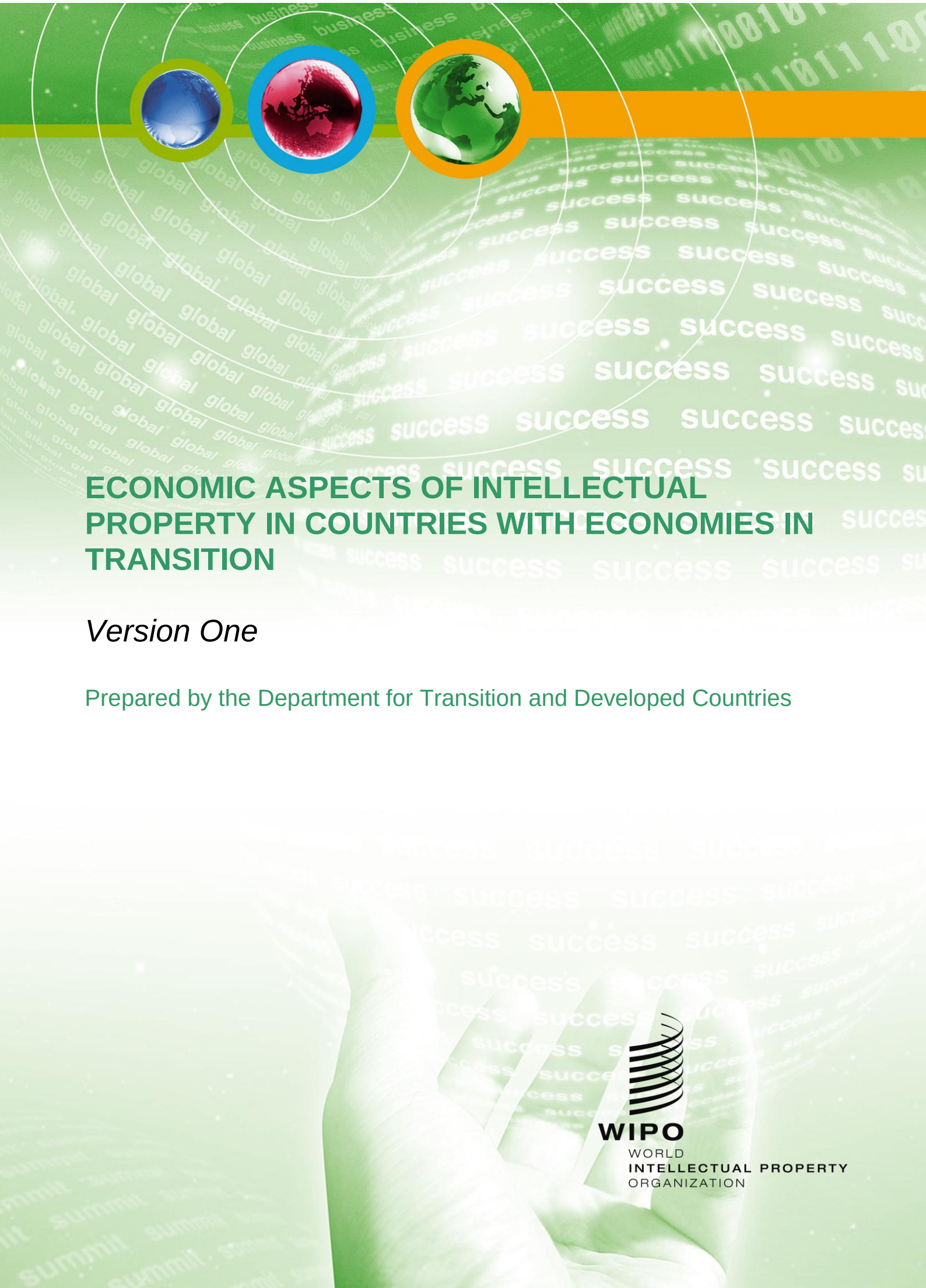

ECONOMIC ASPECTS OF INTELLECTUAL PROPERTY IN COUNTRIES WITH ECONOMIES IN TRANSITION

Version One

Prepared by the Department for Transition and Developed Countries

WIPO
WORLD
INTELLECTUAL PROPERTY
ORGANIZATION

This paper is the updated version of the Guidelines for the Use of IP Rights for the Economic Development of Countries with Economies in Transition.

