

Analysis of innovative development of Ukrainian enterprises in the context of European innovative development

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Abstract

This article is devoted to the study of the level of innovative development of Ukraine in comparison with the level of innovative development of European countries. The main problems of innovative development of the country are considered and the factors influencing this process are analyzed. The essence of the concept of "innovation" is studied and the characteristic features inherent in them are highlighted. The own definition of innovative development of enterprises is formulated. The weaknesses and strengths of Ukraine's innovation development were assessed in terms of the parameters of the global innovation index using SWOT-analysis.

Keywords: innovations, innovative development, innovation index, economy.

Introduction

Ukraine's long-term economic prospects largely depend on its innovative development. Over the last decade, the country has seen a slight increase in innovation performance. Despite this, Ukraine still remains at a low level in terms of innovation development compared to other countries.

The purpose of the study is to assess the level of innovation development of Ukraine and changes in this area compared to the European Union, taking into account the country's participation in this process and the

determinants of innovation policy for the period 2010-2019. The realization of the goal was based on the following theses:

1. The innovative level of development of Ukraine is low and depends on external factors that do not create a permanent basis for innovative development of the country and its regions.

2. Innovations stimulated by external factors did not significantly contribute to the country's development.

Material and methods

One of the important factors in the development of enterprises, increasing their competitiveness and profitability, is innovation. In addition, it is clear that low innovation activity has caused a protracted economic crisis in Ukraine.

A clear understanding of the definition of "innovation" is the basis for assessing the innovativeness of each enterprise. However, it should be noted that despite the significant achievements of foreign and domestic

scientists, today the term "innovation" requires additional study and clarification of the content.

According to many researchers, the term "innovation" should be understood as the implementation of a new or significantly improved product, process, new method of marketing or a new method of organization in business, workplace organization or external contacts, new equipment or technology and more. That is, the defining basis of any innovation is innovation in a particular area of

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the enterprise. In this regard, different authors interpret the essence of this concept differently.

According to the research of Ivanova VV (2009), the concept of "innovation" was first used in the XIX century. in the field of culturological research, and provided for the introduction of certain elements of one culture in another. However, as an economic category, this term began to be used with the publication of the Austrian economist J. Schumpeter's "Theory of Economic Development (1982): A Study of Profit, Capital, Credit, Interest and the Economic Cycle" (1930s), in which The author not only introduced this definition, but also classified innovations, their features and justified the impact of innovation on the economic cycle. It is these studies that have given impetus to the study of innovation by other scientists and scientific schools.

The definition of the term "innovation" is somewhat different in the sense of P. Whitefield (1979), who noted that innovation is a series of complex measures to solve problems, which create a specific and fully developed novelty. A similar view is held by the American economist Ph.D. Kotler (1978).

Summarizing the above, it should be noted that novelty as a feature of innovation, appears in the definitions of many scientists who believe that innovation is a process that covers all activities related to the creation of an idea, invention, and then its implementation – a new product, a new process, etc. (Bazhal YM, 1996), (Burliai A., 2020), (Datsiy O.I., 2004), (Santo B., 1990).

However, according to many modern researchers, innovation, first of all, should be understood as the results of research and development, the introduction of which leads to improved social production, economic, legal and social relations in science, culture, education and other spheres of society.

The main features of innovation are novelty and change. However, not every change is an innovation, but innovation always leads to change.

Despite the variety of definitions of the category "innovation", we can identify the characteristics that are inherent in them:

innovation is a purposeful and useful change

of the current state, proposed by a person;

this change must have practical application;

the subject of changes are products, processes, organization, management methods, market;

changes must lead to concrete technical, economic and social benefits;

innovation is a means to achieve business development goals;

innovations become a mechanism of technical progress if they bring positive economic effects;

innovation requires a specific set of knowledge – technical, market, economic and socio-psychological.

Based on the above characteristics, we can offer our own definition of "innovation" – is the introduction of new or significantly improved man-made goods, methods of production (processes), market, labor organization or management methods to achieve enterprise development goals and certain socio-economic benefits.

