COUNTRIES ON GLOBAL SCIENTIFIC AND EDUCATIONAL MAP: INTELLECTUAL PROPERTY PROTECTION IN ROMANIA AND UKRAINE

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Abstract
Various indicators are used to characterise national scientific and educational systems (SES), but they do not provide clear disposition within global knowledge economy. The paper to identify the disposition of modern national SES o Romania and Ukraine conducted the testing of methods of building competitive maps of global scientific and educational space (SESp) using the sample of intellectual property rights (IPR) protection. Paper provides reasons for choice of indicators for mapping global SESp. Analysis of correlation of these parameters with GDP per capita found that over the past decade there was closest correlation with quality of IPR protection, which causes high competitive status of developed countries. Confirmed the hypothesis of the need to consider the size of GDP per capita to meet the task of building of competitive market map (CMM) based on qualitative indicators. The analysis of SESp maps revealed few leaders and that a number of IPR protection systems are adequately implemented and functioning. Both Romania and Ukraine are found among global outsiders at the moment. Taking into account that the period under review encompassed almost a decade, we conclude that economy is characterized by a significant lag processes in science and education markets on the sample of IPR protection, but there are good examples of fast improvements and their international recognition.

Key words: *competitive market map, intellectual capital, intellectual property, international competitiveness, global scientific and educational space.*

JEL Classification: *A23, I2, F63, L8.*

I. INTRODUCTION

Researches shows that the owners of the land, shares or even intellectual property have no inclination to invest in the improvement and preservation of their property in case their rights are not protected (De Soto H., 2000). When it comes to intellectual property, we can say that it should be knowledge-based economy, where knowledge is considered as the key resource of development, sometimes replacing capital in other forms. Objects of industrial property (particularly patents) are the result of considerable efforts of scientists and inventors, so it is believed that their due protection does not only link the university sector and other science institutions to the economy, but also to the field of innovations, which together form the preconditions for the realization of competitive advantages of enterprises and national economies. Maringe F. (2015) argues the emergence of global higher education market, which is cannot be divided from labour market and innovation systems. Investigation of the possibilities for building a competitive global market maps using as an example some dimensions of science and education states an important theoretical and applied problem, because the results of scientific and educational activity is a factor in social and economic development in the global knowledge economy. Movement of Ukraine's and Romania's economies to a knowledge economy is facing some obstacles detection of which can serve a construction and analysis of maps of the global SESp, studying the experience of their leaders. Relevance to this topic is added by declared in the Sustainable Development Strategy Ukraine reforms of state policy in the sphere of education, science and research, IPR protection (Stratehiya staloho rozvytku "Ukrayina - 2020", 2015).

Unfortunately analysis of international SESp based on building competitive market maps is not found in available Ukrainian and foreign literature. Pretty close to it is a regular publication of the OECD aggregate distributions that characterize the global educational community on a variety of dimensions and indicators (Education at a Glance 2014 OECD Indicators, 2014). It has become quite common to use university and educational system ratings that can characterize SESp, but not from the point of view of their dynamics and size. Examples of such ratings are the QS University Ranking (2014) and World University Rankings (2014) by Times Higher Education, rating of education systems done by Australian University of Melbourne (U21 Ranking of National Higher Education Systems, 2014). Last even offers visualization of the rating on the world map and

the appropriate tools that unfortunately still meets the technical limitations and their capacities. One of the recent studies was the research of the international experience and perspectives of development of research universities in Ukraine, which could be called the heart of SESp (Doslidnyts'ki universytety: svitovyy dosvid ta perspektyvy rozvytku v Ukrayini, 2014)).

Few papers aim to contribute to researches on development of national IPR and other R&D outputs (Sandu S., 2014)). Varga G. etc. (2002) investigated dissemination of information in the specific field of industrial IPR in Romania and advocated close cooperation between such partners as the chambers of commerce and educational institutions. Some look at innovation and marketing of intellectual output in Romania in the European context (Iancu V., 2014)). Papers dedicated to IPR in Ukraine in international comparison context are almost absent in international databases. Only Yegorov I. (2009) contributed with identification of difficulties in the transformation of the R&D systems in Ukraine as part of post-soviet science. Meanwhile, we failed to find those papers that try to make a global map in the field of IPR and identify the place of Romania or Ukraine.

II. THE PURPOSE

The article is to determine the disposition of modern national SES based on processing of techniques to build a global CMM of SESp on a sample of IPR protection. The special attention has to be paid to identification of the place of Ukraine and Romania in global SESp. The purpose determined a number of tasks, namely: rationale for the choice of data base for calculations, processing of theoretical and methodological principles of building a CMM on a sample of IPR protection, analysis of the results and test hypotheses about the need to consider the per capita incomes when building market maps based on qualitative indicators. The results can be used to study changes in the national legislation and actual developments of international economic relations with representatives of the countries concerned in the work and determine the effectiveness of internal policies in terms of the international community and in comparison with other countries. In case such an approach finds international approval it could be extrapolated on other fields.