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Introduction

A top priority task of the government of any country is finding new resources for economic growth, especially in the context of a systemic crisis observed over the last five years. This issue is of particular relevance for countries with economies in transition, where new economic relations are being shaped.

In today's conditions, intellectual resources, i.e. the latest knowledge and technology, become such a resource. Today, when a new economy has been shaped, knowledge plays a decisive role in the development of both separate businesses and the country in general.

A major role in this process plays knowledge, with respect to which intellectual property rights have been granted, i.e. intellectual property (hereinafter referred to as "IP"). IP is a dynamically developing institution, the role and importance of which in the world economic relations has dramatically changed. While previously the legal component of IP dominated, today, when an innovation economy is being shaped, the economic component is becoming the main component.

Today, the principal task of the institution of intellectual property is promoting the growth of the national economy.

To accelerate the accomplishment of this task, a decision was taken to study the main problems and issues connected with the economic aspects of IP; consider the general trends observed in the field of IP, from the point of view of an innovation economy, identify the special characteristics of these processes in countries with economies in transition; in the framework of the outlined purpose identify the whole complex of indicators reflecting the economic component of IP and being the basis for evaluating the connection of the economy with IP; develop some proposals to promote and encourage the use of IP rights for economic development of countries with economies in transition.

These studies were initiated by the Department for Transition and Developed Countries of the World Intellectual Property Organization (hereinafter referred to as "WIPO").

During this study 23 countries were surveyed: Azerbaijan, Albania, Armenia, Belarus, Bulgaria, Hungary, Greece, Georgia, Kazakhstan, Cyprus, Kyrgyzstan, Latvia, Lithuania, Moldavia, Russian Federation, Serbia, Slovakia, Turkey, Ukraine, Montenegro, Czech Republic, Romania and Israel. The replies received from the national patent offices of these countries, as well as scientific and practical literature on the issues of innovative development and intellectual property, materials and reports prepared by WIPO, the United Nations Economic Commission for Europe, OECD, the World Bank, etc. were used for the preparation of this paper. Unfortunately, not all patent offices provided the requested information, and the most difficult were the questions connected with economic indicators in the field of innovations. Since no data were available for certain questions, we did not manage to identify existing trends and typical special features. We hope that these issues will be covered during subsequent studies. The conclusions and proposals made in this paper reflect the opinions and subjective assessments of specialists and experts from patent offices and other organizations involved in the preparation of answers to the questions, as well as those of the author of these studies.

The author would like to express his gratitude to the administration and specialists from the national patent offices that provided the necessary information. The author is particularly grateful to the administration and employees of the Israeli and Turkish patents offices for their organization of fact-finding meetings for the purpose of this work.

The author also expresses his sincere gratitude to the administration and employees of the WIPO Department for Transition and Developed Countries, which demonstrated their interest in studying one of the most complicated issues of innovative development, as well as for their assistance in arranging these studies.

This paper is intended for professionals working in specialized public institutions, heads of enterprises of any form of ownership, universities, creative circles and experts in the field of intellectual property and innovation management.

Furthermore, the results of the present studies can be used in further research conducted by WIPO in the field of the economics of IP.

1. General Issues of Intellectual Property and Innovation Management

1.1. Intellectual Property and Innovations in the Economic Development of Society

In the conditions when the innovation economy is emerging, many countries of the world have chosen a totally new approach to the issues of economic growth, based on promoting knowledge acquisition, use and transfer.

