ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

2018 • 4

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ

БАЯНДАМАЛАРЫ

ДОКЛАДЫ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

REPORTS

OF THE NATIONAL ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN

ЖУРНАЛ 1944 ЖЫЛДАН ШЫҒА БАСТАҒАН
ЖУРНАЛ ИЗДАЕТСЯ С 1944 г.
PUBLISHED SINCE 1944

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ
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«Қазақстан Республикасы Ұлттық ғылым академиясының баяндамалары»
ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы» Республикалық қоғамдық бірлестігі (Алматы қ.)
Қазақстан республикасының Мәдениет пен ақпарат министрлігінің Ақпарат және мұрағат комитетінде 01.06.2006 ж. берілген **№5540-Ж** мерзімдік басылым тіркеуіне қойылу туралы куәлік

Мерзімділігі: жылына 6 рет.
Тиражы: 500 дана.

Редакцияның мекенжайы: 050010, Алматы қ., Шевченко көш., 28, 219 бөл., 220, тел.: 272-13-19, 272-13-18,
http://nauka-nanrk.kz. reports-science.kz

Типографияның мекенжайы: «Аруна» ЖК, Алматы қ., Муратбаева көш., 75.

ДОКЛАДЫ **2018• 4**
НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН

Доклады Национальной академии наук Республики Казахстан»
ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

Собственник: Республиканское общественное объединение «Национальная академия наук Республики Казахстан» (г. Алматы)
Свидетельство о постановке на учет периодического печатного издания в Комитете информации и архивов Министерства культуры и информации Республики Казахстан **№5540-Ж**, выданное 01.06.2006 г.

Периодичность: 6 раз в год.
Тираж: 500 экземпляров

Адрес редакции: 050010, г.Алматы, ул.Шевченко, 28, ком.218-220, тел. 272-13-19, 272-13-18
http://nauka-nanrk.kz. reports-science.kz

Адрес типографии: ИП «Аруна», г.Алматы, ул.Муратбаева, 75

REPORTS **2018 • 4**
OF NATIONAL ACADEMY OF SCIENCES OF THE
REPUBLIC OF KAZAKHSTAN

Reports of the National Academy of Sciences of the Republic of Kazakhstan.
ISSN 2224-5227
ISSN 2518-1483 (Online),
ISSN 2224-5227 (Print)

Owner: RPA "National Academy of Sciences of the Republic of Kazakhstan" (Almaty)
The certificate of registration of a periodic printed publication in the Committee of Information and Archives of the Ministry of Culture and Information of the Republic of Kazakhstan N 5540-Ж, issued 01.06.2006

Periodicity: 6 times a year
Circulation: 500 copies

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

Address of printing house: ST "Aruna", 75, Muratbayev str, Almaty

REPORTS OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
ISSN 2224-5227
Volume 4, Number 320 (2018), 88 – 94

UDC: 339.9(574)
SRSTI: 06.52.42
DOI

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KAZAKHSTAN IN THE CONTEXT OF THE GLOBAL INDEX OF INNOVATIVE ACTIVITY

Abstract. The article analyzes the position of the Republic of Kazakhstan in the Global Innovation Activity Rating of Countries, compiled by the World Intellectual Property Organization (WIPO), Cornell University and the INSEAD Research Institute. The rating of countries on the index of innovative development of the most close to the economy of the Republic of Kazakhstan and advanced economies such as: Australia, Belarus, Brazil, Britain, Germany, India, Canada, China, Kyrgyzstan, Mongolia, Russia, Singapore, Turkey, Ukraine, Switzerland, South Korea, Japan. In addition, an analysis of the innovation system of Kazakhstan was done and the main problems that hampered the development of the innovative economy were identified.

Keywords: Innovation, a global index of innovation, scientific and technological progress, the level of innovative development, public-private partnership.

Introduction. For several centuries, the most important factor of economic development is scientific and technological progress, which is directly related to the innovation process, the basis of which it is.

The uniqueness of the innovation process is that it brings together science, technology, economics, entrepreneurship, management, and extends from the birth of a scientific idea to its commercialization, cover the entire range of relations: production, exchange, consumption obtained by this innovation process.

