

UDC 330.341.1 : 330.117

## THE ESTIMATION OF INNOVATIVE POTENTIAL OF UKRAINE

**O. Maslak, D. Kozhushko**

Kremenchuk Mychailo Ostrogradskyi National University

vul. Pershotravneva, 20, Kremenchuk, 39600, Ukraine.

E-mail: oimaslak@yandex.ru; dasha.kozhushko@mail.ru

This article is devoted to the study of necessary and features of evaluation of innovative potential of Ukraine in the formation of new scientific and technological structure, the processes of globalization and constant volatility, macro instability. The article contains different interpretations of the definition of «innovation potential», formed their own understanding of the concept of «innovation potential of the state». Presented approach to structuring innovative potential and the author's vision of the essence of its components. The method of estimation of innovative potential of Ukraine-based clustering indexes all its elements: intellectual, human, financial, infrastructural and logistical capacities.

**Key words:** innovation potential, the components of innovation potential, intellectual potential, scientific and technological development.

## ОЦІНКА ІННОВАЦІЙНОГО ПОТЕНЦІАЛУ УКРАЇНИ

**О. І. Маслак, Д. М. Кожушко**

Кременчуцький національний університет імені Михайла Остроградського

вул. Першотравнева, 20, м. Кременчук, 39600, Україна.

E-mail: oimaslak@yandex.ru; dasha.kozhushko@mail.ru

Стаття присвячена дослідженню необхідності та особливостей оцінки інноваційного потенціалу України в умовах формування нового науково-технологічного укладу, глобалізаційних процесів та постійної мінливості, нестабільності макросередовища. У роботі наведено різні трактування дефініції «інноваційний потенціал», сформовано власне розуміння поняття «інноваційний потенціал держави». Представлено підхід щодо структурування інноваційного потенціалу країни та авторське бачення сутності його складових. Наведено методiku оцінювання інноваційного потенціалу України на основі групування індексів усіх його елементів: інтелектуального, кадрового, фінансового, інфраструктурного та матеріально-технічного потенціалів.

**Ключові слова:** інноваційний потенціал держави, складові інноваційного потенціалу, інтелектуальний потенціал, науково-технічний розвиток.

**PROBLEM STATEMENT.** In today's context of globalization and internationalization, rapid growth of science and the impact of new technologies on social and economic development essential to the development of the national economy is growing and ensuring the effective use of innovative potential.

Ukraine took the 71 st place in new innovative ranking Global Innovation Index 2013, dropping a year for eight positions. In the ranking of the Cornell University business school INSEAD and the World Intellectual Property Organization WIPO Ukraine received the index 35.78 (on a scale from 0 to 100), being between Tunisia and Mongolia. At the same time Ukraine is one of the leaders in innovativeness in the group of 36 countries with medium to low-income countries [1].

This situation requires finding efficient methods of improving innovation and

scientific and technological progress. However, as we know, can not be improved any phenomenon or process, without taking his current position and not recognizing its problematic aspects. This updated the search for new methodologies to assess the innovation potential of Ukraine and the definition of «bottlenecks» in the course of its development. The development of innovation potential subject issues in many contemporary works of domestic and foreign scholars, among them: A. Amoshi, Y. Bazhala, B. Burkyns'kyi, V. Geets, B. Danylishyn, B. Lanovik, S. Onishko ets.

However, given the complexity and breadth of the outlined issues that require further research approaches to identifying and assessing innovative potential of Ukraine, which is the purpose of this study.

EXPERIMENTAL PART AND RESULTS OBTAINED. First of all, it should be noted that the term «innovation capacity» is interpreted by different scholars in their own way, a common understanding, despite extensive knowledge of the issues do not exist so far. In order to form their own understanding of the term should, above all, to conduct a brief analysis of current views on the definition. In Table. 1 shows the interpretation of well-known scientists and economists nature of the concepts of «innovation potential» and «potential».