III. METHODOLOGICAL BACKGROUND OF RESEARCH

There are many research centres and think thanks involved in investigation of the international competitiveness on the micro and macro levels in the world. The samples are World Economic Forum, IMD World Competitiveness Center, International Center for Competitiveness at IESE Business School and many others, especially on national levels. Significant efforts to collect data from countries and harmonization of methods of obtaining them make international organizations and institutions such as the UNESCO Institute for Statistics, Eurostat, World Bank, World Intellectual Property Organization and others. Given that there have developed different situations with data collection in various fields, and most importantly their accessibility to researchers from countries with economies in transition (like Ukraine), the author selected to identify as an information base for research the World Economic Forum (hereinafter - WEF), which has long worked on development and improvement of methodology for calculating the GCI and publishes it regularly in annual Global Competitiveness Reports (2013).

Structure of the Global Competitiveness Index (hereinafter - GCI) has been analysed in detail in domestic and foreign studies (Yurynets' Z. V., 2014; Loshenyuk V.Ye., 2009). We offer to pay attention to the range of parameters that can be attributed to those that characterize SESp of nations and the global economy as a whole (Table 1). Out of all the indicators, which are used to calculate the GCI, basing on their essence we have singled out those that could be used to characterize the scientific and educational systems and countries, and so to make a comparison between them, to determine the size of correlation with the GDP per capita, and to draw up competitive global market maps. Their annual reassessment creates opportunities determine the path of development of nations.

Tools to detect the existence and closeness of correlation between different indicators of economic systems are widely used in economic research and well established (Mochernyy S.V., 2001; Ekonomiko-matematychne modelyuvannya, 2008). However, the importance should be given not only the interpretation of the results, but the selection of indicators for this analysis. In sufficient sample of countries and periods, measures should be normalized in a comparable range, which will increase the reliability of the results. Methods of obtaining parameters for different countries and in different periods should ideally be the same. In practice, this can be characterized by a small number of sources, which was one of the arguments for choice of WEF GCI as a base for the study.

Table.1. The hierarchy of science and education indicators that form GCI by correlation with the GDP per capita PPP

#	indicator	2013-2014	2012-2013	2011-2012	2010-2011	2009-2010	2008-2009	2007-2008	2006-2007
1.	Innovation and sophistication factors	**0.736**	0.694	0.703	0.681	0.643	0.624	0.627	0.598
2.	**Intellectual property protection** (among other indicators of that year)	**0.731** (2)	**0.701** (1)	**0.710** (1)	**0.702** (1)	**0.706** (1)	**0.701** (1)	**0.689** (2)	**0.662** (3)
3.	Availability of latest technologies	**0.702**	0.678	0.678	0.682	0.693	0.672	0.678	0.662
4.	Extent of marketing	**0.700**	0.671	0.690	0.697	0.649	0.574	0.596	0.586
5.	University-industry collaboration in R&D	**0.690**	0.642	0.650	0.622	0.595	0.590	0.564	0.508
6.	Quality of scientific research institutions	**0.686**	0.633	0.638	0.601	0.566	0.539	0.527	0.486
7.	Nature of competitive advantage	**0.685**	0.609	0.635	0.591	0.555	0.600	0.616	0.586
8.	Availability of research and training services	**0.678**	0.609	0.587	0.579	0.571	0.554	0.560	0.529
9.	Capacity for innovation	**0.664**	0.608	0.644	0.572	0.503	0.507	0.501	0.486
10.	Company spending on R&D	**0.660**	0.610	0.601	0.558	0.535	0.551	0.557	0.507
11.	Extent of staff training	**0.653**	0.621	0.613	0.611	0.626	0.599	0.617	0.599
12.	Quality of primary education	**0.642**	0.600	0.622	0.630	0.637	0.599	0.607	-
13.	Secondary education enrollment	**0.625**	0.612	0.571	0.591	0.610	0.597	0.563	0.534
14.	Reliance on professional management	**0.621**	0.600	0.602	0.583	0.554	0.488	0.502	0.503
15.	Country capacity to retain talent	**0.621**	-	-	-	-	-	-	-
16.	Country capacity to attract talent	**0.587**	-	-	-	-	-	-	-
17.	Quality of management schools	**0.585**	0.542	0.556	0.570	0.543	0.480	0.512	0.475
18.	Quality of math and science education	**0.554**	0.520	0.530	0.552	0.546	0.499	0.509	0.500
19.	PCT patents	**0.554**	0.502	-	-	-	-	-	-
20.	Availability of scientists and engineers	**0.552**	0.512	0.518	0.553	0.523	0.431	0.456	0.413
21.	Tertiary education enrollment	**0.498**	0.438	0.428	0.414	0.424	0.434	0.456	0.424
22.	FDI and technology transfer	**0.460**	0.455	0.460	0.435	0.423	0.441	0.375	0.263
23.	Primary education enrollment	**0.386**	0.390	0.331	0.324	0.355	0.344	0.292	0.297

Source: compiled by the author from data (Global Competitiveness Reports. Dataset 2006-07 to 2014-15; The World Bank Group, 2015).