To assess the level of innovative development of the country by international organizations, generalizing indices are developed that take into account, as a rule, three components: innovation potential, innovation activity and innovative results. For example, the «Global Competitiveness Index» published in the reports of the World Economic Forum (Davos), considers the factors of innovation and improvement as an independent third section of the indicators forming the overall rating of competitiveness and the Global Innovation Index which represents the most comprehensive set of indicators of innovative development in various countries of the world. This rating is calculated from 2007 according to the methodology of the international business school INSEAD (France).

Theoretical and applied aspects of innovation activity are widely studied in the works of such Russian economists: Fatkhudinov R., Trifilova A., Kuznetsova N., Balashova S., Shurina S., Trilitskaya O., Capreeva E. and others [2-6].

Among the scientists of Kazakhstan, it is possible to note the following economists who raised the main issues of innovation activity development in organizational and economic aspects both at macro and micro levels: Abdygapparova S., Alshanov R., Mukhtarova K., Kupeshova S., Turginbayeva A., Kazhymurat K., Kenzheguzin M., Myltykbayeva A. and others.

Particularly it is possible to note article PhD of Myltykbayeva A.T. "Measuring the national development of the Republic of Kazakhstan in the context of a global index of innovation development" analyzes the parameters of the Global Competitiveness Index (GCI) measurement system, which together provide the development efficiency and competitiveness of the country, and depending on the degree of influence and importance in each of the 12 components of the index global competitiveness, they are grouped by subindex and stages of economic development. The weight shares of each subindex at a

certain stage of development are indicated. According to the World Development Classifier, the place of Kazakhstan is shown [7].

Despite wide research of the sphere of innovations, it is very rare to find works on the competitiveness of the Republic of Kazakhstan on the index of innovation activity.

Methods of research.

By definition, this international business school INSEAD "Global Innovation Index" is a global study and its accompanying rating of the countries of the world in terms of the level of innovation development. According to this methodology, the index is calculated as a weighted sum of estimates of two groups of indicators, which are presented in Table 1.

Table 1 - Indicator groups used in the calculation of the global innovation index

Available resources and conditions for innovation (Innovation Input)	Achieved practical results of innovation (Innovation Output)
Institutes; Human capital and research; Infrastructure; Development of the internal market; Business development.	Development of technology and knowledge economy; Results of creative activity. Creativity on-line
Source: compiled by the authors according to The Global Innovation Index, 2017 International Business School INSEAD [1]	

Thus, from Table 1, we can conclude that the final index is a cost-effectiveness ratio, which makes it possible to objectively evaluate the effectiveness of efforts to develop innovations in a particular country. The entry subindex reflects the conditions and factors necessary for creating innovations and includes the following groups of indicators: 1. Institutions; 2. Human capital and research; 3. Infrastructure; 4. Market stability; 5. Sustainability of business. The subindex effect summarizes the results of innovation activities and includes the following groups: 6. Scientific results; 7. Creative results and in the methodology of the report for 2012 added a new indicator - creativity on-line. Of the 84 indicators included in the Global Innovation Index (GII) 57 are input indicators that characterize the country's innovation potential and 27 are impact indicators that describe the effectiveness of using this potential.

Calculation of the final index, as a rule, is based on the principle of the average value of the parameters used, but with some with a preliminary normalization. Statistical values for each of the parameters are normalized according to the principle [8]:

$$X_{norm} = \frac{x-min}{max-min},$$

here, *min* - the minimum value of the indicator; *max* is the maximum value for the sample.

After that, the average value for each of the parameters and the final index are calculated. Thus, the way to measure innovative development differs among organizations in the set of incoming parameters, their number depending on their characteristics, goals and objectives, but on the whole are similar in principle to mathematical calculation. Expertise methods, correlation-regression analysis, factor analysis, the method of principal components, fuzzy sets, index analysis (O. Obraztsova [9], Bagrinovsky K.A. [10], Bandman M.K. [11], Varshavsky A.E. [12], Korotkov A.V. [13], Leontiev V. [14], Tatarkin A.N. [15]). The choice of the model is influenced by: the complexity of the object under study, the availability of data, the mastered mathematical apparatus.

Thus, it can be argued that during the definition of the innovation activity index, various methods can be used depending on the goals and objectives of the study, as well as the complexity of the structure of the innovation system of countries.

