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Vershytsky A.V. PhD in Economics, associate Professor,
Ivanova A.S., student,
V.I. Vernadsky Taurida National University

INNOVATION PERFORMANCE INDICATORS: UKRAINIAN AND NORWEGIAN PERSPECTIVES

At present, the innovative potential is one of the most important indicators in the overall potential of the country as a whole and its individual regions. Developing society and economy require new approaches to various aspects of life. The level of development of innovative potential indicates the level of economic development in general, the degree of preparedness of the country, regions and enterprises to create a fundamentally new technologies and new products. Innovation potential is a complex, multi-factorial, multivariate phenomenon that requires careful and thorough study. But his assessment was initially hampered by the fact that there is no single definition of the concept, is not fully developed system of indicators of innovative potential.

In today's world there are a significant number of the practices of various indicators that measure the level of innovation, starting with an assessment of the human capital indicators that measure knowledge, scientific and technical, as well as individual performance of the stock market. Various international organizations have developed their own system of indicators that reflect the level of innovative capacity of the country (region). In world practice, evaluation of the level of innovation potential is by different methods, the most important of which are:

1) Index of scientific and technological capacity (World Economic Forum) as an integral component of the evaluation index of the level of competitiveness of the country.

According to the methodology of the WEF experts, the ability to achieve sustainable growth in the medium and long term, depends equally on the three categories of variables: the macroeconomic environment, public institutions and technology. In the long run, economic growth is not possible without STP.

Index of scientific and technological capacity is calculated on the basis of such data as the number of patents per 1 million populations, the country's position in terms of technological development, the contribution of foreign investment in innovation of local firms, the number of Internet users per 10,000 people, etc.

a) The Global Competitiveness Report 2011–2012 and The Global Competitiveness Report 2012–2013 are published by the World Economic Forum within the framework of the Centre for Global Competitiveness and Performance [1] (table 1).

Table 1

Global Competitiveness Index 2012–2013 rankings and 2011–2012 comparisons

Country/Economy	Rank/144	Score (1–7)	Rank among GCI 2011–2012 sample	GCI 2011–2012 rank	Innovation and sophistication factors	
					Rank	Score
Norway	15	5.27	15	16	16	5.00
Ukraine	73	4.14	73	82	79	3.43

Partners in Norway: BI Norwegian School of Management, Eskil Goldeng, Researcher, Torger Reve, Professor; partners in Ukraine: CASE Ukraine, Center for Social and Economic Research, Dmytro Boyarchuk, Executive Director, Vladimir Dubrovskiy, Leading Economist. The final pillar "Innovation" of competitiveness can emerge from new technological and non-technological knowledge (table 2).

Non-technological innovations are closely related to the know-how, skills, and working conditions that are embedded in organizations and are therefore largely covered by the eleventh pillar of the GCI.

The final pillar of competitiveness focuses on technological innovation. Although substantial gains can be obtained by improving institutions, building infrastructure, reducing macroeconomic instability, or improving human capital, all these factors eventually seem to run into diminishing returns.

The same is true for the labor efficiency, financial, and goods markets. In the long run, standards of living can be largely enhanced by technological innovation.

Technological breakthroughs have been at the basis of many of the productivity gains that our economies have historically experienced. These range from the industrial revolution in the 18th century and the invention of the steam engine and the generation of electricity to the more recent digital revolution.

The latter is transforming not only the way things are being done, but also opening a wider range of new possibilities in terms of products and services. Innovation is particularly important for economies as they

approach the frontiers of knowledge and the possibility of generating more value by only integrating and adapting exogenous technologies tends to disappear.18 Although less-advanced countries can still improve their productivity by adopting existing technologies or making incremental improvements in other areas, for those that have reached the innovation stage of development this is no longer sufficient for increasing productivity.