The theoretical outline and features for compiling CMMs are fairly well described in domestic and foreign scientific periodicals and books (Dyachenko T.A., 2012; Budnik M. M., 2013; Kovtun N., 2011; Malyarets' L.M. & Norik L.O., 2009). Wattenberg M. (2003) has patented the interface system for information mapping, which is now used by the Wall Street Journal to build market maps and to license the map applet[1]. Methodology of the CMMs has found a very broad application in practice and analysis of the dynamics of the individual markets such as the stock market (Kobushko I. M., 2012). Methodology of the competitive internal (national) maps of regional and sectorial markets is actively used, particularly for the regional market of vegetables and agricultural markets (Markova O.V., 2011; Martynchyk O. A., 2014). Analysis of the CMMs on an example of scientific and educational services is specific, because the world has almost no reliable sources that can give objective characteristics for such qualitative indicators as availability of technologies, extent of staff training, nature of competitive advantage, quality of scientific research institutions, etc.. Methodologies for compiling of most international rankings of universities and educational systems use interpretation of quantitative indicators, which are essentially of qualitative nature (Sakharov V.E. & Ilnytskyy D.O., 2011). Although qualitative indicators add significant subjective factor in the analysis, in the methodology for determining the GCI WEF managed to largely overcome these drawbacks. For example, the Global Competitiveness Report 2013–2014 (2013) in order to determine the qualitative characteristics incorporated 13 264 CEOs' questionnaires from 144 countries representing 98.7% of world GDP. Therefore, assessment of certain qualitative indicator, which is used as a characteristic of economic relations, can be considered as the basis for determining the market player position. For instance, such an assessment of IPR protection worldwide could provide the foundation for building a competitive global market maps SESp.

The choice of GCI indicators, as a base for analysis and building map of the global market of scientific and educational services, is also due to the fact that the WEF is the only provider of data in the public domain,

1 To see an example, please visit http://www.marketwatch.com/tools/stockresearch/marketmap

ready for processing data with a long period of time and the data obtained by the method, which eventually virtually unchanged. In compiling GCI experts used informational capacities of major international organizations that provide appropriate information. The main sources for us were the World Economic Forum and the World Bank, although each specific indicator has its own history of origin.

Among the main pillars on which the calculation of GCI is based, the first place by correlation with the GDP per capita worldwide belongs to technological readiness, and other pillars relating to SESp also show a high correlation (Table 2.). Since 2006 tightness of correlation for technological readiness of a country to the GDP per capita increased by 13.7%, for higher education and training by 17.3%, for innovation - 31.2%, for health and basic education - 17.9%, which was the highest growth among all pillars (except the size of the market where the correlation although increased, but was not as strong). IPR protection somehow finds its expression in the performance of ***all*** GCI pillars. By its nature this component can be called to have a ***horizontal*** character (similar to horizontal policies of the EU). Note that the choice of the period from 2006 to 2014 was due to inertia, very slow rate of change in the SESp and the only method of assembly.

Table 2. Hierarchy of GCI pillars by correlation with the GDP per capita PPP

#	GCI pillar	correlation coefficients by year							
		2013-2014	**2012-2013**	**2011-2012**	**2010-2011**	**2009-2010**	**2008-2009**	**2007-2008**	**2006-2007**
	Global Competitiveness Index	0.782	0.774	0.764	0.759	0.752	0.723	0.701	0.675
1	**9th pillar: Technological readiness**	**0.788**	**0.754**	**0.748**	**0.742**	**0.754**	**0.722**	**0.711**	**0.693**
2	2nd pillar: Infrastructure	**0.757**	0.743	0.740	0.743	0.707	0.701	0.702	0.695
3	1st pillar: Institutions	**0.735**	0.709	0.697	0.695	0.712	0.700	0.703	0.688
4	**5th pillar: Higher education and training**	**0.728**	**0.687**	**0.671**	**0.680**	**0.686**	**0.655**	**0.655**	**0.621**
5	11th pillar: Business sophistication	**0.728**	0.690	0.705	0.684	0.648	0.634	0.651	0.627
6	**12th pillar: Innovation**	**0.721**	**0.675**	**0.675**	**0.649**	**0.612**	**0.591**	**0.584**	**0.550**
7	6th pillar: Goods market efficiency	**0.681**	0.659	0.679	0.698	0.668	0.638	0.656	0.652
8	**4th pillar: Health and primary education**	**0.615**	**0.617**	**0.612**	**0.598**	**0.622**	**0.615**	**0.600**	**0.521**
9	8th pillar: Financial market development	**0.567**	0.553	0.577	0.553	0.554	0.627	0.645	0.663
10	7th pillar: Labour market efficiency	**0.537**	0.477	0.502	0.491	0.513	0.498	0.493	0.517
11	3rd pillar: Macroeconomic environment	**0.494**	0.560	0.590	0.586	0.547	0.572	0.530	0.593
12	10th pillar: Market size	**0.362**	0.363	0.356	0.360	0.333	0.339	0.276	0.223

Source: compiled by the author from data (Global Competitiveness Reports. Dataset 2006-07 to 2014-15; The World Bank Group, 2015).