Results and discussion.

If we look at the twenty countries with the level of economic development from the Global Innovation Index 2017 report prepared by the World Intellectual Property Organization (WIPO), the Cornell University and the INSEAD research institute, it can be argued that over the past two years, exporters of technologically new products and services of daily use (consumption). Such as: Switzerland,

the United States, Great Britain, Singapore, Germany, South Korea, Japan, Canada and China. China, in 2017, was able to raise another 3 steps, ranking 22nd in the innovation development rating, thanks to high results at once on a number of indicators, including the number of companies engaged in research and development (R & D) in the country, the state research personnel in enterprises and the number of filed patent applications. Kazakhstan in this rating is on the 75th place according to 2016, and according to the data of 2017, having lost two positions it is located on the 78th place. Of the CIS countries, Kazakhstan is only ahead of Russia and Ukraine, which according to 2017 are located at 45 and 50 places respectively (Table 2 and Picture 1).

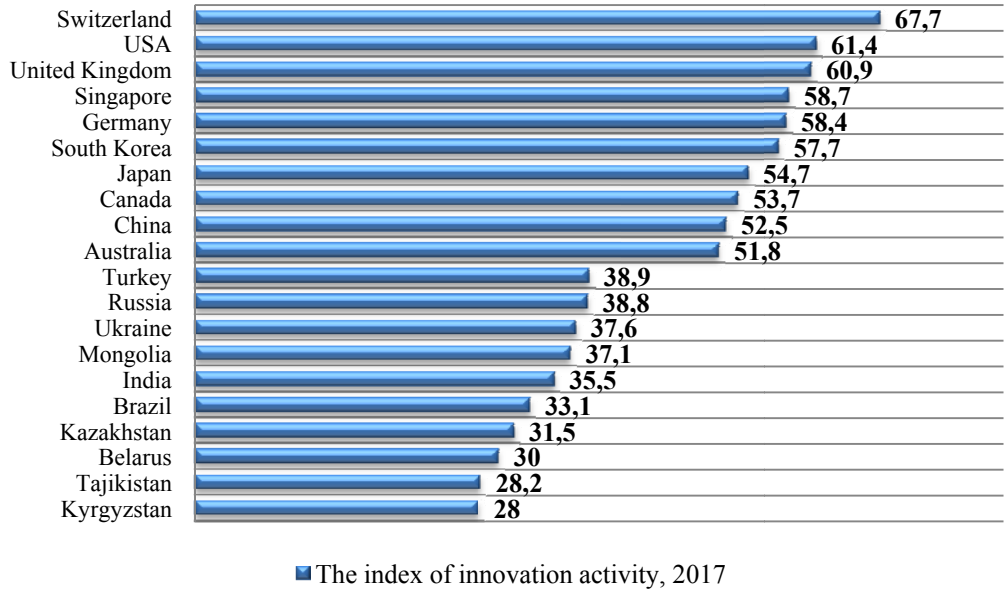
As for the rating on the level of innovative activity of the countries of Central and South Asia, Kazakhstan also closes in the top three, letting ahead only India and the Republic of Iran. India has been the undisputed leader in this region for the seventh consecutive year, having risen by 6 positions in 2017 compared to 2016 (from 66th to 60th place). Following India, as in 2016, are Iran (75th in the ranking of 2017) and Kazakhstan (78th place) (Table 2 and Picture 1).

Table 2 - 20 countries from the global rating of innovation activity with different levels of economic development

№	Countries	2017		2016	
		index	place	index	place
1.	Australia	51,8	23	53,1	19
2.	Belarus	30,0	88	30,4	79
3.	Brazil	33,1	69	33,2	69
4.	United Kingdom	60,9	5	61,9	3
5.	Germany	58,4	9	57,9	10
6.	India	35,5	60	33,6	66
7.	Kazakhstan	31,5	78	31,5	75
8.	Canada	53,7	18	54,7	15
9.	China	52,5	22	50,6	25
10.	Kyrgyzstan	28,0	95	26,6	103
11.	Mongolia	37,1	52	35,7	55
12.	Russia	38,8	45	38,5	43
13.	Singapore	58,7	7	59,2	6
14.	USA	61,4	4	61,4	4
15.	Tajikistan	28,2	94	29,6	86
16.	Turkey	38,9	43	39,0	42
17.	Ukraine	37,6	50	35,7	56
18.	Switzerland	67,7	1	66,3	1
19.	South Korea	57,7	11	57,1	11
20.	Japan	54,7	14	54,5	16