In modern conditions, the recognized international standard of innovation is "Oslo Manual". The key components of the concept of innovation of this organization are knowledge as a basis for innovation, novelty and usefulness, as well as the creation or preservation of value as the intended goal of innovation. Innovation differs from other similar concepts (e.g., invention) by the requirement for implementation, i.e. introduction into use. That is, an innovation is a new or improved product or process (or a combination thereof) that is significantly different from previous products or processes of the unit and that has been provided to potential users (product) or put into operation by the unit (process). There are 4 main types of innovation:

innovation activity, which includes all development, financial and commercial activities carried out by the firm, which should lead to innovation for the firm;

marketing innovation is a new or improved product or marketing process (or a combination thereof) that differs significantly from the firm's previous products or business processes and

that has been marketed or used by the firm;

product innovation is a new or improved product or service that differs significantly from the company's previous products or services and that has been introduced to the market.

business process innovation is a new or improved business process for one or more business functions, which is significantly different from previous business processes of the firm and which was used by the firm (Hausner J., 2013).

Today, innovations have become an integral part of enterprise development and have legal support. Thus, Ukraine has adopted the Law of Ukraine "On Innovation" (2002), according to which innovations are newly created (applied) and (or) improved competitive technologies, products or services, as well as organizational and technical solutions of production, administrative, commercial or other nature, significantly improving the structure of production and (or) social sphere.

We agree with the statement of A. Olejniczuk-Merta (2015) that the modern economy has great potential for the transformation of knowledge and creative

abilities and skills of people into various forms of technical and technological, organizational, managerial, marketing and social achievements. These achievements are expressed in new solutions, the result of which is development, which is called innovative. The word "innovative" comes from the term "innovation", "innovative development" – is the development caused by innovation. That is, the basis of innovative development is the introduction of innovations, which leads to qualitative and quantitative changes. According to V. Naidyuk (2013), "... innovative – characterizes the result of the invention, as well as associated with the process of qualitative change and aimed at creating new opportunities".

Summarizing the above, we can formulate our own definition of innovative development of the enterprise – a process of purposeful, consistent movement of the enterprise due to the systematic action of innovative technical, technological, organizational, managerial, marketing and social factors, which leads to qualitative and quantitative changes and increased efficiency.

Results and discussion

According to Bloomberg, in 2020 in the ranking of The Bloomberg Innovation Index Ukraine was ranked 56th among 60 countries, which is three positions lower than in 2019 and

10 points lower than in 2018. In the dynamics of innovative development of Ukraine, the indicators show a downward trend (table 1).

Table 1 – Indicators of innovative development of Ukraine according to Bloomberg (among 60 countries)

Indicator	2018	2020	Deviation (+, -)
The Bloomberg Innovation Index	46	56	10
productivity	50	57	7
technology company density	48	57	9
research and development expenditures	47	57	10
tertiary education	21	35	14
patent activity	27	36	9
manufacturing value added	32	48	16
research personnel concentration	46	49	3

* - formed according to The Bloomberg Innovation Index

However, the data in the table show an absolute increase in terms of these indicators. That is, absolute indicators are growing, but increases in the context of other countries tend to decrease, which determined the place of Ukraine in the ranking.

At the same time, Ukraine retains 35th place in terms of the efficiency of higher education and 36th place in terms of patent activity, which testifies to the existing potential for innovative development.

The decline in the above ranking in terms of indicators is observed in all areas without exception, including productivity, technological

capabilities and spending on research and development in the country's GDP, Ukraine ranks 57th out of 60 represented.

It should be noted that according to this rating, the top three innovative countries include Germany, South Korea and Singapore.

One of the indicators that determines the innovative development of the country is the share of expenditures on research and development in the total GDP of the country. In Ukraine, the level of this value has almost halved over the past eight years – from 0.75 in 2010 to 0.47 in 2018. However, it should be noted its growth in the European Union (Table 2).