Table 1 – Defining the potential in the writings of eminent scientists

The concept	The author	Essence of the term
1	2	3
The potential	Great Dictionary of the Ukrainian language	1) energetic characteristics of a particular point of the force field (electric, gravitational), which determines the potential energy of the body with the appropriate charge, which is located at this point. 2) the combination of all available means, opportunities, productive forces etc., which can be used in any industry, region, area. Stock of something; reserve. Hidden ability, strength for any activity that may be subject to conditions.
	The Great Soviet Encyclopedia	it's available tools, supplies and sources that can be used for a particular purpose, solving specific tasks and capabilities of the individual, society and state in a particular area
	Arkhangel'skii V. M., Zinoviev L.E.	vehicles, supplies, sources that are available and can be mobilized to achieve a particular goal or solving a particular problem
The innovative potential	Zaharchenko V.I.	This is one of the three components of the innovation space, which includes a "personal competencies business leaders, professional and economic training, professional achievements (author's identity, inventions, etc.), logistical and financial support
	Balabanov I.T.	The totality of different types resources, including physical, financial, intellectual, information and other resources, needed for realization of innovative activity
	Kokurin D.I.	contains unused and hidden features of accumulated resources that can be employed to achieve the aims of economic agents

The continuation of table 2

1	2	3
The innovative potential	Masalov A.	represents a special category of content that includes not only innovative resources and mechanism of their use in the organizational and economic system, but also the activity of innovation processes in the regional economy
	Martyusheva L.S., Kalishenko V.O.	organized in a certain socio-economic forms of resource that may, under certain existing internal and external factors of innovation environment be directed to innovation, purpose of which is satisfaction the new needs of society.

Analyzing shown in Table. 1 definition of innovation potential should agree with the opinion Martyushev L.S. and Kalishenko V.A., although there are different approaches to the interpretation of the term, but all the emphasis on resource availability or the possibility of their use. But most of the so-called resource guided approach that represents innovative capacity as a set of resources, often highlighting its elements such as human resources, information and methodological, organizational and logistical components [2].

In our opinion the innovation potential of the state is a collection of all the country's resources and capabilities to ensure the effective and innovative technological development and national capacity to implement perspective ways of innovation development in the current economic conditions.

There are different approaches to structuring innovative potential, in our opinion its stock should isolate: intellectual, human, financial, infrastructural and logistic potentials (Fig. 1).

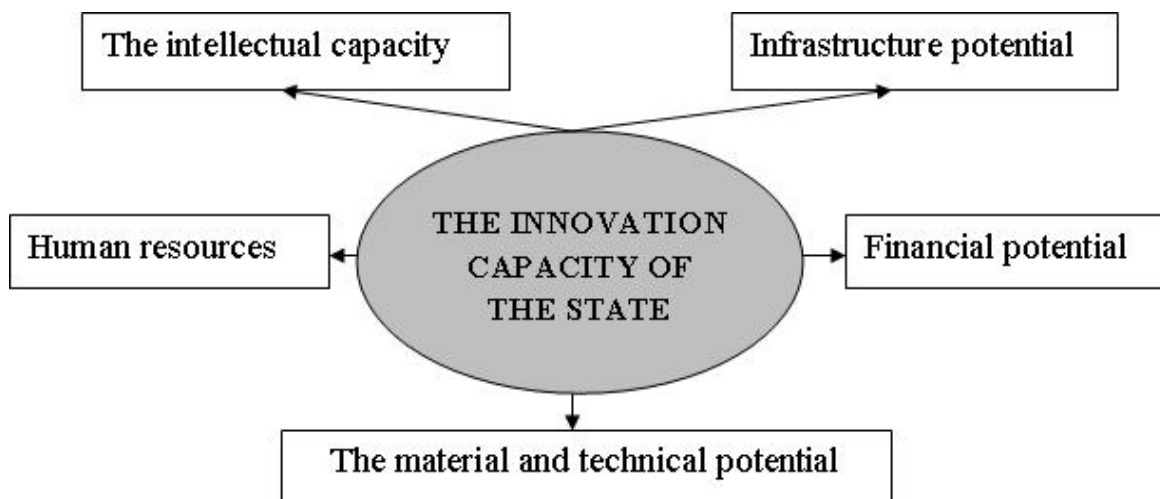


Figure 1 – The structure of the innovation capacity of the state

Thus, **the intellectual capacity** is the possibility of the State to introduce innovations and development of innovation culture, increase power of intellectual

capital. **Human resources** – the ability of qualified human resources for the innovation process in the country. **Financial potential** is the amount of financial resources in the country for research and technological development, development innovation, scientific research, etc. **Infrastructure potential** covers the different forms of ownership and activities that provide the necessary conditions for stimulation, expansion, efficiency, and accelerated development of the innovation process. **The material and technical potential** – a combination of material and technical resources that can ensure the development of the innovation process in the country.