Source: compiled by the authors according to The Global Innovation Index, 2017 International Business School INSEAD [1]

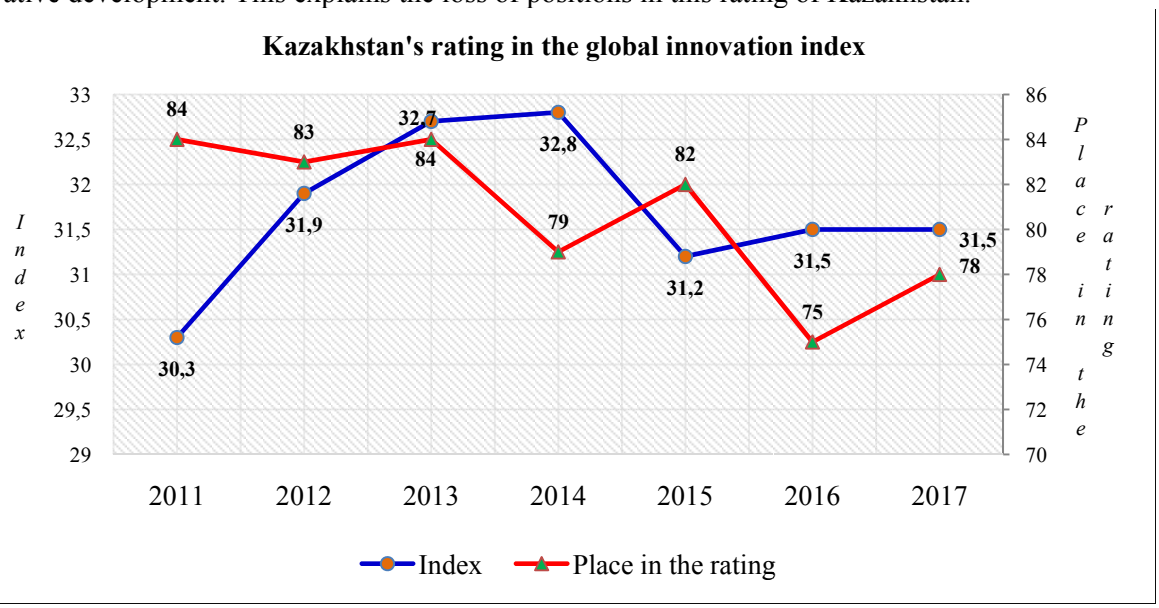
If we consider the data of Table 2 in the form of a diagram, we can see the following picture, which is shown in Figure 1, where we clearly see that the leading positions are countries with a high level of economic development. As is known, in modern conditions, economic growth is achieved due to the innovative activity of the economy. What is surprising, in this rating Kazakhstan is ahead of Mongolia, which is usually associated with the country with the lowest level of economic development in comparison with the Republic of Kazakhstan. However, the neighboring countries of Kazakhstan, such as Kyrgyzstan and Tajikistan, are represented in the report of The Global Innovation Index and occupy 95th and 94th places respectively.



Source: compiled by the authors according to The Global Innovation Index, 2017 International Business School INSEAD [1]

Picture 1 - Twenty countries from the global rating of innovation activity with different levels of economic development, 2017

Despite the stable position of Kazakhstan in the global innovation index, the experts of JSC "Institute for Economic Research" believe that the improvement of individual components of the index, the development of the national system of support and introduction of innovations of Kazakhstan is at the stage of formation, thereby explaining the gap with the leading countries of the world. The effectiveness of innovation depends on the overall economic situation in the country and the state scientific and technical strategy, on full-fledged resource support, market conditions, the availability of professional staff and effective management. To improve the calculations, the methodology for calculating the rating is revised annually. This year, new quality indicators were introduced. Since some processes cannot be adequately represented, the model of the global innovation index is not decisive in assessing the country's innovative development. This explains the loss of positions in this rating of Kazakhstan.