To build a CMM we used mean values provided by the sources as well as checked the calculations. Mean values are crucial, because the deviation from them is a factor of referring to a particular group on a CMM. To determine the place of a country we used the approach of comparing with the mean value of the world (formula 1). In order to determine the place of a country on CMM we further use formula described in the papers mentioned before.

$$Si = \frac{P_i}{P_{avg}} \quad (1).$$

where S_i - the market share of a country on the relevant market;
P_{avg} - mean value of the adjusted [2] qualitative indicators across all countries;
P_i - the adjusted value of qualitative indicator of *i* - country.

Limitations of the results of our analysis include the fact that a number of countries dropped out of the research due to the lack of data on them in the international organizations' databases, however they generally have a small share in the global economy. These were mostly small island countries, and these economies are worthy of separate area of research (e.g. Marshall Islands, Micronesia, Antigua, Solomon, Caribbean, Cayman, Papua New Guinea, Maldives, Cuba etc.), the newly formed small countries (Kosovo, Eritrea, South Sudan). Unfortunately part of them were the countries data for which could enrich our results, particularly Belarus, Afghanistan, Iraq, Turkmenistan, Uzbekistan, Sudan, N. Korea. For a number of countries that did not participate in the GCI in the first years the data for the first periods were replaced with the closest data in the

2 GCI indicators undergo a number of processing procedures, bringing to the point where they can be used to obtain reliable results. See. (The Global Competitiveness Report 2014–2015, 2014).

ranking, in particular these included countries such as Iran, Burma, Angola, Bhutan, Liberia, Côte d'Ivoire, Yemen, Turkey, Ghana and some others.

Since 2008 GCI is constructed in the way that the greatest rates of correlation with GDP per capita shows GCI itself and its individual components do not ahead it, and thus they only collectively demonstrate the synergistic effect of individual factors on the outcome of economies. Moreover, the GDP per capita is the indicator that has a strong and positive relationship with the GCI and is often used by scientists to analyse national productivity levels (The Global Competitiveness Report 2013–2014, 2013).

We decided to check the existence of GCI-indicators correlation with the size of GDP per capita as the main indicator that sum up of all types of economic activity. One of the advantages of this indicator is its relative independence from the size of the economy and its other characteristics.

IV. ANALYSIS OF THE GLOBAL SESP MARKET MAP

To start with we build a global competitive scientific and educational market map based on indicator of quality of protection of intellectual property, which over the last 8 years of compiling GCI has always been in the top three indicators by correlation with GDP per capita, and in for the 2007 - 2013 reports ranked the first. WEF experts assessed the protection of intellectual property rights on a scale of 1 to 7, where the latter is the highest possible score, which enables us to use this quantitative data to map the global market in terms of quality of protection of intellectual property rights (Table 3.).

As we see Finland and Singapore should be attributed to the leaders, which worsened their position during the period analysed (2006-2014). A large group of countries has a strong competitive position, but those that continue to improve the quality of protection of intellectual property are China and its provinces – Taiwan and Hong Kong, and a number of smaller countries. G-7 countries (except Japan) - Britain, Canada, France, Germany and the US - have worsened their positions and even Italy was in the group of countries with weak competitive position accompanying ***Ukraine***, India and ***Romania***. Note that the EU-countries can be found both among groups with a strong competitive position and the weak group, confirming a significant difference in levels of their development as a whole and for the protection of IPR in particular, and the need for their further integration. In general about 67 countries that belong to leaders and groups of countries with a strong competitive position have systems with enough quality of IPR protection.

Analysing Ukraine's position on this map we come to the conclusion of a high degree of subjectivity in resulting index. However, this vision of Ukraine by the world should encourage action to change this attitude. The same is true for Romania as a country that is participating in processes of European integration and expecting FDI to influence economic development. One should note that Romania and Ukraine are neighbouring countries and it is unlikely that they can have too big asymmetries in the levels of socio-economic development.

The analysis only of quality of IPR protection unfortunately does not give us an idea of the real distribution of forces in the scientific and educational markets in the global economy. Therefore we implemented an approach that takes into account the economic performance of the national economy on the welfare of their citizens by weighting qualitative indicators with GDP per capita data (equation 2). To improve the accuracy of the results GDP per capita at PPP standard was used.

$$Siw = Si * \left[\frac{(P]_i}{P_{avg}}\right) \quad (2).$$

where P_i – GDP per capita at PPP standard for *i*-country, P_{avg} – world average GDP per capita at PPP standard.

Results of consideration of GDP per capita gave a very different picture of the global market map in terms of IPR protection, which more adequately describe the current situation regarding the IPR protection and its relative impact on the welfare of the citizens of the world (Table 4.). So the leaders include US monopoly, that although during the period analysed worsened their position. China and India are actively and purposefully improve their strong competitive position, and they are trying to catch up USA with company of S.Korea, Brazil, Russia, Turkey and others. All G-7 countries have worsened, but still have strong competitive positions. Weighing of indicators revealed that a number of EU countries have worsened their position so much that they should be attributed to outsiders – Hungary, Croatia, Slovenia, Estonia, Cyprus, Latvia. Almost all countries in the G-20 joined leaders or countries with strong market positions, except Indonesia, South Africa and Argentina.