Table 2

Global Competitiveness Index, Indicator "Innovation"

Indicator	Norway, value (max=7)	Norway, Rank (1-144)	Ukraine, value (max=7)	Ukraine, Rank (1-144)
Capacity for innovation	4,7	14	3,3	58
Quality of scientific research institutions	4,9	27	3,7	64
Company spending on R&D	4,3	20	2,7	104
University-industry collaboration in R&D	5.0	19	3,6	69
Government procurement of advanced technology products	4,1	28	3,2	97
Availability of scientists and engineers	4,5	42	4,8	25
PCT patent applications, Number of applications filed under the Patent Cooperation Treaty (PCT) per million population | 2008–09 average*	143,6	11	2,1	51

*PCT patent applications Number of applications filed under the Patent Cooperation Treaty (PCT) per million population | 2008-2009 This measures the total count of applications filed under the Patent Cooperation Treaty (PCT), by priority date and inventor nationality, using fractional count if an application is filed by multiple inventors. The average count of applications filed in 2008 and 2009 is divided by population figures for 2009. Sources: Organization for Economic Co-operation and Development (OECD), Patent Database, June 2012; United Nations, Department of Economic and Social Affairs, Population Division, 2011, World Population Prospects: The 2010 Revision, CD-ROM Edition; authors' calculations

Firms in these countries must design and develop cutting-edge products and processes to maintain a competitive edge and move toward higher value-added activities. This progression requires an environment that is conducive to innovative activity and supported by both the public and the private sectors. In particular, it means sufficient investment in research and development (R&D), especially by the private sector; the presence of high-quality scientific research institutions that can generate the basic knowledge needed to build the new technologies; extensive collaboration in research and technological developments between universities and industry; and the protection of intellectual property, in addition to high levels of competition and access to venture capital and financing that are analyzed in other pillars of the Index. In light of the recent sluggish recovery and rising fiscal pressures faced by advanced economies, it is important that public and private sectors resist pressures to cut back on the R&D spending that will be so critical for sustainable growth going into the future.

Following a protracted economic crisis, Ukraine bounces back to 73rd position in this year's GCI. The country's competitiveness benefits notably from a healthier macroeconomic environment than in previous years. The budget deficit was cut to 2.7 percent of GDP in 2011, the debt-to-GDP ratio fell somewhat, and inflation was reduced, although it still remains fairly high at almost 8 percent. Overall, Ukraine maintains its competitive strengths; these result from its large market size (38th) and a solid educational system that provides easy access to all levels of education (ranked 47th on higher education and training and 54th on primary education). The good educational outcomes provide a basis for further developing the innovation capacity of the country (71st). Putting economic growth on a more stable footing in future will require Ukraine to address important challenges. Arguably, the country's most important challenge is the needed overhaul of its institutional framework, which cannot be relied on because it suffers from red tape, lack of transparency, and favoritism. Ukraine could realize further efficiency gains from instilling more competition into the goods and services markets (117th) and continuing the reform of the financial and banking sector (114th).

Norway is ranked 15th this year, up by one place and showing progress in a number of areas. Specifically, the country features a notable improvement in its innovative capacity (up from 20th to 15th place), driven by improved R&D spending by business, a better collaboration between the business sector and academia, and increased government procurement of advanced technological products. However, looking forward, reversing the downward trend in the availability of scientists and engineers (from 18th two years ago to 42nd in 2011) will be critical to maintain the country's high level of innovative activity. Similar to the other Nordic countries, Norway is further characterized by well-functioning and transparent public institutions; private institutions also get admirable marks for ethics and accountability. Markets in the country are efficient, with labor and financial markets ranked 18th and 7th, respectively. Productivity is also boosted by a good uptake of new technologies, ranked 13th overall for technological readiness. Moreover, Norway's macroeconomic environment is ranked an

impressive 3rd out of all countries (up from 4th last year), driven by windfall oil revenues combined with prudent fiscal management. On the other hand, Norway's competitiveness would be further enhanced by continuing to upgrade its infrastructure (27th), fostering greater goods market efficiency and competition (28th), and further improving its environment for research and development [1].

b) THE WORLD COMPETITIVENESS SCOREBOARD 2012, IMB (Institute of Management Development) [2] (table 3).

