	7,57	9,7	10,67
All R&D personnel per 1000 persons of manpower	7,3	6,24	7,52	12,09	13,55
R&D financed by production sector as % of GDP	1,76	1,66	2,09	2,45	2,68
R&D financed by the state as % of GDP	0,44	0,55	0,64	0,85	1
Expenditure of business sector on R&D as % of GDP	1,7	1,7	2,15	2,53	2,8
Expenditure of higher education sector on R&D as % of GDP	0,19	0,26	0,28	0,37	0,4

<sup>14</sup> Hemmert, Martin. The Korean Innovation System. From Industrial Catch-Up to Technological Leadership. — International Conference «Pathways to Innovation: Policies, Products, and Processes for Competitive Advantage in a Global Economy». — Nishogakusha University. — Tokyo. — May 20-21. — 2005

<sup>15</sup> Based on the database of OECD (Main scientific and technological indicators). [Electronic resource]. Access mode: [http://stats.oecd.org/Index.aspx?DataSetCode=MSTI\\_PUB](http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB).

	1995	2000	2005	2008	2010
% of R&D performed by business sector	73,73	74,05	76,85	75,37	74,8
% of R & D performed by the State	19,1	23,94	23,02	25,4	26,75
% of R&D performed by higher education sector	8,7	11,28	9,93	11,4	10,28
% of R&D performed by private sector	1,1	1,36	1,36	1,43	1,71
Programs of economic development as % of government budget appropriations or outlays for R&D*		53,42	51,85	49,9	49,5
Environmental programs and health programs as % of government budget appropriations or outlays for R&D		14,82	18,75	14,03	13,79
Number of patent applications (total)	78 499	102 010	160 921	163 523	170 101
Number of patents registered (total)	12 512	34 956	73 512	83 523	68 843
Number of patents in ICT	43,05	890,81	2 300	3 120,58	3 700
Number of articles in scientific and technical journals	3 308	9 572	16 396	18 600	21 350

\*GBAORD = Government Budget Appropriations or Outlays for R&D

As it can be seen, the state's share in the financing of basic science and R&D is rather low because the leading role is played by the private business sector, mainly by Chaebol<sup>16</sup>. It is demonstrative that a portion of the programs aimed at economic development and growth is over a half of all public spending on R&D, which confirms the priority for Korea of structural nationwide changes towards achieving the global competitiveness. In this case, universities do not actively participate in the performance of major research, first of all, due to shortage of funds and lack of capabilities to conduct R&D, and, secondly, because of their traditional focus on education and human capital formation of the country for its universal ability to implement the knowledge economy.

Table 3 shows that R&D resources are concentrated mainly in the field of ICT and other knowledge-intensive industries, which confirms the sectoral orientation of Korea on creative activity in the modern paradigm of the knowledge economy.

<sup>16</sup> Chaebol is the South Korean form of financial and industrial groups. The conglomerate which is a group of formally independent firms owned by certain families and under a single administrative and financial supervision (key Chaebols today are Samsung, LG, Hyundai, Daewoo, Lotte)

**Table 3. Internal R&D expenditures Korea by sectors (2004—2010)<sup>17</sup>**

Socio-economic objectives	South Korea (million of US dollars)						
	Years						
	2004	2005	2006	2007	2008	2009	2010
Research and exploitation of the Earth	85.873	101.638	94.332	136.349	224.453	314.996	399.527
Environment	552.451	631.38	666.646	740.577	1054.806	1317.707	1321.824
Research and exploitation of space	319.839	310.22	412.089	381.919	437.709	360.413	356.476
Transport, telecommunications and ICT infrastructure development	417.426	325.861	305.543	551.036	2105.949	2571.59	4304.386
Energy	895.025	937.483	1180.351	1526.421	2002.527	2487.739	3195.112
Industrial production and innovation technologies	-19370.522	23039.34	23493.074	25937.656	29883.857	28954.231	30054.877
Agriculture	721.296	687.225	783.194	964.963	1112.792	1163.84	1208.287
Education	..	..	..	..	268.125	399.775	444.514
Culture, religion and mass media	..	..	..	..	472.86	682.928	807.479
Political and social systems, processes and structures	..	..	..	..	460.955	606.852	597.212
General development of the knowledge economy	1407.881	1702.12	2553.756	2166.709	821.499	1287.562	1393.439
Defense	932.718	713.175	789.817	936.06	1234.309	1861.86	2009.959
Total	28305.225	30618.326	34711.976	38923.471	41685.335	44311.219	49447.725