Table 2 – Comparison of the share of R&D expenditures in GDP in Ukraine and EU countries

Country	2010 year	2015 year	2018 year
<i>EU 28</i>	<i>1,92</i>	<i>2,03</i>	<i>2,12</i>
Bulgaria	0,57	0,95	0,76
Estonia	1,57	1,46	1,40
Spain	1,36	1,22	1,24
Germany	2,73	2,93	3,13
Poland	0,72	1,00	1,21
Slovakia	0,61	1,16	0,84
Hungary	1,14	1,35	1,53
Czech Republic	1,53	1,34	1,93
<i>Ukraine</i>	<i>0,75</i>	<i>0,55</i>	<i>0,47</i>

* - formed according to the Statistical Collection "Scientific and Innovative Activity of Ukraine for 2019"

According to the European Innovation Scoreboard, in 2020 Ukraine was named a modest "novator", whose productivity since 2012 has been declining relative to the level of EU countries. Favorable for the development of domestic innovation are indicators of the innovation environment and the impact on employment, and among the deterrents are attractive research systems, finance and support for innovation and innovators.

Table 3 presents the innovation index of countries according to the calculations of the European Innovation Scoreboard, EIS.

It is an indicator of scientific and technological development of European

countries and is formed on the basis of 27 partial indicators, which are grouped into ten groups: 1) human resources, 2) attractive research systems, 3) innovation environment; 4) finance and innovation support; 5) costs of innovation; 6) innovators; 7) connections; 8) intellectual property; 9) impact on employment; 10) impact on exports.

This data also allows us to conclude that for the period from 2012 to 2019, the innovation index of Ukraine is declining. Thus, in 2012 its level was 36.84, and in 2019 – 35.85, i.e. in the ranking of 37 European countries on the innovation index over the past decade, Ukraine is in 36th place, which is an extremely low result.

Table 3 – Innovation index of European countries according to the European Innovation Scoreboard

Country	2012	2015	2019
Austria	118,99	119,32	127,86
Belgium	119,51	119,47	131,98
Bulgaria	42,32	45,93	49,46
Switzerland	157,10	160,43	179,73
Cyprus	86,02	84,83	96,76
Czech Republic	83,24	86,04	91,72
Germany	130,96	125,53	130,48
Denmark	144,74	143,17	146,38
Estonia	92,71	89,79	107,74
Greece	62,81	66,14	83,47
Spain	78,07	73,85	92,63
Finland	133,26	130,98	152,23
France	107,64	112,30	113,74
Croatia	54,52	52,91	63,98
Hungary	64,77	65,70	72,29
Ireland	112,08	113,18	121,92
Israel	119,67	120,26	120,89
Iceland	125,76	127,00	124,22
Italy	78,30	80,43	90,14
Lithuania	59,11	65,41	86,77
Luxembourg	133,90	132,36	137,13
Latvia	45,66	60,86	68,61
Montenegro	42,25	42,43	47,22
Northern Macedonia	33,71	37,82	48,48
Malta	66,70	85,56	91,45
Netherlands	128,68	129,87	139,08
Norway	104,49	105,89	131,09
Poland	51,01	52,11	64,07
Portugal	83,78	83,59	105,27
Romania	40,21	31,08	34,40
Serbia	53,94	57,71	67,14
Sweden	146,24	145,80	153,12
Slovenia	102,27	101,31	92,42
Slovakia	70,42	68,89	72,48
Turkey	55,25	54,83	67,78
Ukraine	36,84	34,82	35,85
UK	114,31	120,38	131,59

* - formed according to the European Innovation Scoreboard

Another indicator that characterizes the country's innovative development is the Global Innovation Index – a ranking of global economies based on innovation opportunities, consisting of

about 80 indicators grouped into input and output of innovation. Table 4 shows the ratings of Ukraine for the period 2017-2019.

Table 4 – Global Innovation Index of Ukraine

Indicator	2017	2018	2019
Global Innovation Index	50	43	47
Innovation Inputs	77	75	82
Innovation Outputs	40	35	36

* - formed according to the Global Innovation Index

This table shows the growth of the global level of globalization of Ukraine over the past three years. In 2019, Ukraine ranked 82nd in terms of innovation, which is worse than in previous years. In terms of innovative results, Ukraine ranks 36th. This position is worse than last year, but better than in 2017.

Compared to other European economies,

Ukraine operates below the average level in almost all indicators that form the innovation index. The highest values are in such areas as higher education, knowledge creation and intangible assets.

Figure 1 shows the ratings of Ukraine in the formation of the Global Innovation Index for 2019.