As noted earlier, it is very important to find the most appropriate and efficient method of estimation of innovative potential. In our opinion, very successful method is shown in Fig. 2 and is based on the calculation indexes that characterize innovation potential.

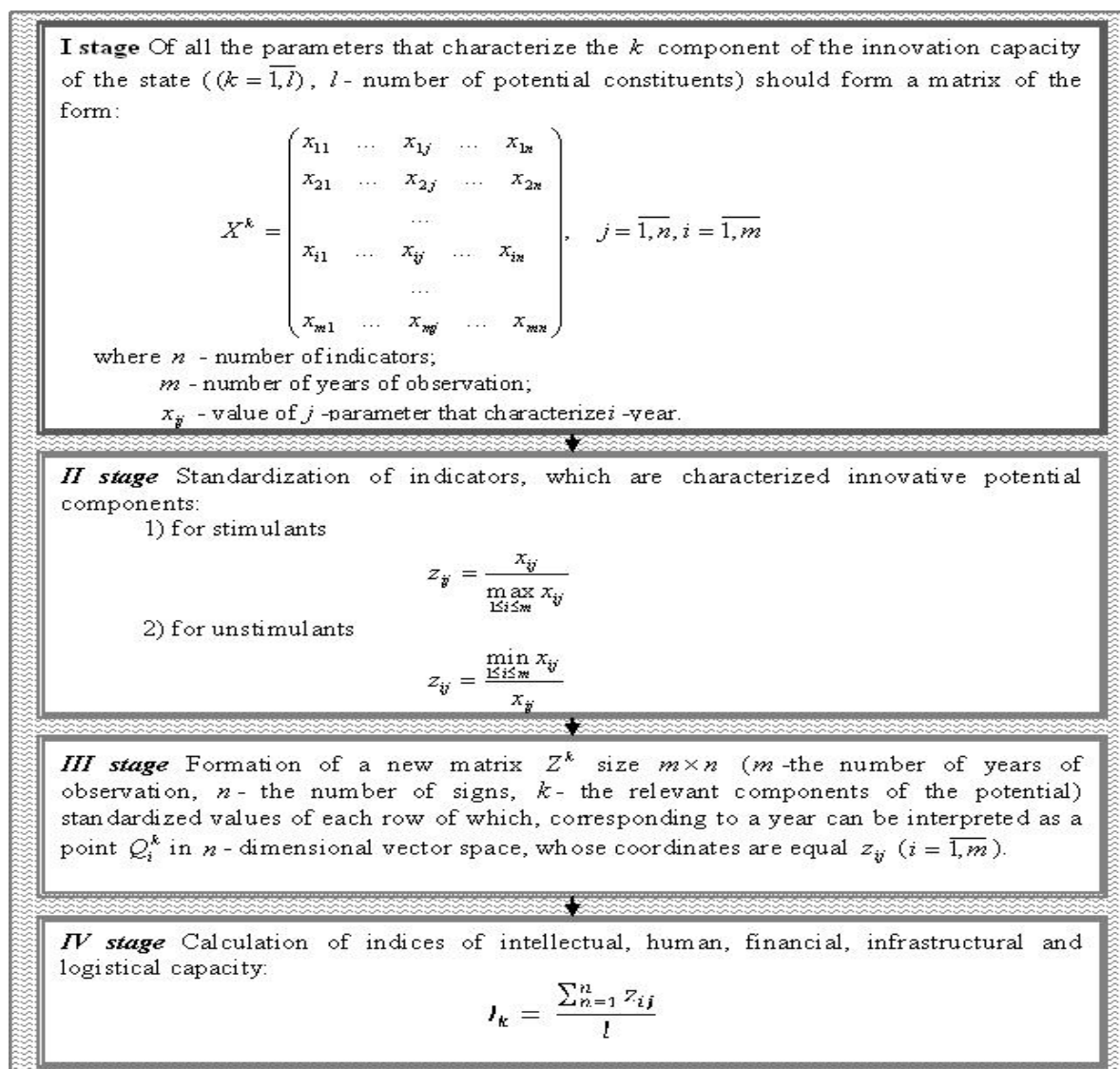


Figure 2 – Algorithm for assessment of innovation potential state on the basis indexes of its components

The results of the proposed methodology for assessing innovative potential of Ukraine in 2010, 2011 and 2012 are shown in Table. 2. It should be noted, the value of each index ideally equal to 1. That is, the closer it is to 1, the higher the level of one or another component of the innovation potential.

Table 2 – Evaluation of innovative potential of Ukraine in 2010, 2011 and 2012  
[3, 4, 5, 6, 7, 8]

Indicators	2010	2011	2012	Standardized values		
				2010	2011	2012
1	2	3	4	5	6	7
The number of patents;	3874	4061	3405	0,954	1,000	0,838
The number of acquired new technologies (technological advances) in Ukraine;	565	672	571	0,841	1,000	0,850
The number of acquired new technologies (technological advances) outside Ukraine;	142	200	168	0,710	1,000	0,840
The amount of scientific and technical work performed by its own organizations (enterprises), mln.uah	9867,1	10349,9	11252,7	0,877	0,920	1,000
<b>The index of intellectual capacity</b>	<b>0,845</b>	<b>0,980</b>	<b>0,882</b>	–	–	–
The number of pupils, students of vocational schools; per 10,000 population (at year-end, persons)	95	90	93	1,000	0,947	0,979