The main difference in the innovation economy or knowledge economy is that intellectual property, such as knowledge, skills, experience and particularly advanced technologies becomes an intellectual reserve of both separate businesses and the country in general, and serves as a main resource for their development. Not without reason, the world's leading companies are interested in an accelerated growth in knowledge.

One of the conditions for the integration of countries with economies in transition into the new economic system is the creation of effective mechanisms for the utilization of their intellectual resources, especially those covered by intellectual property rights.

Two issues become of particular importance in this connection[1]:

- Understanding the nature of the phenomenon of IP that enables using IP as an effective resource for economic development;
- Devising a state IP development strategy that will become an integral part of the general innovative development strategy.

The first issue is connected with the strengthening of the economic component of IP. This is connected with the special characteristics of property relations in intellectual production that is based on ***knowledge.***

For the purpose of this paper, *knowledge* means any *results of human intellectual activity* (hereinafter referred to as "RIA") in the field of science, technology, literature, art, business, etc. and constitutes the intellectual resource of any business.

Talking about knowledge as an intellectual resource, a set of *special attributes* that determine its active use in the field of production should be explained.

- First of all, knowledge is intangible, i.e. ideal, which is its general attribute and determines all other attributes.
- Unlike natural resources, knowledge is not subject to wear and tear, is inexhaustible and is capable of self-reproduction, i.e. knowledge grows faster and more qualitative in the course of its productive implementation. In other words, knowledge is an *unlimited resource.*

[1] Karpova N.N. "Intellectual Property in the Innovative Economy", Collected works "Intellectual Property in the XXI century. Legal protection of innovations", Moscow, Russian Academy of Justice , the Intergovernmental Foundation for Educational, Scientific and Cultural Cooperation in the CIS countries, 2010

- The main property of intellectual resources, which enables their active use in the field of production, is that intellectual resources can be reproduced and used on any scale.

Consequently, *the effect of greater return from an increase in the scale of production or the effect of economies of scale* is the economic nature of an intellectual resource or an intellectual product, i.e. knowledge can be used by several entities or persons at a time. However, such property will give a considerable advantage to a company only if its competitors *have no free access* to such knowledge. This condition is of utmost importance, since unlike tangible resources, intellectual resources (knowledge) are not *scarce* (in this case inaccessible). These circumstances make knowledge extremely *vulnerable* as soon as it becomes known to a wide circle of persons. Having discovered the essence of some novel thing, any company can apply it in its own production process. Therefore, it is necessary to ensure that intellectual property *will not be accessible* to competitors.

Inaccessibility is ensured by the *institution of intellectual property* that introduces *exclusive rights to intellectual property*, thus restricting access to knowledge and making it *scarce*. In addition, the essence of property relations (including with respect to tangible items) is in the *monopolistic use* of property by its owner, i.e. preventing all other entities from accessing the given property. By introducing *exclusive rights* to intellectual property, the institution of intellectual property establishes the *legal monopoly on knowledge.*

Legal monopoly establishes conditions for the distribution of protectable knowledge *in the form of goods*. So, the intangible nature of knowledge and monopoly on knowledge (exclusive rights) determine the nature of the *phenomenon* of intellectual property.

The economic component of IP is an opportunity for the recurrent use of exclusive intellectual property rights. It is this very attribute that makes it possible to treat intellectual property as one of the main factors of economic development of today's companies and entire countries.

The second issue deals with intellectual property management. The economic processes happening in society require that current management structures dramatically change their *priorities* when devising management strategies. Today, effective intellectual property management is the most important component of the development strategy of any country. Devising an IP management strategy is the most important step in the innovative development process.

The problems of innovative development are of particular significance for countries with economies in transition. It is already clear to everyone that the exploitation of labour and natural resources is unable to get a country out of the crisis. Innovations are the only source of development, i.e. practical implementation of new knowledge in all fields of activity, including the management system. Before we proceed to the issues of innovative development, it is necessary to clarify what we mean by the word "innovation".