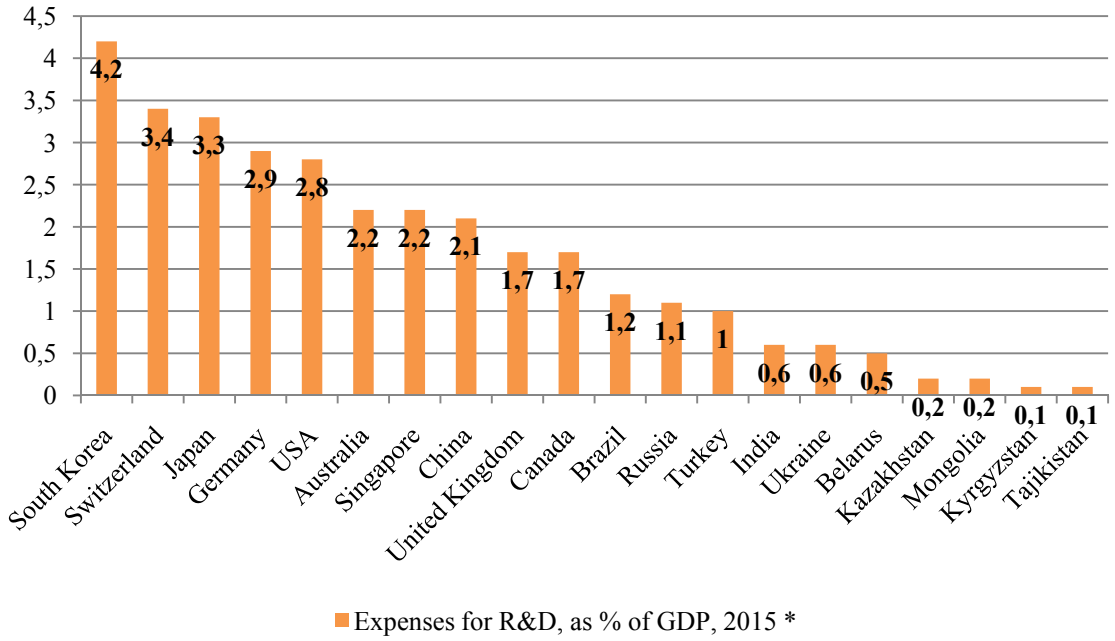
Source:: *compiled by the authors according to The Global Innovation Index, 2017 International Business School INSEAD [1]*

Picture 2 - Kazakhstan's rating in the global innovation index for the period 2011-2017

In different years, Kazakhstan's position in the Global Innovation Index has been different. From Figure 2, we can see the index of innovation activity and the rating for the period 2011-2017. For seven years, Kazakhstan improved its position by 6 points, and the turkeys of innovation activity increased from 30.3 to 31.5. However, in 2013 and in 2014 the result of innovative activity was 32.7 and 32.8 points, respectively.

In many ways, the development of the national innovation system depends on the share of R&D funding in% of the ratio to GDP. If we look at the countries that took as an example in our work, we can see the difference in the volume of R&D financing and see the objective reason for the development of innovative economies among the leading countries on the Global Innovation Index list.

According to KNOEMA, where 78 countries are represented in 2015, Kazakhstan is located at 67 positions with R & D expenditures of 0.2% to GDP, whereas the International Council's recommended share of expenditures for developing countries is 1-1.5% of GDP. Leading positions in this list are: Israel (4.3% of GDP), South Korea (4.2% of GDP), Switzerland (3.4% of GDP) and Japan (3.3% of GDP) (Picture 3).



Source:*: compiled by the author according to the literature [16-17]*

Picture 3 - Expenditure on R & D in% of the ratio to the GDP of the countries of the world, 2015

Thus, summarizing the above data, we can draw the following conclusions that from the list of countries listed in this sample with different levels of economic and innovative development, the Republic of Kazakhstan is at the stage of becoming its innovation system. The index of innovation activity from 2011 to 2017 ranges between 30.3 and 32.8, when as the leader in this ranking of Switzerland, the innovation activity index is 67.7 points, which indicates that these countries are twice as fast as Kazakhstan in the sphere innovative development.