A response of South Korea adequate to modern challenges to the extremely difficult problem of industrialization and appropriate infrastructure provision for economically backward regions of the country through the creation of industrial clusters is required, in our opinion, special research attention. In the process of their building a synergistic effect was achieved by regional concentration of different sector companies due to the minimization of pro-

<sup>17</sup> Based on the database of OECD (Principal scientific and technological indicators. [Electronic resource]. Access: [http://stats.oecd.org/Index.aspx?DataSetCode=MSTI\\_PUB](http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB).

duction and transportation costs, generation of benefits of economies of scale, increase in employment level, increase in foreign investment, etc. Afterwards the formation of a favorable environment for innovation spurred the transformation of industrial clusters in innovation technoparks based on the knowledge economy, which are developing towards the creative economy (Figure 4).

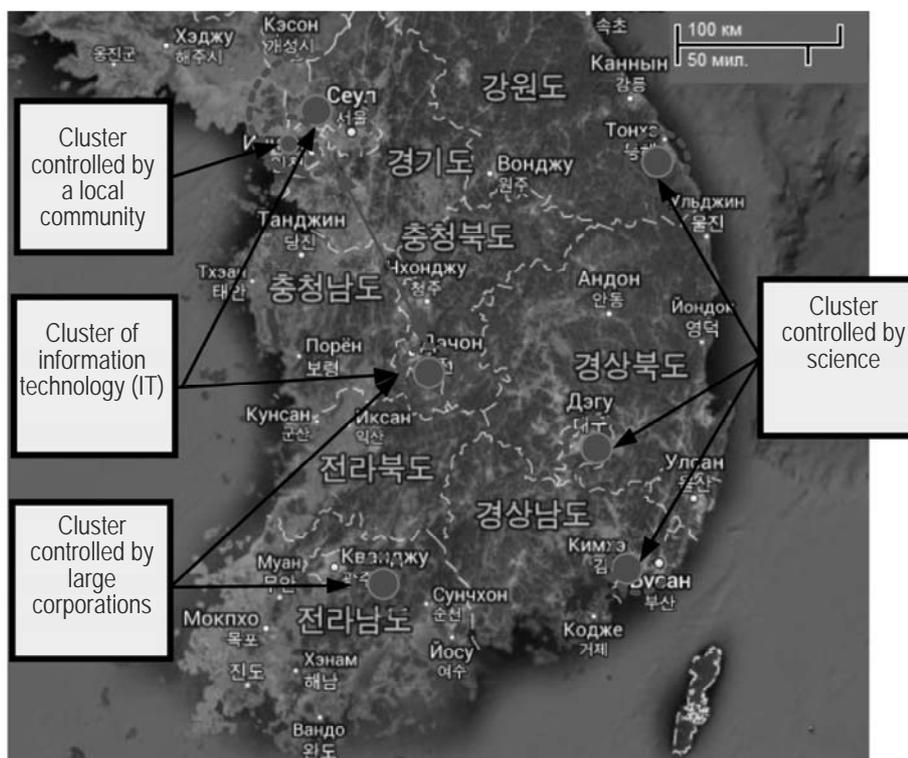


Fig. 4. Location of clusters in Korea<sup>18</sup>

In general, the Korean economy in the effective symbiosis of national and business motivations and concerted actions has transformed in the innovative and creative knowledge economy, becoming a highly competitive member of the global market. However, such level of competitiveness, in our opinion, can be determined only in a system of international comparative matches. In the context of our study, experts from the World Bank have concluded that the successful transition to the knowledge economy involves the creation of certain conditions through long-term in-

<sup>18</sup> the authors figure

vestments in education, development of innovation systems, continuous upgrading of information infrastructure and formation of an enabling environment for market innovation<sup>19</sup>. The ability of countries to form the knowledge economy is evaluated in the format of appropriate criteria (Table 4).