Unfortunately Ukraine remained in the group of outsiders, although slightly improved its market position. For many years, scientists say that a place of our country meets the real situation and reflects the

structural asymmetries and imbalances in the policies carried out by governments of countries (Loshenyuk V.Ye., 2009). Both Romania and Ukraine have moved to the group of countries that improve the competitive position, however these countries are still outsiders.

Usage of method to build CMMs based on a combination of qualitative indicators with macroeconomic ones, the main of which can be called GDP (GNI) per capita, opens the possibility of testing to calculate other coefficients and ratios. In particular Herfindahl-Hirschman index to measure of market concentration, Rosenbluth index, other concentration ratios, coefficient of variation, entropy indices etc.. Just like Bikker J.A. and Haaf K. (2002) offer for EU banking industry. Our preliminary calculations show that in the global SESp there is a pretty **intense competition** despite significant dominance of the United States, Japan, China and Germany, which together cover about half of it. Therefore, the development of humanity should consider this competition between countries in order to encourage cooperation and mutually beneficial exchange of gains.

V. CONCLUSION AND FURTHER RESEARCH

It is argued that in a number of countries the system of IPR protection is implemented and functioning **adequately** to their place in the global economy, for example, in Russia which is focused on energy exports, or China and India that are trying to implement quantitative potential of the workforce. The places of Russia, India, Brazil, Turkey on our maps vary dramatically for the better when weighted, which may find other explanations besides of being adequate to their economic interests and strategies of countries, but they should still be found.

Countries outsiders (92 countries) can be attributed to those serving in the global economy as suppliers of resources, especially workforce. It can be argued that with the growth of status of those with a weak competitive position in direction of strong one, there is a change in attitude to IPR and other components of national intellectual capital from their use as a resource into treatment as capital, which is vital for economic development (Lin C.Y.-Y., Edvinsson L., 2011). About 67 countries belonging to the group leaders and countries with a strong competitive position, have built system of IPR protection with enough quality. Only 22 countries are aware of and use their intellectual property as ***capital***, including by engaging it from abroad.

The functioning of system of IPR protection should be an adequate model for the national economy and match the strategic objectives of its development. The example of Finland and Singapore has shown that existence of a system of IPR protection with high quality alone is not enough for leadership or strong positions in global markets. It should match the country's available resources and capital, and national economic interests too. Therefore, a key ***recommendation*** that could be offered for Ukraine and Romania is conducting systematic work to implement the national interests on the global scientific and educational market and to include all aspects of IPR, treat IPR as capital and resource for social and economic development.

Another result of the study is that the world has almost no country where there had been a rapid deterioration of the competitive position. Given that the period under review encompassed almost a decade, we can also conclude that economy is characterized by a significant ***lag*** processes when it comes to the functioning of the IPR protection, but there are good examples of their improvement and its international recognition. Probably for Ukraine and Romania there is a need for common reforms in IPR system. Neighbouring Romania and Ukraine do not have big asymmetries in the levels of IPR protection at the moment.

Further research in this area could better substantiate the findings, refute or confirm them. In particular, analysis of the competitive global market maps using other indicators that are used to compile the GCI. It is likely that the use of other indicators can give a somewhat different picture of global scientific and educational market map. One of the most important future researches should become clearer identification of content of concept of global scientific and educational area and market for its products and services. Priority areas for further research should be defined on the basis of identified national interests.

VI. REFERENCES

1. Bikker J.A. & Haaf K. (2002) *Measures of Competition and Concentration in the Banking Industry: a Review of the Literature*, Economic & Financial Modelling. Summer 2002. pp.1-46. http://www.dnb.nl/en/binaries/Measures%20of%20Competition_tcm47-145799.pdf
2. Budnik M. M. (2013) *Formuvannya ta rozvytok konkurentnykh perevah pidpryyemstva v suchasnykh umovakh roboty na ryn*ku / M. M. Budnik, Ye. S. Kryvoruchko, Problemy i perspektyvy rozvytku pidpryyemnytstva, № 2, pp. 74-78. Retrieved from: http://nbuv.gov.ua/j-pdf/piprp_2013_2_17.pdf. (Буднік М. М. Формування та розвиток конкурентних переваг підприємства в сучасних умовах роботи на ринку / М. М. Буднік, Є. С. Криворучко // Проблеми і перспективи розвитку підприємництва. – 2013. – № 2. – С. 74-78. – Режим доступу: http://nbuv.gov.ua/j-pdf/piprp_2013_2_17.pdf.)
3. De Soto H. (2000) *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* / De Soto H. – New York: Basic Books. – 288 p.
4. *Doslidnyts'ki universytety: svitovyy dosvid ta perspektyvy rozvytku v Ukrayini* (2014) [Monography] / [A. F. Pavlenko, L. L. Antonyuk, N. V. Vasyl'kova, D. O. Ilnytskyy etc..] ; ed. A. F. Pavlenko, L. L. Antonyuk. — K. : KNEU. — 550 p. (Дослідницькі університети:

світовий досвід та перспективи розвитку в Україні : монографія / [А. Ф. Павленко, Л. Л. Антонюк, Н. В. Василькова, Д. О. Ільницький та ін.] ; за заг. ред. А. Ф. Павленка та Л. Л. Антонюк. — К. : КНЕУ, 2014. — 550 с.)