The number of students in higher education I – IV accreditation levels; per 10,000 population (in the beginning of the school year ..., persons)	544	506	477	1,000	0,930	0,877
The number of specialists who perform scientific and technical work (persons)	89534	84969	82032	1,000	0,949	0,916
The number of Employees of scientific organizations, thousand persons	141,1	134,7	129,9	1,000	0,955	0,921
The number of doctors of science who are employed in the economy of Ukraine;	14418	14895	15592	0,925	0,955	1,000
The number of candidates of sciences employed in the economy of Ukraine;	84000	84979	88057	0,954	0,965	1,000
The number of graduate students;	34653	34192	33640	1,000	0,987	0,971
The number of doctoral candidates	1561	1631	1814	0,861	0,899	1,000
The index of human resources	<b>0,967</b>	<b>0,948</b>	<b>0,958</b>	–	–	–
Index of investment in fixed assets; percent to the previous year	103,4	118,9	108,3	0,870	1,000	0,911
Internal current expenditure on scientific and technical work performed by its own scientific organizations; (in fact. prices, thous.uah)	8825559,7	9365003,6	10335136,5	0,854	0,906	1,000
Expenditures on innovative activity, million. UAH.	8045495,2	14333891,9	11480562,8	0,561	1,000	0,801
Financing of scientific and technical work (in fact. prices, thous. uah)	8995893,9	9591349,5	10558480,1	0,852	0,908	1,000
<b>The index of financial potential</b>	<b>0,784</b>	<b>0,954</b>	<b>0,928</b>	–	–	–
The number of subjects USREOU;	1258513	1294641	1323807	0,951	0,978	1,000
The number of organizations that carry out scientific and technical work;	1303	1255	1205	1,000	0,963	0,925