Innovation means a new phenomenon in different spheres of human life. Innovation means a set of activities resulting in a fundamental improvement in the field of production, management, education, or in the social sphere, etc. Historically, a considerable portion of innovations has been manifested primarily in the field of scientific research and associated developments, as well as the manufacturing of new products, i.e. in the field of production. Indeed, the achievements brought by scientific and technological progress can become an example of the greatest innovations of the present time. Therefore, with respect to devising a national innovative development strategy, innovations mean first of all innovations in the field of production, i.e. technological innovations[*]

*Oslo. Manual "Guidelines for collecting and interpreting innovation data", 2005

Technological innovations are a process or a result of a process, whereby the achievements in the field of scientific research and developments are transferred to business. The essence of this process is to create a new protectable product and bring such product to consumers. For the purpose of this definition, the term “protectable” means those patentable technical solutions, such as inventions, utility models, industrial designs, computer software or any other IP, which constitute the basis of, or have been used for the production of, a new product.

Therefore, a statement can be made that in all cases when intellectual property is created or used, we are dealing with innovations, i.e. this means that the existence of intellectual property is a sufficient (but not necessary) condition to say that innovations exist. In other words, most often innovations are intellectual property used in practice.

Therefore, intellectual property is an integral component of innovation processes, and the importance of IP in the country’s economy depends on the way these processes are organized.

1.2. State Policy in the Field of Science and Innovations

The economic growth of any country (whether developed or developing) requires long-term efforts by the country and the community. The effectiveness of such efforts is determined by an efficient state policy in the field of science and innovations.

In the leading countries of the world, state policy in the field of innovations is the most important element of their state economic policy and is revised every 5 to 10 years in furtherance of the respective government's new objectives, tasks, internal and externals conditions. For example, the United States, the unquestionable leader in the field of science, technology and innovations, has seen multiple transformations of its policy in the field of science and innovations over the last 30 years. The EU Member-States, Japan and new industrial countries also pay great attention to the elaboration of their innovation policies[*].

For countries with economies in transition, the policy in the field of science and innovations becomes their *top priority*, since when resources, in particular financial resources, are scarce; this policy enables them to use the potential and efforts of the country, business and community as effectively as possible.

The importance of and the need for the development of a state scientific–technical and innovation policy in countries with economies in transition are supported by the data received during the survey. Such policy has already been devised in all countries that participated in the survey (in three of them - Georgia, Azerbaijan and Cyprus, it is still being devised).

The analysis has revealed the *shared goals and tasks* of the innovation policy of developed countries and countries with economies in transition, which include:

- Time horizons (in most countries state innovation policy was devised for the period until 2015, while in some countries it was until 2020);
- Increased contribution of science and technology to the development of the national economy;
- Creation of fundamentally new high-tech and knowledge-based sectors of the economy;
- Improved quality of life of the population;
- Creation of an energy-saving economy;
- Improved environmental situation.

[*] The State of the Union Address 2011. Winning the Future. http://www.whitehouse.gove/state-of-the-union 2011

Aside from that, both general and specific factors, which are typical for developing countries and undoubtedly have an impact on the elaboration of their national innovation policies, have also been identified; such factors include:

- Poor involvement of the business community in innovation policy elaboration and implementation (including funding of innovation projects);
- Poor development of public-private partnerships;
- Inadequate level of education in the field of IP;
- No connection between scientific institutions and the production sector;
- Inadequate level of interaction between public and private research centers;
- Low level of cooperation between research institutes and industry;
- Inadequate harmonization of national standards in the field of innovations and IP with international standards, etc.

The factors specified above *slow down the process of innovative development* and, therefore, should be taken into consideration *in the first place* when devising state scientific-technological and innovation policy.