Table 3

The world competitiveness scoreboard 2012, and comparison with 2011, IMB

	Value (0 to 100)	Place in 2012(of 59)	Place in 2011(of 59)
Norway	89.673	8	13
Ukraine	46.878	56	57

The World Competitiveness Yearbook (WCY) ranks and analyzes the ability of nations to create and maintain an environment in which enterprises can compete. It means that we assume that wealth creation takes place primarily at enterprise level (whether private or state owned) - this field of research is called: "competitiveness of enterprises". However, enterprises operate in a national environment which enhances or hinders their ability to compete domestically or internationally - this field of research is called: "competitiveness of nations" and is covered by the WCY.

Based on analysis made by leading scholars and by our own research and experience, the methodology of the WCY thus divides the national environment into four main factors:

- Economic Performance;
- Government Efficiency;
- Business Efficiency;
- Infrastructure.

The World Competitiveness Scoreboard presents the 2012 overall rankings for the 59 economies covered by the WCY. The economies are ranked from the most to the least competitive and the results from the previous year's scoreboard (2011) are shown in brackets. The Scores shown to the left are actually indices (0 to 100) generated for the unique purpose of constructing charts and graphics [2].

2) KAM – the Knowledge Assessment Methodology [3];

The Knowledge Indexes were designed as an interactive tool for benchmarking a country's position vis-a-vis others in the global knowledge economy. It was created by the World Bank Institute using the Knowledge Assessment Methodology (KAM) (table 4).

The Knowledge Index or KI is an economic indicator prepared by the World Bank Institute to measure a country's ability to generate, adopt and diffuse knowledge (table 4).

Table 4

The Knowledge Indexes for benchmarking a country's position vis-a-vis others in the global knowledge economy

Rank	+\-	Country	KEI	KI	Economic Incentive Regime	Innovation	Education	ICT
5	+2	Norway	9.11	8.99	9.47	9.01	9.43	8.53
56	-2	Ukraine	5.73	6.33	3.95	5.76	8.26	4.96

Methodologically, the KI is the simple average of the normalized performance scores of a country or region on the key variables in three Knowledge Economy pillars - education and human resources, the innovation system and information and communication technology (ICT).

The Knowledge Economy Index (KEI) takes into account whether the environment is conducive for knowledge to be used effectively for economic development. It is an aggregate index that represents the overall level of development of a country or region towards the Knowledge Economy. The KEI is calculated based on the average of the normalized performance scores of a country or region on all 4 pillars related to the knowledge economy - economic incentive and institutional regime, education and human resources, the innovation system and ICT.

The 4 pillars of the Knowledge Economy framework:

- an economic and institutional regime to provide incentives for the efficient use of existing and new knowledge and the flourishing of entrepreneurship;
- an educated and skilled population to create, share, and use knowledge well;
- an efficient innovation system of firms, research centers, universities, consultants and other organizations to tap into the growing stock of global knowledge, assimilate and adapt it to local needs, and create

new technology;

- information and communication technology to facilitate the effective creation, dissemination, and processing of information [4].

A list of all countries by Human Development Index as included in a United Nations Development Programme's Human Development Report (table 5).

Table 5

List of countries by Human Development Index

Rank	Country	HDI, New 2011 estimates for 2011	Change compared to new 2011 data for 2010
1	Norway	0.943	+0.002
77 (+3)	Ukraine	0.729	+0.004

The latest report was released on 2 November 2011 and compiled on the basis of estimates for 2011. It covers 185 member states of the United Nations (out of 193), along with Hong Kong (of the People's Republic of China), and the Palestinian territories; 8 UN member states are not included due to lack of data. The average HDI of regions of the World and groups of countries are also included for comparison.

The Human Development Index (HDI) is a comparative measure of life expectancy, literacy, education, standards of living, and quality of life for countries worldwide. It is a standard means of measuring well-being, especially child welfare. It is used to distinguish whether the country is a developed, a developing or an underdeveloped country, and also to measure the impact of economic policies on quality of life. The index was developed in 1990 by Pakistani economist Mahbub ul Haq and Indian economist Amartya Sen [5].