The continuation of table 2

1	2	3	4	5	6	7
The number of higher education institutions of I-IV accreditation levels;	854	846	823	1,000	0,991	0,964
The number of institutions with graduate studies;	530	524	521	1,000	0,989	0,983
The number of institutions with doctoral studies;	263	266	271	0,970	0,982	1,000
<b>The index of infrastructure capacity</b>	<b>0,984</b>	<b>0,980</b>	<b>0,974</b>	–	–	–
The value of fixed assets of organizations engaged in scientific and technical activities; million uah.	11256,8	12987,5	12534,2	0,867	1,000	0,965
The capital-workers core of scientific organizations; thousand uah.	82,3	86,7	82,5	0,949	1,000	0,952
The technical equipment workers core of scientific organizations; thousand uah.	23,5	25,8	24,7	0,911	1,000	0,957
The total area of their premises scientific organizations per one employee average number of full-time employees scheduling;	62,3	65,7	66,3	0,940	0,991	1,000
The availability of computer technology park (in the beginning., thousand)	2458,2	2679,4	2701,2	0,910	0,992	1,000
<b>The index of material and technical capacity</b>	<b>0,915</b>	<b>0,997</b>	<b>0,975</b>	–	–	–

Based on the indices of the components of the innovation capacity of the state is possible to construct graphical model, designed to study their balance. The form of a pentagon building may be of two types. The first type is the correct form – a figure visually close to the pentagon. That is the underlying year the state has balanced innovation potential.

The second type has a curved shape, the reason for this may be twofold: one of the components of the innovation potential of the state is more advanced, or all its components developed in different ways (potential disharmony components). If in the state is a second type forms a pentagon, its capacity needs urgent reforms that would improve the innovation development.

In Fig. 3-5 presents graphical model innovation potential of Ukraine for 2010-2012. From these figures we can conclude that the best thing was the shape of a polygon graphic innovation potential of Ukraine in 2011, indicating that the balance of its components in this period.

Thus in 2010, were worse quality of financing innovative development and intellectual capacity. In 2012, despite the improvement of these components significantly decreased index of intellectual potential. All this points to the need to stimulate a balanced development of high-tech national production.