**Table 4. The level of readiness of countries for transition to the knowledge economy among 146 countries of the world (from 0 to 10 points) according to the methodology of the World Bank**

Position in 2012	Country	Components					
		Education	Innovation system	Information and communication technologies	Index of knowledge	Economic incentives and institutional regime	Knowledge economy index
1	Sweden	8.92	9.74	9.49	9.38	9.58	9.43
2	Finland	8.77	9.66	9.22	9.22	9.65	9.33
3	Denmark	8.63	9.49	8.88	9	9.63	9.16
4	Netherlands	8.75	9.46	9.45	9.22	8.79	9.11
5	Norway	9.43	9.01	8.53	8.99	9.47	9.11
8	Germany	8.2	9.11	9.17	8.83	9.1	8.9
29	South Korea	9.09	8.8	8.05	8.65	5.93	7.97
55	The Russian Federation	6.79	6.93	7.16	6.96	2.23	5.78
56	Ukraine	8.26	5.76	4.96	6.33	3.95	5.73

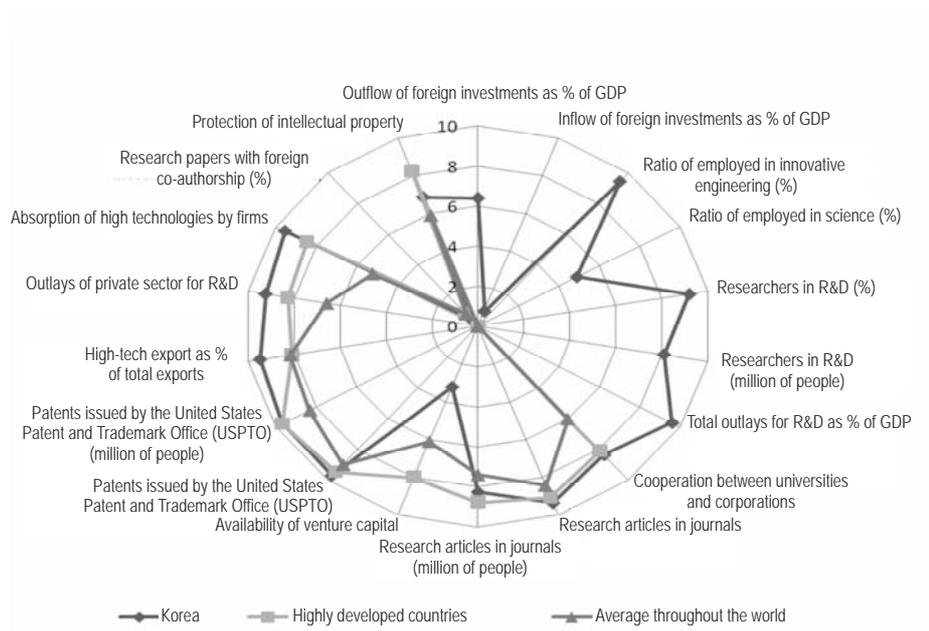
**Source:** The Knowledge Assessment Methodology of the World Bank ([www.worldbank.org/kam](http://www.worldbank.org/kam))

The positions of South Korea in education are impressive with rather significant indicators relating to development of the national innovation system and information and communication technologies. Despite considerable influence of the state on supporting the innovations, the institutional regime is estimated as negligible compared to the leading countries in rating (Figure 5).

In general, South Korea even exceeds by many indicators the highly developed countries and the world's average values. It is a leader as to the number of employed in the areas of science and technology, outlays for R&D, including those of private sector, the manufacturing of mobile phones, semiconductor memory chips,

<sup>19</sup> WBI. [The World Bank Institute Development Studies]. Building Knowledge Economies. Advanced Strategies for Development. Washington, DC: The International Bank for Reconstruction and Development, 2007 — p. 4.

automobiles, shipbuilding, telecommunications, high-tech export, which is provided by the well functioning innovation system with targeted support of the state.



**Fig. 5. Indicators of the Innovation system: a comparative analysis<sup>20</sup>**

However, to become a sustainable social harmonized society of the knowledge economy, it is required the continuous generation and implementation of highly ambitious national development strategies, which today is the state program «Future of 2025: Korea's long-term plan for the development of science and technology», that will facilitate its positioning as an example of 21st century economy, as one of the global centers of creative knowledge economy.