5. Dyachenko T.A. (2012) *Teoretyko-metodychni zasady otsinky konkurentnoho seredovyshcha ta konkurentnoyi pozytsiyi pidpryyemstva na rynku*, Marketynh i menedzhment innovatsiy. – № 4. – pp.203-208. (Дяченко Т.А. Теоретико-методичні засади оцінки конкурентного середовища та конкурентної позиції підприємства на ринку // Маркетинг і менеджмент інновацій. – 2012. – № 4. – С.203-208.)
6. *Education at a Glance 2014 OECD In*dicators (2014), OECD. – OECD Publishing. – 568 p. Retrieved from: http://dx.doi.org/10.1787/eag-2014-en.
7. *Ekonomiko-matematychne modelyuvannya* (2008): Navch. posibnyk/ Za zah. red. V. V. Vitlins'koho. — K.: KNEU, 2008. — 536 p. (Економіко-математичне моделювання: Навч. посібник/ За заг. ред. В. В. Вітлінського. — К.: КНЕУ, 2008. — 536 с.)
8. *Global Competitiveness Reports. Dataset 2006-07 to 2014-15*. / World Economic Forum. Retrieved from: http://www3.weforum.org/docs/GCR2014-15/GCI_Dataset_2006-07-2014-15.xlsx.
9. Iancu V. (2014) *Romania in the context of European innovation and marketing of intellectual output*, Procedia Economics and Finance. 1st International Conference 'Economic Scientific Research - Theoretical, Empirical and Practical Approaches', ESPERA 2013. #8, pp.380 – 387. doi: 10.1016/S2212-5671(14)00104-X
10. Kobushko I. M. (2012) *Vyznachennya rivnya konkurentsiyi na fondovomu rynku yak providnomu sehmenti investytsiynoho rynku* / I. M. Kobushko // Ekonomika Ukrayiny. - №9. - pp.33-46. (Кобушко І. М. Визначення рівня конкуренції на фондовому ринку як провідному сегменті інвестиційного ринку / І. М. Кобушко // Економіка України, 2012. - №9. - С.33-46.)
11. Kovtun N. (2011) *Vykorystannya statystychnoyi informatsiyi dlya pobudovy konkurentnoyi karty rynku* [Electronic resource] / N. Kovtun, O. Khvostenko // Visnyk natsional'noho universytetu imeni Tarasa Shevchenka. Ser. Ekonomika. – №124-125. – pp.21-25. Retrieved from: papers.univ.kiev.ua/ekonomika/10852.pdf. (Ковтун Н. Використання статистичної інформації для побудови конкурентної карти ринку / Н. Ковтун, О. Хвостенко // Вісник національного університету імені Тараса Шевченка. Сер. Економіка. – 2011. – №124-125. – С.21-25. – Режим доступу: papers.univ.kiev.ua/ekonomika/10852.pdf.)
12. Lin C.Y.-Y., Edvinsson L. (2011) *National Intellectual Capital: A Comparison of 40 Countries*. Springer. 392 p.
13. Loshenyuk V.Ye. (2009) *Konkurentospromozhnist' ekonomiky Ukrayiny u mizhnarodnykh reytynhakh* / V.Ye. Loshenyuk // Naukovyy visnyk Chernivets'koho universytetu.– Vypusk 494. Ekonomika. – pp. 14-22. Retrieved from: http://arr.chnu.edu.ua/jspui/bitstream/123456789/746/1/nv_494_losheniuk.pdf. (Лошенюк В.Є. Конкурентоспроможність економіки України у міжнародних рейтингах // Науковий вісник Чернівецького університету. – 2009. – Випуск 494. Економіка. – С. 14-22. Режим доступу: http://arr.chnu.edu.ua/jspui/bitstream/123456789/746/1/nv_494_losheniuk.pdf.)
14. Malyarets' L.M., Norik L.O. (2009) *Ekonomiko-matematychni aspekty diahnostyky konkurento-spromozhnosti pidpryyemstva* / L.M. Malyarets', L.O. Norik – [Monohrafiya] Naukove vydannya. – Kharkiv: Vyd. KhNEU. – 214 p. (Малярець Л.М., Норік Л.О. Економіко-математичні аспекти діагностики конкуренто-спроможності підприємства / Л.М. Малярець, Л.О. Норік – [Монографія] Наукове видання. – Харків: Вид. ХНЕУ, 2009. – 214 с.)
15. Maringe F. (2015) *Higher Education Market*. International Encyclopedia of the Social & Behavioral Sciences (Second Edition), pp. 850–861. doi:10.1016/B978-0-08-097086-8.92118-4
16. Markova O.V. (2011) *Formuvannya konkurentnoyi karty rehional'noho rynku plodoovochevoyi produktsiyi* / O.V. Markova // Visnyk Kharkivs'koho natsional'noho tekhnichnoho universytetu sil's'koho hospodarstva: Ekonomichni nauky.– Vyp. 112. — Kharkiv: KhNTUS·H. Retrieved from: http://khntusg.com.ua/files/sbornik/vestnik_112/68.pdf. (Маркова О.В. Формування конкурентної карти регіонального ринку плодоовочевої продукції // Вісник Харківського національного технічного університету сільського господарства: Економічні науки. – 2011. – Вип. 112. — Харків: ХНТУСГ)