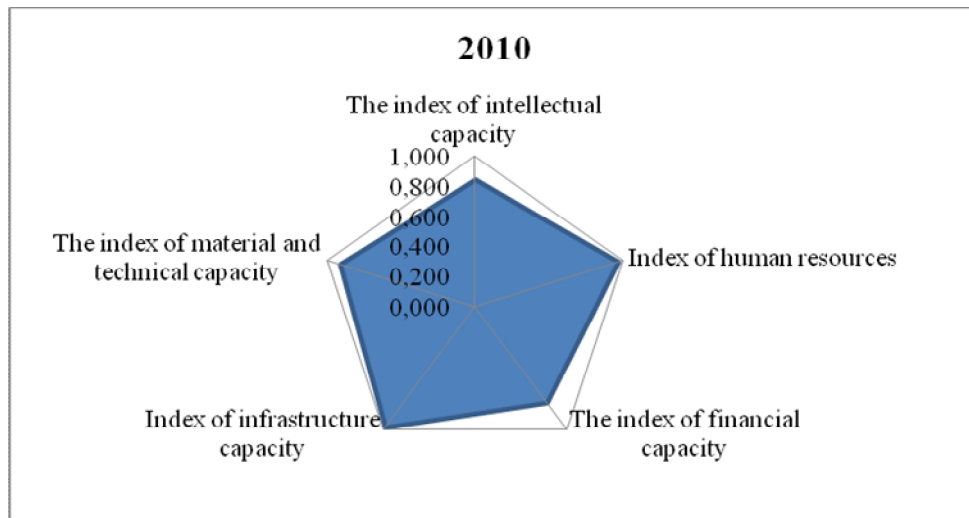


Figure 3 – A graphical model of innovation potential Ukraine in 2010

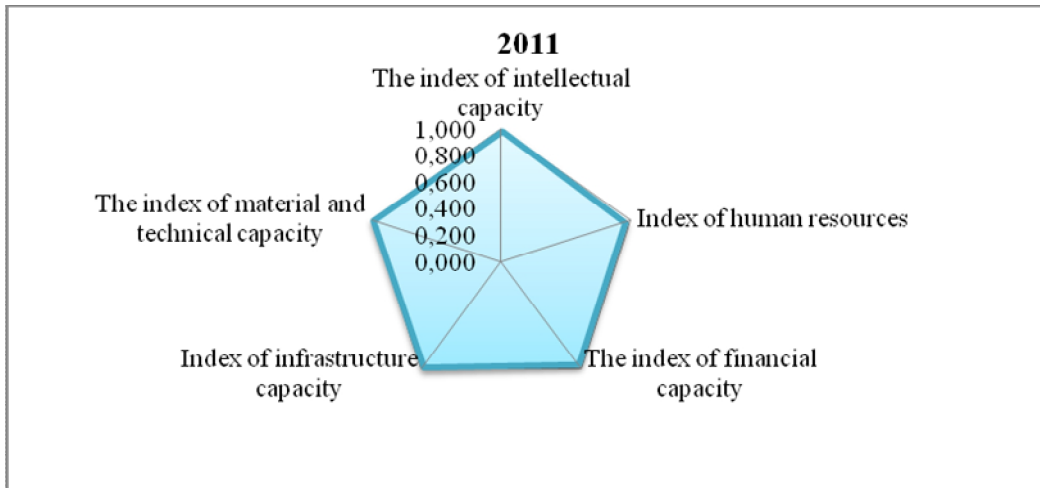


Figure 4 – Graphical model of innovation potential Ukraine in 2011

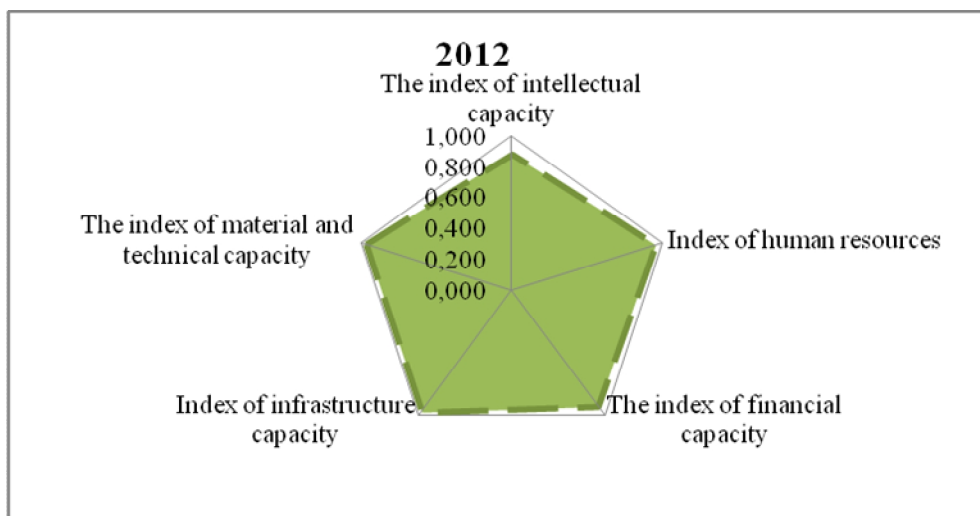


Figure 5 – Graphical model of innovation potential Ukraine in 2012

CONCLUSIONS. So, conducted statistical analysis indicates deterioration of components of innovation potential of Ukraine in 2012. In the same period fell Global Innovation Index (from 63rd place to 60th among 125 countries), which is caused by the following factors:

- the level of development higher education in Ukraine in 2012, took 34th place (39th in 2011), particularly in terms of coverage of higher education – 8<sup>th</sup> place, by the percentage of graduates of science and engineering focus – 19th place;
- evaluation of research and development includes 3 indicators: the number of researchers per 1 million population – 44th, spending on research and development – 37 and the quality of research institutions – 69th;
- for effectiveness research in Ukraine 2012 took place 30 (40 – in the 2011), in particular for indicators: the creation of new scientific knowledge, which is characterized by the number of patents and scientific papers – 21 seats, knowledge – 55, the impact of knowledge – 66 place.

All changes are defined clearly reflected in the proposed approach to the assessment of innovation potential of Ukraine, which makes it possible not only to obtain a quantitative estimate of its components, but also analyze their dynamics using graphical models. In further studies on this issue is planned to develop innovative models of Ukraine, search optimization techniques and patterns to balance innovation potential.