Countries fall into four broad human development categories, each of which comprises 47 countries: Very High Human Development, High Human Development, Medium Human Development and Low Human Development (46 countries in this category).

3) The Global Innovation Index (GII)

a) The Global Innovation Index by The Boston Consulting Group is a global index measuring the level of innovation of a country, produced jointly by The Boston Consulting Group (BCG), the National Association of Manufacturers (NAM), and The Manufacturing Institute (MI), the NAM's nonpartisan research affiliate. NAM describes it as the "largest and most comprehensive global index of its kind" (table 6).

Table 6

Global Innovation Index by The Boston Consulting Group

Rank	Country	Overall	Innovation Inputs	Innovation Performance
18	Norway	1.15	1.16	1.11
64	Ukraine	-0.45	-0.13	-0.73

The International Innovation Index is part of a large research study that looked at both the business outcomes of innovation and government's ability to encourage and support innovation through public policy. The study comprised a survey of more than 1,000 senior executives from NAM member companies across all industries; in-depth interviews with 30 of the executives; and a comparison of the "innovation friendliness" of 110 countries and all 50 U.S. states. The findings are published in the report, "The Innovation Imperative in Manufacturing: How the United States Can Restore Its Edge" [6].

The report discusses not only country performance but also what companies are doing and should be doing to spur innovation. It looks at new policy indicators for innovation, including tax incentives and policies for immigration, education and intellectual property.

b) The Global Innovation Index by INSEAD is an annual publication of INSEAD which features, among others, the Global Innovation Index (GII), a composite indicator that ranks countries/economies in terms of their enabling environment to innovation and their innovation outputs [7] (table 7).

Table 7

Global Innovation Index rankings by INSEAD

Country\Economy	Score (0-100)	Rank in 2011	Rank in 2010	Rank in 2009
Norway	52.60	18	10	14
Ukraine	35.01	60	61	79

The Global Innovation Index (GII) project was launched by INSEAD in 2007 with the simple goal of determining how to find metrics and approaches to better capture the richness of innovation in society and go beyond such traditional measures of innovation as the number of PhDs, the number of research articles produced, the research centers created, the patents issued, and research and development (R&D) expenditures.

There were several motivations for setting this goal. First, innovation is important for driving economic progress and competitiveness - both for developed and developing economies. Many governments are putting innovation at the center of their growth strategies. Second, there is awareness that the definition of innovation has broadened - it is no longer restricted to R&D laboratories and to published scientific papers. Innovation could be and is more general and horizontal in nature, and includes social innovations and business model innovations as well. Last but not least, recognizing and celebrating innovation in emerging markets is seen as critical for inspiring people - especially the next generation of entrepreneurs and innovators.

Policy discussions in Europe have to include a focus on innovation, not just austerity, to bridge gaps in a multi-speed continent (fig. 1) [8].