### Lessons for Ukraine

Globalization causes the ever increasing impact on the economic development of Ukraine as external challenges under conditions of high openness of the national economy are becoming more noticeable. This also applies to the traditional raw material oriented and energy-intensive industries, which experience the severe impact of global price situation and especially to innovative segments of the

<sup>20</sup> Based on the information of KAM [Electronic resource]. — Access mode: [http://info.worldbank.org/etools/kam2/KAM\\_page1.asp](http://info.worldbank.org/etools/kam2/KAM_page1.asp)

economy, that are directly dependent on orientation of the state and business on the generation and commercialization of knowledge.

Aggravation of the global competition pushes major corporate market actors to find the most optimal new forms of production and sale of new goods and services, and the states to create effective national innovation systems. At the same time, the global experience, particularly in South Korea, shows that not only reaching and holding the position of a global innovation leader is an extremely difficult task, but also a task of catching up with the leaders in the most profitable science-intensive segments of market.

As far as Ukraine is concerned, the availability of highly qualified staff and national education, including the higher education, received due recognition in the above rating of readiness of the country to the knowledge economy (Table 4). According to UNESCO, Ukraine is among the world leaders in terms of a proportion of the population aged 25 years with higher education (indicator of higher education prevalence is 38 %) with the highest index at the European level only in Russia (54.8 %), and globally in the United States (38.6%), Israel (42.4%) and Canada (43.9 %) <sup>21</sup>. Ukraine occupies in the rating of countries in terms of global competitiveness in 2012-2013 47th position among 144 countries by sub-index «Higher Education and Training» (Russia – 52) <sup>22</sup>. The global network of research universities «Universitas 21», while evaluating the state policy as to education, its effectiveness, resource provision, awarded the Ukrainian higher education system with the 25th position among 48 countries. Ukraine managed to get ahead of the Czech Republic, Poland, Slovenia, Russia and Italy. The education systems of the United States, Sweden, Canada, Finland and Denmark were recognized as the best.

This situation is also confirmed by other international ratings. Thus, according to some values of the global innovation index, in 2010-2011 Ukraine ranked pretty high places: innovation potential – 11; availability of higher education – 14; net inflow of direct foreign investment – 29; public spending on R&D – 31; ability to innovate – 32; human capital – 36. Instead, effectiveness of the legal system is positioned as 129, regulatory environment – 112, protection of intellectual property – 107, an index of investor

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<sup>21</sup> Global Education Digest 2011. Comparing Education Statistics across the World // UNESCO Institute for Statistics. — Montreal, 2011. — 312 p. — [Electronic resource]. — Access mode: [http://www.uis.unesco.org/Library/Documents/global\\_education\\_digest\\_2011\\_en.pdf](http://www.uis.unesco.org/Library/Documents/global_education_digest_2011_en.pdf)

<sup>22</sup> The Global Competitiveness Report 2012-2013 // World Economic Forum, 2013. — 545 p. — [Electronic resource]. — Access mode: [http://www3.weforum.org/docs/WEF\\_GlobalCompetitivenessReport\\_2012-13.pdf](http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf)

protection — 129<sup>23</sup>. In fact, the country follows the path of copying substantially all modern technologies, while preserving human, natural and financial resources for domestic technologies of lower industrial structures.

However, the natural resources available continue to be exploited today in Ukraine, when export-oriented business represented by large corporations of raw mineral complex is based on low-tech production providing a certain level of employment and preservation of its monopoly position of leadership in the national economy. Global ratings for 2007-2011 reflect the deterioration of most indicators of competitiveness of Ukraine. It is indicative that while its place by the general global competitiveness index fell by 10 points (from 72nd position among 134 countries in 2007-2008 to 82 among 142 countries in 2011-2012), fall by the criterion of innovation was 22 points, technological readiness — 17, spending by companies on R&D — 23, cooperation between universities and businesses in research activities — 21.

The main reasons that hinder the effective implementation of innovation and technological model of the Ukrainian economy development include: immaturity of the national innovation system; a low level of financing the innovation sector; low innovation activity of domestic enterprises and weak links between actors in the innovation sector, a low level of research works in the business sector; a low level of innovation commercialization; a scanty demand for innovative products by the industrial sector; weak scientific and technological exchange; an extremely low level of patenting of domestic inventions with foreign patent organizations; a lack of national venture capital market and competition in the innovation entrepreneurship; underdevelopment of the legal framework governing the innovation sector. This is followed by a rapid decline in the quality of education, research degradation of both retrospectively productive institutes of the National Academy of Sciences of Ukraine and leading domestic universities. Instead, the advanced forms of intellectual capital concentration and intensification of innovation activities well proven in the world, such as clusters, technoparks, technopolises, are scarcely used in Ukraine.