For example, for most countries with economies in transition, the common negative factors include *a low level of research and insufficient practice in the field of technology transfer*. Accordingly, these problems require close attention from competent government structures, namely: in particular a set of steps supported financially and aimed at eliminating this phenomenon should be provided for when devising scientific-technological and innovation policy. Another barrier on the way to innovative development is *low activity of business* – this requires the provision of special benefits that will encourage the involvement of business in the innovation processes. Moreover, such important factor as *an insufficient level of education in the field of IP* requires that special educational programs be included in the list of the top priorities in the innovation policy.
On the other hand, such factor as *a high level of education* among the population requires the creation of special innovation policy tools that will make it possible to use this positive factor as effectively as possible.

Therefore, when devising their state scientific-technological and innovation policy, countries with economies in transition should take into consideration both the global trends and their specific domestic conditions that effect their innovative development. This policy should determine the objectives, tasks and priorities of the country's innovative development.

Priorities in scientific-technological and innovation policy

State scientific-technological and innovation policy is devised taking into consideration constantly changing factors, such as external environment, economic requirements and the social environment. Such a policy is similar to a living organism that dynamically transforms in accordance with new objectives, new tasks and new challenges.

The U.S. scientific-technological and innovation policy, which has undergone dramatic changes over the last two decades, can be taken as an example[*]. Such external factors as a rapid globalization of the world economy and the end of the USA-USSR superpower confrontation have resulted in a dramatic transformation of the U.S. federal scientific-technological and innovation policy starting in the late 1980s and mid-1990s. The emergence of a specific factor in the 21st century – increased requirements triggered by post-industrial values – entailed the need to revise the priorities of the U.S., then-current, scientific-technological and innovation policy[*].

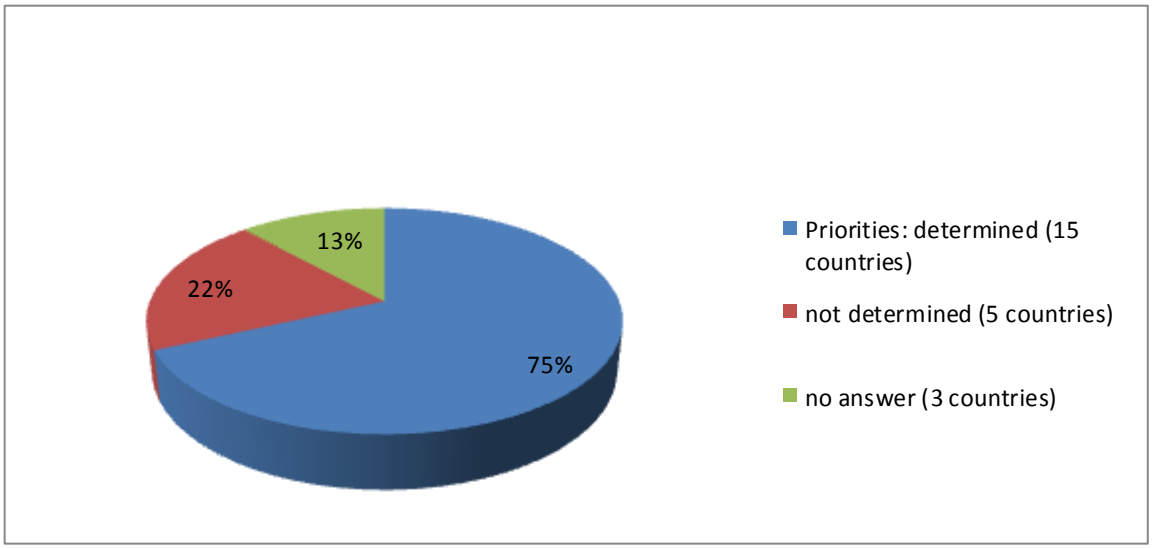
In the conditions of constant changes, it is necessary to clearly determine the *priorities* in scientific-technological and innovation policy, where the society will direct its major financial and

[*] I.V. Danilin. Current Scientific and Technology Policy of the United States, M: Institute of World Economy and International Relations of the Russian Academy of Science, 2011

labour resources. Therefore, new basic inventions, new technology and new platforms, which should become the basis for the country's economic growth, are to be developed in these particular areas.