Conclusions/

Having analyzed the innovative system of Kazakhstan, it is possible to identify the following main problems that hamper the development of the innovation economy, as well as to reduce Kazakhstan's positions in international ratings [18]:

1. Low level of science financing in Kazakhstan. Expenses for scientific research from the budget are 0.2% of GDP. According to UNESCO, the world economy allocates 1.7% of GDP to science.

2. Low share of private sector financing for the development of the country, in contrast to developed countries.

3. Weak material and technical basis.

4. Low effectiveness and competitiveness of research results in the domestic and foreign markets. Approximately 17 thousand scientists account for 1-2 international patents.

5. There is a gap between science, education and business.

Thus, international ratings of the innovation activity of the Kazakh economy reveal, in fact, the same vulnerable areas. Basically, these are factors of institutional and regulatory nature that affect the development of R&D and the innovative economy as a whole. In the interaction of the state and business in the innovation sphere, two aspects come to the fore. The first is related to the institutional foundations of this interaction. The second - with the financing of research and development.

Basically, all the problems associated with the low level of development of innovation in the country is due to the poor financing of innovation. In this regard, we propose to introduce in the innovative sphere the mechanisms of the institution of public-private partnership, which will be able to solve a number of problems arising during the life cycle of innovative products. Through PPP, an innovative infrastructure is being formed, investment in small and medium-sized businesses is increasing, the percentage of commercialization of innovative developments is increased by means of introduction into production, and indicators of socio-economic development are improving.

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КАЗАХСТАН В КОНТЕКСТЕ ГЛОБАЛЬНОГО ИНДЕКСА ИННОВАЦИОННОЙ АКТИВНОСТИ

Аннотация. В статье анализируется позиция Республики Казахстан в Глобальном рейтинге инновационной активности стран, рассчитывающейся Всемирной организацией интеллектуальной собственности (ВОИС), Корнельским университетом и исследовательским институтом INSEAD. Сделан рейтинг стран по индексу инновационного развития наиболее близких к экономике Республики Казахстан и стран с развитой экономикой, таких как: Австралия, Беларусь, Бразилия, Великобритания, Германия, Индия, Канада, Китай, Кыргызстан, Монголия, Россия, Сингапур, США, Таджикистан, Турция, Украина, Швейцария, Южная Корея, Япония. А также, проделан анализ инновационной системы Казахстана и выявлены основные проблемы, препятствующие развитию инновационной экономики.

Ключевые слова. Инновации, глобальный индекс инноваций, научно-технический прогресс, уровень инновационного развития, государственно-частное партнерство.

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Әл-Фараби атындағы Қазақ Ұлттық университеті, Алматы, Қазақстан Республикасы

ҒАЛАМДЫҚ ИННОВАЦИЯЛЫҚ БЕЛСЕНДІЛІК ИНДЕКСІ ЖАҒДАЙЫНДАҒЫ ҚАЗАҚСТАН

Аннотация. Мақалада Қазақстан Республикасының Әлемдік зияткерлік меншік ұйымы және INSEAD зерттеу институты мен Корнель университетімен есептелетін мемлекеттердің жаһандық инновациялық белсенділігінің индексіндегі орны сарапталады. Қазақстан Республикасының экономикасының даму деңгейіне біршама жақын және экономикасы дамыған келесі мемлекеттердің инновациялық даму индексі бойынша рейтинг жасалды: Австралия, Беларусия, Бразилия, Ұлыбритания, Германия, Үндістан, Канада, Қытай, Қырғызстан, Монғолия, Ресей, Сингапур, АҚШ, Тәжікстан, Түркия, Украина, Швейцария, Оңтүстік Корея, Жапония. Сондай-ақ Қазақстанның инновациялық жүйесіне талдау жүргізіліп, инновациялық экономиканың дамуына кедергі келтіретін негізгі мәселелер анықталды.

Түйін сөздер. Инновация, инновацияның жаһандық индексі, ғылыми-техникалық прогресс, инновациялық даму деңгейі, мемлекеттік жеке меншік серіктестік.

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www:nauka-nanrk.kz

ISSN 2518-1483 (Online), ISSN 2224-5227 (Print)

http://www.reports-science.kz/index.php/ru/

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

Подписано в печать 13.08.2018.
Формат 60x881/8. Бумага офсетная. Печать – ризограф.
8,3 п.л. Тираж 500. Заказ 4.