The experience of South Korea shows that the most common form among large-scale industrialization forms and subsequently the local concentration of innovations became just clusters that offered new opportunities for the development of both traditional sectors of economy and the newest ones. Experts rightly assert that the cluster structures are, first of all, innovative, act as an engine of growth of national and regional economies and that the imple-

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<sup>23</sup> Global Innovation Index 2009/10/ — [Electronic resource]. — Access mode: <http://www.globalinnovationindex.org>.

mentation of cluster initiatives is a key tool for competitiveness of countries.

Although, in principle, we can talk about a minimum regulatory support of organization of progressive forms of innovative development in the economy of Ukraine (Law of Ukraine «On Innovation», Law of Ukraine «On Special Regime of Innovation Activity of Technology Parks», the Resolution of the Cabinet of Ministers of Ukraine «On Approval of Regulation on Procedure for Establishment and Operation of Technoparks and Other Types of Innovative Structures», the Resolution of the Cabinet of Ministers of Ukraine «On Approval of Concept of National Innovation System Development» and other regulatory legal acts of Ukraine), their occurrence is not only fragmented but statistically inconsistent<sup>24</sup>. Moreover, it never comes to the organization and operation of innovation clusters in the official programs and national statistics, although, given the experience of South Korea, in particular, it could be argued that it was clusters of this type that appeared to be the most effective during the evolution of forms of concentration of innovation activities to enhance the competitiveness of regions.

However, the formation of motivation and practical actions to transit to the knowledge economy most naturally occurs in the countries where not only technological, but also micro- and macro-economic conditions have been established.

A visual representation of comparing the baseline indicators of the knowledge economy in Korea and Ukraine (Figure 6) shows some lag in our country, but in the sectors of education and human resources, Ukraine and Korea are almost at the same level. This means that Ukraine may create favorable conditions for innovation development of the economy, based on the significant past investment in education and science, where significant competitive advantages still exist.

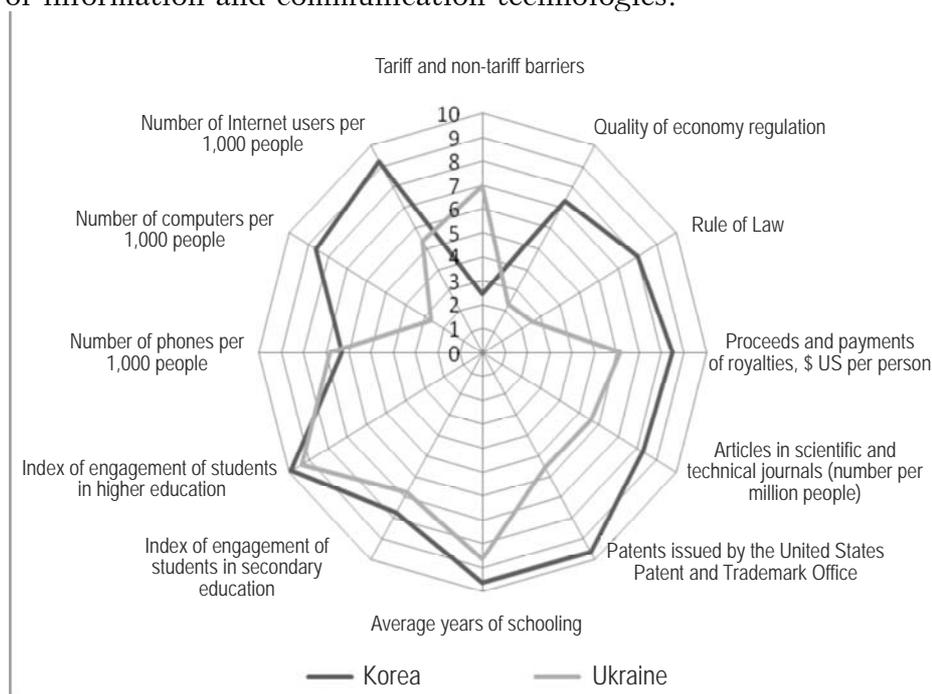
In the case of South Korea, for example, the indicator of tariff and non-tariff barriers shows a low level of economic freedom in the country, and as far as Ukraine is concerned, ICT indicators are the most critical, which, in our opinion, largely resulted in a general lag in transition to the knowledge economy.