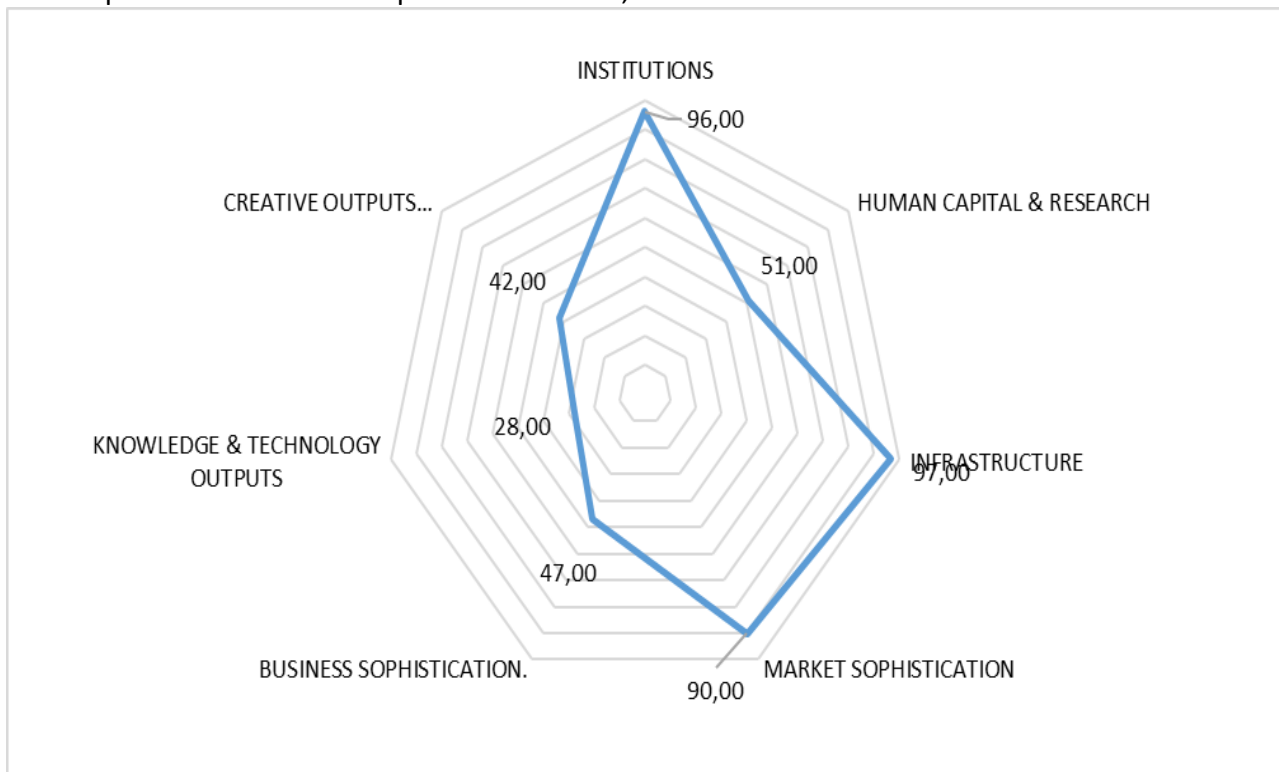


Figure 1 – Global Innovation Index of Ukraine in terms of indicators in 2019
(built by the author according to the Global Innovation Index)

Ukraine ranks highest in the global innovation index on the indicator of knowledge and technology (28th place), creative inventions (42nd place) and business research (47th place). The lowest ratings are related to the development of relevant institutions in the country (96th place) and the appropriate level of infrastructure (97th place).

Let's assess the strengths and weaknesses of Ukraine's innovation development in terms of the parameters of the global innovation index using SWOT-analysis (Table 5).

Having conducted a SWOT-analysis of Ukraine's innovation development in terms of the parameters of the global innovation index, it is possible to identify the strengths and

weaknesses of this process.