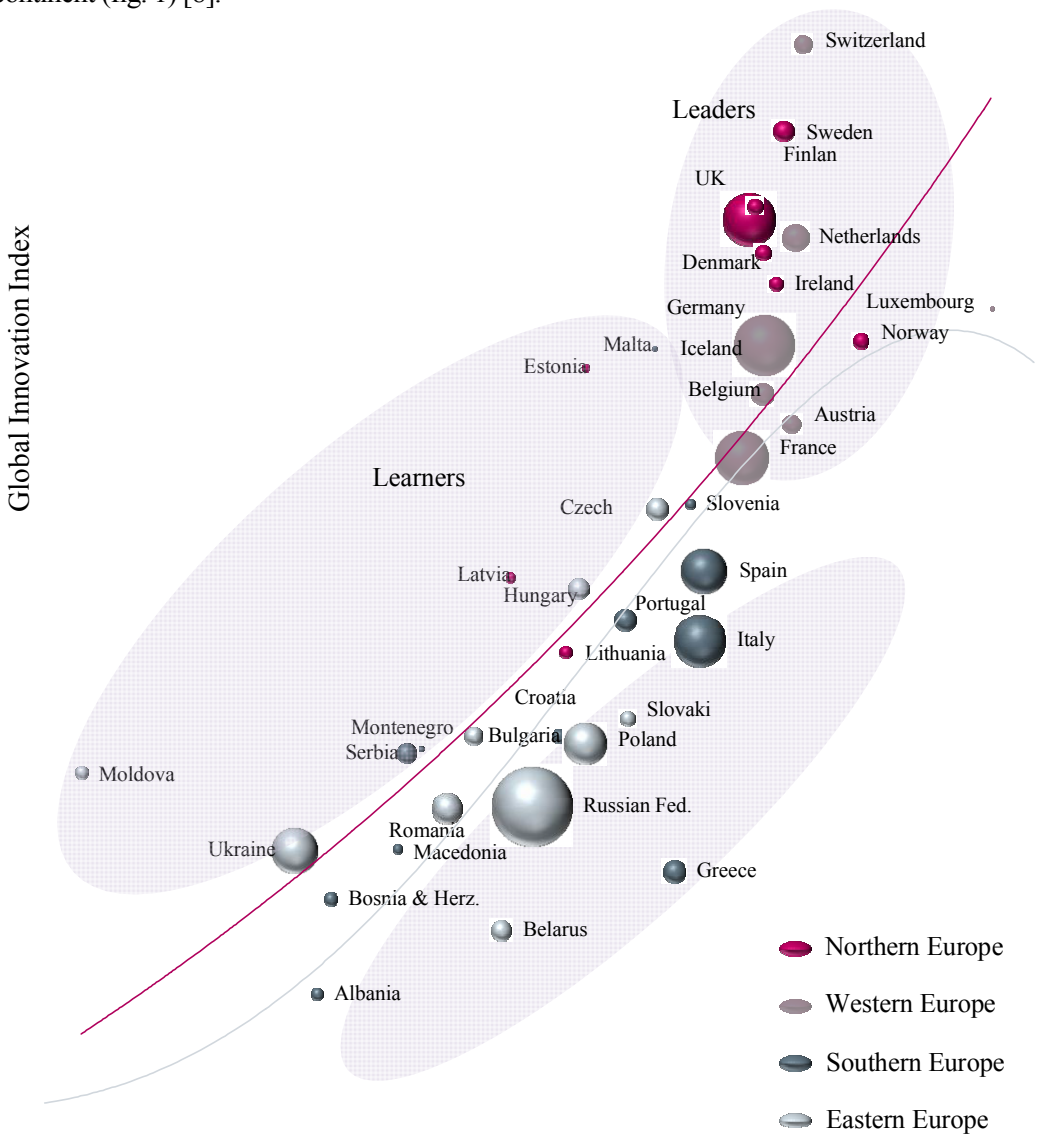

Fig. 1. Innovation in Europe (bubble size: population)

However, reaching this goal has not been simple. A serious body of literature (see the next section) has attempted to outline metrics for innovation over the last several years. The GII builds on these prior approaches and attempts to incorporate new perspectives on both traditional and emerging views of innovation. Many aspects of innovation, such as those in the informal economy, remain hard to identify and harder to measure with objective metrics. The GII innovation model, described in further detail in this chapter, takes several important steps in this direction, but feedback from experts and practitioners allows the model to continue to evolve.

An ambition of the GII has been to maximize the number of economies evaluated in the study. This continues to be a challenge because obtaining timely and relevant metrics on a global basis is often not possible.

All available official data from international organizations such as the World Bank, the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the International Telecommunications Union

(ITU) were considered, although many critical measures of innovation are not covered in the efforts of these organizations. Finally, combining various metrics into a simple measure of innovation for an economy is fraught with statistical and other complexities, 1 especially when considering economies that are often vastly different in size, population, and stage of economic development.

Three key indicators at the beginning of each profile are intended to put the economy into context; population in millions, 1 GDP per capita in PPP current international dollars, 2 and GDP in US$ billions. 3 While coming from different sources, the three series were extracted from the World Bank World Development Indicators database in April 2011 (table 8).