17. Martynchyk O. A. (2014) *Otsinka konkurentnoho seredovyshcha sil's'kohospodars'kykh pidpryyemstv Zhytomyrs'koyi oblasti* / O. A. Martynchyk // BIZNESINFORM, № 7, pp. 149-153. (Мартинчик О. А. Оцінка конкурентного середовища сільсько-господарських підприємств Житомирської області / О. А. Мартинчик // БІЗНЕСІНФОРМ, 2014. – № 7. – С. 149-153.)
18. Mochernyy S.V. (2001) *Metodolohiya ekonomichnoho doslidzhennya* / S.V. Mochernyy – L.: Svit. – 415 p. (Мочерний С.В. Методологія економічного дослідження / С.В. Мочерний – Л.: Світ, 2001. – 415 с.)
19. QS World University Rankings: Methodology (2014). Retrieved from: http://www.topuniversities.com/university-rankings-articles/world-university-rankings/qs-world-university-rankings-methodology.
20. Sakharov V.E. & Ilnytskyy D.O. (2011) *Methodical grounds for international competitiveness assessment of world class research universities*, Actual problems of economics, № 11, pp.152-168.
21. Sandu S. (2014) *Market of R&D Results in Romania*, Procedia Economics and Finance, ESPERA 2013. Volume 8, pp. 649–657. doi:10.1016/S2212-5671(14)00140-3
22. *Stratehiya staloho rozvytku "Ukrayina - 2020"* (2015), skhvalena Ukazom Prezydenta Ukrayiny vid 12 sichnya 2015 roku № 5/2015// Ofitsiynyy visnyk Ukrayiny, 23.01.2015. – № 4, p. 8. (Стратегія сталого розвитку "Україна - 2020", схвалена Указом Президента України від 12 січня 2015 року № 5/2015// Офіційний вісник України, 23.01.2015. – № 4, с. 8.)
23. *The Global Competitiveness Report 2013–2014* (2013). Full Data Edition. / Klaus Schwab, Xavier Sala-i-Martín, World Economic Forum. Switzerland. – 553 p. Retrieved from: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2013-14.pdf.
24. *The Global Competitiveness Report 2014–2015* (2014). Full Data Edition. / Klaus Schwab, Xavier Sala-i-Martín, World Economic Forum. Switzerland. – 549 p. Режим доступу: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf.
25. *The World Bank Group* (2015). GDP per capita, PPP (current international $) Retrieved from: http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD.
26. *U21 Ranking of National Higher Education Systems* (2014). Retrieved from: http://www.universitas21.com/article/projects/details/152/u21-ranking-of-national-higher-education-systems.
27. Varga G., Boreschievici B., Atanasoaie A., Bararu C.-M., Nicolae E. (2002) *Dissemination of information in the field of industrial property protection in Romania*, World Patent Information. Volume 24, Issue 1, March 2002, pp. 41–46. doi:10.1016/S0172-2190(01)00060-6.
28. Wattenberg M. (2003) *US patent US6583794: Interface system for information mapping*. Retrieved from: https://www.google.com/patents/US6583794
29. *World University Rankings 2014-2015 methodology* (2014). Retrieved from: http://www.timeshighereducation.co.uk/world-university-rankings/2014-15/world-ranking/methodology.
30. Yegorov I. (2009) *Post-Soviet science: Difficulties in the transformation of the R&D systems in Russia and Ukraine*, Research Policy. Special Issue: Emerging Challenges for Science, Technology and Innovation Policy Research: A Reflexive Overview. Volume 38, Issue 4, May 2009, pp. 600–609. doi:10.1016/j.respol.2009.01.010
31. Yurynets' Z. V. (2014) *Analiz metodyk i rezul'tativ otsinky konkurentospromozhnosti natsional'nykh ekonomik u napryami vprovadzhennya innovatsiy* / Z. Yurynets' // Stratehiya ekonomichnoho rozvytku Ukrayiny, № 34, pp.57-63. (Юринець З. В. Аналіз методик і результатів оцінки конкурентоспроможності національних економік у напрямі впровадження інновацій / З. Юринець // Стратегія економічного розвитку України. – 2014. – № 34. – С.57-63.)