#### REFERENCES

1. Knyazevych, A. (2013), “Global Innovation Index – evaluation of innovation potential Ukraine”, *Journal TNEU*, no. 2, pp. 142–148.
2. Martyushev, L., Kalyshenko, V. (2002), “The innovative potential of the company as an object of economic research”, *Finance of Ukraine*, no.10, pp. 61–66.
3. Osaulenko, O. (Ed.) (2013), *Ukraine in Numbers 2012: [Statistical Yearbook]*, State Statistics Service of Ukraine, Kyiv, 245 p., Ukraine.
4. Osaulenko, O. (Ed.) (2013), *Statistical Yearbook of Ukraine for 2012*, State Statistics Service of Ukraine, Kyiv, 551 p., Ukraine.
5. *Scientific and innovation activity in Ukraine: [Statistical Yearbook]*. (2013). State Statistics Service of Ukraine, Kyiv, 285 p., Ukraine.
6. Osaulenko, O. (Ed.) (2013), *Ukraine Regions [Statistical Yearbook]*, Part II, State Statistics Service of Ukraine, Kyiv, 285 p., Ukraine.
7. *Scientific and technological sphere Ukraine*. (2013). State Agency on Science, Innovations and Informatization of Ukraine, Kyiv, 25 p., Ukraine.
8. *State Statistics Service of Ukraine*, available at: [www.ukrstat.gov.ua/](http://www.ukrstat.gov.ua/), (accessed January 15, 2014).

#### ОЦЕНКА ИННОВАЦИОННОГО ПОТЕНЦИАЛА УКРАИНЫ

**О. И. Маслак , Д. М. Кожушко**

Кременчугский национальный университет имени Михаила Остроградского  
ул. Первомайская, 20, г. Кременчуг, 39600, Украина.

E-mail: oimaslak@yandex.ru; dasha.kozhushko@mail.ru



Стаття посвячена дослідженню необхідності і особливостей оцінки інноваційного потенціалу України в умовах формування нового науково-технологічного укладу, глобалізаційних процесів і постійної змінливості, нестабільності макросередовища. В роботі приведені різні трактування визначення «інноваційний потенціал», сформульовано авторське розуміння поняття «інноваційний потенціал держави». Представлені підходи до структуризації інноваційного потенціалу країни і авторське бачення сутності його складових. Приведено методика оцінки інноваційного потенціалу України на основі групування індексів всіх його елементів: інтелектуального, кадрового, фінансового, інфраструктурного і матеріально-технічного.

**Ключові слова:** інноваційний потенціал держави, складові інноваційного потенціалу, інтелектуальний потенціал, науково-технічне розвиток.

### ЛІТЕРАТУРА

1. Князевич А. Глобальний інноваційний індекс – оцінка інноваційного потенціалу України / А. Князевич // Вісник ТНЕУ. – 2013. – №2. – С. 142–148.
2. Мартюшева Л.С. Інноваційний потенціал підприємства як об'єкт економічного дослідження / Л. С. Мартюшева, В. О. Калишенко // Фінанси України. – 2002. – № 10. – с. 61–66.
3. Україна у цифрах 2012: [Статистичний збірник] / За ред. О. Г. Осауленка. – К.: Державна служба статистики України, 2013. – 245 с.
4. Статистичний щорічник України за 2012 рік / За ред. О. Г. Осауленка. – К.: Державна служба статистики України, 2013. – 551 с.
5. Наукова та інноваційна діяльність в Україні: [Статистичний збірник]. – К.: Державна служба статистики України, 2013. – 285 с.
6. Регіони України: [Статистичний збірник] / За ред. О. Г. Осауленка.. – К.: Державна служба статистики України, 2013. – Частина II. – 285 с.
7. Науково-технологічна сфера України. – К.: Державне агентство з питань науки, інновацій та інформатизації України, 2013. – 25 с.
8. Державна служба статистики України [Електронний ресурс]. Офіційний сайт. – Режим доступу : <http://www.ukrstat.gov.ua/>.

Стаття надійшла 02.02.2014