Table 8

Key World Development Indicators

Country	Population (millions)	GDP per capita, PPP (current international $)	GDP (US$ billions)
Ukraine	45,4	6317.8	113.5
Norway	4.9	55672.1	381.5

As a sign of the increasing validation and importance of the GII project, four key Knowledge Partners have contributed to the project this year: Alcatel- Lucent, Booz & Company, the Confederation of Indian Industry (CII), 2 and the World Intellectual Property Organization (WIPO, a specialized agency of the United Nations). Each of these partners shares a common vision of the importance of a broader notion of innovation in our world today. The GII project has benefited from the knowledge and input of these partners, and contributions from other public- and private-sector leaders who are interested in understanding and improving innovation in their economies will continue to provide valuable input.

4) Innovation: Transforming the way business creates [9].

Innovation: Transforming the way business creates is a white paper by the Economist Intelligence Unit sponsored by Cisco Systems (table 9). The Economist Intelligence Unit bears sole responsibility for this report. The paper was written by Nick Valery and Laza Kekic, with sidebars contributed by Bob Johnstone and David Jacoby. It was edited by Nigel Holloway and the paper was designed by Richard Zoehrer.

Table 9

Innovation: Transforming the way business creates, Innovation index, 2007-2011

Country	Innovation Performance				Innovation Enablers					
	Innovation performance index	Rank	Growth expected during the next 5 years	Change in rank	Direct inputs index	Rank	Innovation environment index	Rank	Aggregate innovation enablers index	Rank
Norway	8.94	18	2.4	-2	8.50	19	7.92	19	8.35	19
Ukraine	6.19	49	15.3	3	5.94	44	4.85	73	5.67	52

Cisco Systems constructed three indices of innovation for 82 countries, drawing on the Economist Intelligence Unit's Business Environment Ranking (BER) model. The first index measures innovation output or performance, and is based on international patents data.

There are also two composite indices, constructed on the basis of BER scores, that measure innovation inputs, or innovation enablers. The first covers direct innovation inputs and the second the innovation environment, the broad economic, social and political backdrop that facilitates innovation activity. There is a fourth aggregate innovation inputs or innovation enablers index that combines the direct innovation and the innovation environment indexes. The weights used - 0.7 for direct inputs and 0.3 for the environment index - correspond to weights based on the estimated coefficients in the regression equation described below that relates innovation performance to innovation inputs. Innovation - defined here as the application of knowledge in a novel way, primarily for economic benefit - is becoming increasingly important for companies and governments. Business executives regard it as a vital weapon in fending off their corporate competitors. Government policymakers see the need for an innovative environment if their countries' economies are to grow.

This paper has shown that governments and companies are no longer paying lip service to innovation, if they ever did. Heightened global competition is forcing both to find new ways to increase productivity. They have little choice but to innovate, or at least to encourage the innovators.

But what is the best way to become more innovative? One thing is clear from this study: there is no single, right method. Take, for example, the diversity of the countries at the top of the ranking. Some are large and some are small. Some value rote learning, others improvisation and spontaneity. Innovation is certainly not a Western preserve; witness the position of Japan at the top of the innovation ranking, as well as the strong performance of Taiwan and Singapore, not to mention the emergence of China. All heavily emphasize the use of government policies to encourage innovation, along with educational systems that produce large numbers of scientists and engineers.

Their forecast for innovation rankings over the next five years highlights the rise of China in the league table. But it would have been more surprising if the ranking had not predicted that the world's second-largest economy in terms of purchasing power would climb up the ladder. Less predictable was the strong showing of Mexico and Lithuania, hardly countries famed for their innovation prowess. This is particularly so for the former, being part of a region, Latin America, not noted for its innovativeness.

Clearly, it helps to be close to the United States, which ranks number three in the innovation league. The same is true for companies too. Their survey found that many more firms that are located in or near high-tech clusters in such countries as Israel perform better than their peers than companies that are not in such a location. One answer is to move to a high-tech cluster. A less drastic course, however, would be simply to open an outpost there and breathe the same air.