Table 3. Global SESp market map by quality of IPR protection

		the size of the market share			
		leader	**strong competitive position**	**weak competitive position**	**outsider**
the rate of growth of market share	**rapid improvement of the competitive position**	-	New Zealand, Qatar, Luxembourg, Puerto Rico, Hong Kong (**China**), South Africa, United Arab Emirates, Taiwan (**China**), Oman, Saudi Arabia, Malta, Panama, Jordan, Brunei Darussalam, Namibia, Gambia, Botswana, Latvia, Swaziland, **China**, **Macedonia**, Indonesia, Ghana, Zambia, Kuwait	Azerbaijan, **Poland**, Kazakhstan, **Turkey**, Armenia, Montenegro, Philippines, Ecuador, **Brazil**, Nicaragua, Ethiopia, Kenya, Sierra Leone, Malawi, Trinidad and Tobago, Lesotho, Bolivia, Cambodia, **Bulgaria**, Cape Verde, **Russian Federation**, Albania, **Serbia** Nepal, Suriname, Uganda, Peru, Côte d'Ivoire, Timor-Leste, Bangladesh, Bosnia and Herzegovina, Yemen, Burundi	Chad, Haiti
	improvement of the competitive position	-	**Japan,** Estonia, Rwanda, Barbados, Uruguay, Seychelles, Costa Rica, Sri Lanka	**Lithuania,** Mexico, Jamaica, Tanzania, Senegal, Zimbabwe, Vietnam, Iran, Mozambique, Mongolia, Angola, Paraguay	Guinea
	deteriorating competitive position	**Finland,** Singapore	**United Kingdom, Canada**, Norway, Ireland, Bahrain, Cyprus, Bhutan, **Czech Republic**, Laos	**Slovak Republic,** Belize, **Georgia**, **Moldova**, Myanmar	
	rapid deterioration of the competitive position	-	Switzerland, Netherlands, **France**, **Germany**, Sweden, Austria, Australia, Belgium, **USA**, Denmark, Iceland, Malaysia, Israel, Portugal, Slovenia, S.Korea, Mauritius, Spain, **Hungary**, Chile	**Italy,** Liberia, **Greece**, **India**, **Croatia**, Burkina Faso, Morocco, Egypt, Colombia, Tunisia, Cameroon, Benin, Thailand, Honduras, Dominican Republic, Madagascar, Pakistan, **Romania**, Guatemala, El Salvador, Nigeria, Mali, Gabon, Mauritania, **Ukraine,** Lebanon, Argentina, Kyrgyzstan	Algeria, Libya, Venezuela

Source: compiled by the author from data (Global Competitiveness Reports. Dataset 2006-07 to 2014-15.).

Table 4. Global SESp market map by quality of IPR protection adjusted with GDP per capita PPP

		the size of the market share			
		leader	**strong competitive position**	**weak competitive position**	**outsider**
the rate of growth of market share	**rapid improvement of the competitive position**	-	**China**, **India**	Indonesia	Peru, Vietnam, Sri Lanka, Angola, Panama, Azerbaijan, Ethiopia, Ghana, Tanzania, Zambia, Uganda, Mozambique, **Georgia**, Rwanda, Laos, Mongolia, Bhutan
	improvement of the competitive position	-	Australia, Korea, Taiwan **(China**), **Brazil**, **Russian Federation**, Switzerland, Saudi Arabia, **Turkey**	South Africa, **Poland, Hong Kong (China**), United Arab Emirates, Singapore, Malaysia, Israel, Argentina, Thailand, Colombia, Chile, Iran	Philippines, Nigeria, Pakistan, **Romania,** Egypt, Algeria, **Kazakhstan**, Venezuela, Morocco, **Slovakia**, Luxembourg, **Ukraine**, Bangladesh, Dominican Republic, Tunisia, **Lithuania,** Costa Rica, Guatemala, Uruguay, Bahrain, **Bulgaria**, Kenya, Jordan, Cameroon, Lebanon, Côte d'Ivoire, El Salvador, Trinidad and Tobago, Botswana, Bolivia, Namibia, Honduras, Senegal, Mauritius, Nepal, Paraguay, Albania, Gabon, **Macedonia**, Cambodia, Burkina Faso, Chad, Armenia, Mali, Madagascar, Malawi, **Moldova**, Montenegro, Haiti, Kyrgyzstan, Sierra Leone, Guinea, Lesotho, Suriname, Mauritania, Seychelles, Cape Verde, Burundi, Guyana, Gambia
	deteriorating competitive position	**USA**	**Japan, Germany, Britain, France, Canada, Italy, Spain,** Netherlands, Mexico, Sweden, Belgium	Austria, Norway, Denmark, **Finland,** Ireland, Portugal, New Zealand, Greece, Czech Republic	Puerto Rico, **Hungary**, **Croatia, Slovenia**, Iceland, Estonia, Cyprus, Latvia, Libya, Jordan, Malta, Nicaragua, Zimbabwe, Swaziland
	rapid deterioration of the competitive position	-	-	-	-

Source: compiled by the author from data (Global Competitiveness Reports. Dataset 2006-07 to 2014-15; The World Bank Group, 2015).