The importance and primary role of the knowledge economy in the transformation processes of 21st century are inarguable in theoretical and practical terms, when pioneering technological and organizational ideas have become a major driving force for economic progress. Today the most popular products in the global

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<sup>24</sup> Lukianenko O.D. Clusters in the system of innovation activity intensification/O.D. Lukyanenko// Problems and prospects of development of cooperation between the countries of South-Eastern Europe in the framework of the Black Sea Economic Cooperation and GUAM. Collection of scientific papers — Albena-Donetsk: DonNU, RF NISS in Donetsk, 2012. — pp. 185-188.

market becomes the intellectual property, especially in the sector of information and communication technologies.



**Fig 6. Baseline indicators of Ukraine and Korea within the criteria for the knowledge economy, 2005–2011<sup>25</sup>**

## Conclusions

Transition from the raw material production economy of industrial type to the post-industrial information knowledge economy requires implementation of its values in national economy development strategies. Despite the fairly loyal and somehow harmonized international rating estimates, a huge gap between developed and other countries as to mastering the results of techno and informative globalization has long been fixed quite a while. The catastrophic lag behind the world's scientific and technological progress with no apparent prospects of catching up development has been emphasized in the Development Program of the World Bank's titled «Knowledge for Development» in relation to developing countries, structured in accordance with the modern priorities of the knowledge economy<sup>26</sup>.

<sup>25</sup> Based on the knowledge evaluation methodology of the World Bank ([www.worldbank.org/kam](http://www.worldbank.org/kam))

<sup>26</sup> The World Bank. WDR [World Bank Development Report]. Knowledge for Development. World Bank and Oxford University Press, 1998. — Pp. 181.

The example of South Korea is one of the most successful patterns of application of the knowledge economy paradigm with the practical demonstration of a positive correlation between an innovation development strategy and economy growth. It became an example of successful combination of the interests and efforts of the state and business with regard to the consolidated innovative development providing a high competitive status of the country in the global economy.

Despite the innovative development priorities of Ukraine's economy repeatedly declared at all levels, it has not been managed so far to create in it a competitive environment and innovative climate, to significantly increase the innovation motivation of economic entities, to optimally use the limited financial resources for research and technological modernization. This situation not only discredits the existing national innovation capacity, but is unacceptable for the country with pretensions to formation of the knowledge economy that is increasingly assuming the characteristics of creativity in its progressing segments.

The formation of an effective innovation system and implementation of the cluster approach, providing effective tools and instruments to stimulate the effective development, concentration of financial resources is vital for the national economy, which has great potential of modernization of traditional technologies and development of new ones. In the context of national competitiveness in the global development environment, Ukraine requires, on the one hand, the synthesis and use of adequate experience on implementation of its modern cluster policy, and, on the other hand, keeping to the systemic innovation policy with the goals, motivations and priorities of economy clustering, defined at the state level.

Under the present conditions, when the economic theory interprets mainly quantitative transformations apparently late in traditional paradigms only, producing respective baseline characteristics of the economy, and differentiated economic sciences demonstrate their methodological inability as to the knowledge economy paradigm, it is necessary to study and evaluate new globalization challenges and contradictions. Recognition of importance to transform the traditional economy into the knowledge-intensive one by the developing countries and not just by the leading countries can be a turning point in achieving the general civilizational progress, ensure social and economic stability and change an asymmetric model of the global economy of 21st century.