The strengths of domestic innovation processes are in four of the seven areas. Most of these relative advantages belong to the category of “Knowledge and Technology”, where the relatively strong sides of Ukraine are

the positions of “Knowledge Creation” and “Patent Level” (17th place), “Software Cost Level” and “ICT Export”. In “Creative Inventions” the country’s position in the creation of trademarks, industrial designs and mobile applications is strong.

Table 5 – SWOT-analysis of innovation development of Ukraine in terms of parameters of the Global Innovation Index (2019)

<u>Strengths</u>	<u>Point</u>	<u>Weaknesses</u>	<u>point</u>
Business sophistication:		Institutions:	
- Number of women with scientific degrees	2	- Legislative environment	78
- Investing in innovations from abroad	15	- Business environment	99
Knowledge and technologies:		- Efficiency of the state government	95
- Creation of knowledge	17	- Regulatory policy	94
- Level of patenting	17	Infrastructure:	
- software costs, % of GDP	19	- Information and communication technologies (ict)	81
- share of exports of ICT services, % of total trade	11	- General infrastructure	95
Creative outputs:		Market sophistication:	
- Intangible assets	17	- credit development	91
- Trademarks by origin	6	Business sophistication:	
- Industrial designs by origin	8	- Absorption of knowledge	71
- Creation of mobile applications	19	- Import of ict services, % of total trade	79
Human capital & research:		- State of cluster development	98
- The relationship between students and teachers	3	Creative outputs:	
- Enrollment in higher education, %	14	- Creative goods and services	91
- State funding for 1 student	23	- Export of creative goods, % of total trade	82
<u>Opportunities</u>	<u>Point</u>	<u>Threats</u>	<u>point</u>
Institutions:		Institutions:	
- Ease of starting a business	48	- Unfavorable political environment	110
Human capital & research:		- Political instability	125
- Development of education	43	- Lack of rule of law	107
- Higher education	37	- The complexity of insolvency settlement	115
- Research and development	54	Infrastructure:	
Market sophistication:		- Environmental sustainability	120
- Trade, competition and market scale	42	- Ict and business model creation	109
Business sophistication:		- Energy consumption	115
- Knowledge worker	45	Market sophistication:	
- Innovative connections	55	- Investments	115
Knowledge and technologies:		Creative outputs:	
- Impact on knowledge	47	- Ict and business model creation	109
- Dissemination of knowledge	47		
Creative outputs:			
- Online creativity	43		

* - formed according to the Global Innovation Index

Of course, this depends on the level of human capital development and research costs, including

higher education enrollment (14), the level of public funding per student and the ratio of

students to teachers, where it ranks 3rd in the world.

However, it should be noted that in modern conditions, the weaknesses of innovation processes clearly outweigh the strengths, are identified in five of the seven indicators and are significant threats to the innovative development of the country as a whole. Among them, it is important to emphasize the insufficient institutional level of the country's development (unfavorable political and legislative environment, political instability, lack of rule of law, low efficiency of the state government and its imperfect regulatory policy). The low level of infrastructure, market and business development is also a constraint. The country is experiencing a situation of slowing down progressive changes, market monopolization, lack of motivation to

develop science due to low levels of funding and investment.

These factors together have a negative impact on the innovative development of the country and need immediate improvement primarily through the implementation of the outlined opportunities. Among them it is necessary to emphasize the existing potential in the country in the field of human capital development and research (development of different levels of education), knowledge and technologies, creative inventions. Favorable factors are also available conditions for starting a business, developing trade and competition. It is the strengths of Ukraine's innovative development together with the potential of this process that are the basis for the growth of innovation in the country's economy.

Conclusions

From all of the above, it follows that innovative development is an integral part of the country as a whole. Innovative development is a process of purposeful, consistent movement of the enterprise due to the systematic action of innovative technical and technological, organizational, managerial, marketing and social factors, which leads to qualitative and quantitative changes and increase the efficiency of its activities.

The article raises the ratings of Ukraine among other countries on innovative development:

- The Bloomberg Innovation Index – 56th place (out of 60 countries);
- European Innovation Scoreboard – 36th place (from 37 countries);
- Global Innovation Index – 82nd place.

That is, according to indicators of innovative development, Ukraine ranks last in various world rankings. At the same time, it is necessary to note the significant innovation potential of the country, which was determined by SWOT-analysis.

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