According to western economists, the methods described here allow an assessment of the innovation potential in countries that follow the dynamics of change of innovative activity, to analyze the strengths and weaknesses of individual countries and conclude the extent of the gap between them, and use the results to improve innovation policy.

Norway and Ukraine established diplomatic relations in 1992, shortly after Ukraine regained its independence. In 1992 the Norwegian Embassy in Kiev was established.

Ukraine is a large country centrally placed in Europe. Except for a few sectors, economic relations between Norway and Ukraine are not particularly strong and direct political cooperation is also not particularly deep, with few exceptions. However, the potential for future growth in all dimensions is quite large.

Norway and Ukraine cooperate well within international organizations. Norway regards Ukraine's cooperation with the United Nations system, NATO, OSCE, Council of Europe, the International Monetary Fund and international development banks as very important for the reform and modernization of Ukraine.

Norway supports a fuller integration of Ukraine in pan-European and Transatlantic cooperation and regards Ukraine's relations with the European Union and NATO as particularly important in this respect. As part of the economic integration and development process Norway as EFTA member in 2010 signed a free trade agreement with Ukraine. This agreement is pending ratification in both countries [10].

Agreements in force include:

28.09.1994 Protocol between the Ministry of Foreign Affairs of Norway and the Ministry of Foreign Affairs of Ukraine on cooperation and economic development

28.09.1994 Agreement between Norway and Ukraine on Early Notification of Nuclear Accidents and on the exchange of information on nuclear facilities

07.03.1996 Protocol between Norway and Ukraine on the agreements concerning the bilateral relations between Norway and Ukraine

07.03.1996 Agreement between Norway and Ukraine for the avoidance of double taxation and prevention of fiscal evasion with respect to taxes on income and wealth

27.01.1998 Agreement between Norway and Ukraine on trade and economic cooperation

03/27/2001 Air Transport Agreement between Norway and Ukraine

15.06.2004 Agreement between Norway and Ukraine on international road transport of passengers and goods

15.06.2004 Agreement between Norway and Ukraine on mutual assistance in customs matters

12.09.2006 Agreement between Norway and Ukraine on the Protection of Classified Information

The Following agreements are not yet in force:

13.02.2008 Agreement between Norway and Ukraine on readmission of persons

13.02.2008 Agreement between Norway and Ukraine on the facilitation of issuance of visas

24.06.2010 Free Trade Agreement between the EFTA States and Ukraine

24.06.2010 Agreement on Agriculture between Norway and Ukraine

The most important thing is to adopt experience of international colleagues. The experience may be used while solving problems of Ukraine. To improve the innovative capacity and innovation activity in Ukraine requires implementation of a set of measures implemented at the level of regional government in the following

areas:

1. Implementation of additional financial mechanisms targeted support industrial enterprises, including in the form of:

a) Guarantees for loans taken for the implementation of priority projects for modernization and development of production;

b) Payment of the budget of the cost of maintaining facilities used by organizations of innovation infrastructure;

c) The creation of technology parks in the high technology and government support to the establishment and functioning as part of the program "Development of Ukraine in the parks of the high technology."

2. Development of venture capital activity:

a) The creation of the legal framework for venture capital investment by domestic pension funds, insurance companies and banks;

b) Promotion of venture capital activity in the business environment through the promotion of "success stories";

c) Decrease in interest rates.

3. Development of information, expert consulting and educational infrastructure of innovation:

a) The creation of an effective system of innovative monitoring systems that form an integrated system of information on scientific and innovation potential and innovation activities and industrial sectors on the basis of the modern state and indicators of innovation;

b) Support for cross-border cooperation;

c) The creation and support of regional database of research development;

d) The creation of specialized databases to support service innovation;

e) Strengthening the links between education to the economy through the creation of integrated scientific and educational institutions;

f) Establishment of a system of multi-level continuing education in innovation and the associated process of forming an innovation culture in the scientific community and the business sector;

g) The formation of an innovative partnership between the state, science, education, business and civil society.

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