## References

1. *Dahlman, Carl and Thomas Andersson*. Korea and the Knowledge-Based Economy: Making the Transition. — World Bank Publications // International Bank for Reconstruction and Development. — World Bank 2000. — Pp. 152
2. *Drucker, Peter*. The Age of Discontinuity: Guidelines to Our Changing Society. — New York: Harper & Row. — 1969. — Pp. 394.
3. Global Education Digest 2011. Comparing Education Statistics across the World // UNESCO Institute for Statistics. — Montreal, 2011. — 312 p. — [Electronic resource]. — Access mode: [http://www.uis.unesco.org/Library/Documents/global\\_education\\_digest\\_2011\\_en.pdf](http://www.uis.unesco.org/Library/Documents/global_education_digest_2011_en.pdf)
4. Global Innovation Index 2009/10/ — [Electronic resource]. — Access mode: <http://www.globalinnovationindex.org>.
5. *Hemmert, Martin*. The Korean Innovation System. From Industrial Catch-Up to Technological Leadership. — International Conference «Pathways to Innovation: Policies, Products, and Processes for Competitive Advantage in a Global Economy». — Nishogakusha University. — Tokyo. — May 20-21. — 2005
6. Innovations in Ukraine: the European experience and recommendations for Ukraine. — Volume 3. Innovations in Ukraine: Proposals for political actions: final version (draft of 19.10.2011). — K.: Phoenix, 2011. — p.76. [in Ukrainian]
7. Knowledge Assessment Methodology of the World Bank [Electronic resource]. — Access mode: [http://info.worldbank.org/etools/kam2/KAM\\_page1.asp](http://info.worldbank.org/etools/kam2/KAM_page1.asp)
8. Knowledge evaluation methodology of the World Bank [Electronic resource]. Access mode: [www.worldbank.org/kam](http://www.worldbank.org/kam)
9. *Lukianenko O.D.* Clusters in the system of innovation activity intensification/O.D. Lukianenko // Problems and prospects of development of cooperation between the countries of South-Eastern Europe in the framework of the Black Sea Economic Cooperation and GUAM. Collection of scientific papers — Albena-Donetsk: DonNU, RF NISS in Donetsk, 2012. — pp. 185-188. [in Ukrainian]
10. *Machlup, Fritz*. The Production and Distribution of Knowledge in the United States. — Princeton: Princeton University Press. — 1962. — Pp. 460.
11. Ministry of Education, Science and Technology of South Korea data. [Electronic resource]. — Access mode: <http://www.moe.go.kr/main.do>
12. Ministry of Knowledge Economy of South Korea data. [Electronic resource]. — Access mode: <http://www.mke.go.kr/language/eng/index.jsp>
13. OECD database (Main scientific and technological indicators). [Electronic resource]. Access mode: [http://stats.oecd.org/Index.aspx?DataSetCode=MSTI\\_PUB](http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB).
14. OECD database (Principal scientific and technological indicators). [Electronic resource]. — Access mode: [http://stats.oecd.org/Index.aspx?DataSetCode=MSTI\\_PUB](http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB).

15. Organization for Economic Cooperation and Development. The Knowledge-Based Economy. — OECD/GD (96)102. — Paris. — 1996.
16. Organization for Economic Cooperation and Development. The Knowledge-Based Economy. — OECD/GD (96)102. — Paris. — 1996.
17. *Peter F. Drucker*. Management. Challenges of 21st century: Transl. from English. — M.: publishing house Mann, Ivanov and Ferber, 2012. — 256 p. [in Russian]
18. *Schumpeter, Joseph A.* The Process of Creative Destruction. From Capitalism, Socialism and Democracy. — New York: Harper. — 1975 (Original publication 1942).
19. *Stiglitz, Joseph*. Knowledge for Development: Economic Science, Economic Policy, and Economic Advice. — World Bank Conference on Development Economics. — Washington, D.C. — April 20–21. — 1998.
20. The Global Competitiveness Report 2012-2013 // World Economic Forum, 2013. — 545 p. — [Electronic resource]. — Access mode: [http://www3.weforum.org/docs/WEF\\_GlobalCompetitivenessReport\\_2012-13.pdf](http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf)
21. The World Bank. WDR [World Bank Development Report]. Knowledge for Development. World Bank and Oxford University Press, 1998. — Pp. 181.
22. The World Bank's Development Program «Knowledge for Development (1998/99)». — [Electronic resource]. — Access mode: <http://go.worldbank.org/AW9KZWJB10>
23. *Tuyen, Thanh Nguyen*. Knowledge Economy and Sustainable Economic Development: A Critical Review. — Walter de Gruyter GmbH & Co. KG, Berlin/ New York. — 2010 — [Electronic resource]. Access mode: <http://www.e-cademic.de/data/ebooks/extracts/9783598251818.pdf>
24. WBI. [The World Bank Institute Development Studies]. Building Knowledge Economies. Advanced Strategies for Development. Washington, DC: The International Bank for Reconstruction and Development, 2007 — p. 4.

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