In the context of global competition and growing budgetary restrictions, the choice of priorities in scientific-technological and innovation policy becomes, for countries with economies in transition, the decisive factor determining the growth of their national economies.
The survey results demonstrate that most countries participating in the project have determined their priorities in science and technology (Fig. 1).

Fig. 1 Forming a list of priorities of scientific-technological and innovation policy



Analysis of answers (Table 1) revealed *shared* priorities for most respondents:

- Information and telecommunication technology (ITT);
- Nanotechnology;
- Energy, energy efficiency and energy savings;
- Biotechnology;
- Technology related to health and quality of life, life science;
- New materials;
- Agriculture;
- Food industry;
- Transport systems.

Table 1
Priorities in scientific-technological and innovation policies in countries with economies in transition

Country	ITT	Transport systems	Energy efficiency and energy savings	Health and quality of life (life science)	New materials	New technology	Nanotechnology	Biotechnology Biomedicine	Laser and optical technology	Food industry	Agriculture	Energy	Environmental protection	Pharmaceutics
Azerbaijan	+		+	+	+		+				+		+	-
Belarus	+						+	+	+					
Bulgaria	+							+						
Hungary	+	+	+					+			+			+
Georgia	+	+					+			+	+			
Kazakhstan	+							+						
Kyrgyzstan												+		
Lithuania	+							+	+	+				
Moldavia	+		+	+	+		+	+			+			
Russia	+	+	+	+	+	+	+							
Serbia	+		+		+		+	+		+	+			
Ukraine	+	+	+		+		+				+		+	+
Czech Republic	+				+							+		
Montenegro	+		+	+				+			+	+	+	
Romania	+			+		+	+	+			+	+	+	

The trends listed above coincide with the trends the leading economies of the world. For example, the U.S. administration identified the following priorities for 2012-2015: new energy, energy savings and energy efficiency, transport systems, health and quality of life[*].

In addition to shared priorities, the list also includes priorities that are characteristic for the given country. The choice of such priorities in the development of science and technology reflects the national peculiarities of the concerned countries.

For example, Bulgaria, among its priorities, specified the preservation and development of its cultural heritage, while Hungary included the development of the pharmaceutical industry in the list of its priorities. Georgia and Lithuania determined, apart from other priorities, the development of engineering services.

For Moldavia, it is important to integrate into the European Community, and Azerbaijan chose, among its priorities, determining the position of Azerbaijan in the context of East-West relations.

Montenegro and Kazakhstan, in addition to other priorities, chose the development of tourism as a priority area.

Such important priorities as nuclear industry and nuclear energy are included in the innovation development program of Russia, Kazakhstan and Belarus.

The development or rocket and space industry, military and special machinery is included as a priority in the programs of Russia and Belarus; in addition, Russia also identified public security issues and counterterrorism as its core national priorities.

The above-mentioned priorities in scientific-technological and innovation policy reflect the *specific* conditions existing in every country, as well as its objectives and tasks. Therefore, the efforts of scientists, researchers and business should be focused on tackling these problems.

1.3. State Strategy of Intellectual Property Development

The accomplishment of the objectives and tasks set forth in the state innovation policy, to a considerable extent, depends on how effectively IP is used. Here, it is very important to determine what government agency should handle IP management issues, including management of the economic aspects of IP.

The survey results showed that almost all countries do not have a separate independent authority to deal with the issues pertaining to the management and economics of IP.

In some countries (6.8%), these issues are handled by a special ministry or office, such as the Patent Office (Greece, Montenegro) or the Ministry of Economy (Armenia). However, in most cases (93.2%) the issues of management and economics of IP are dealt with by several public authorities, such as the Patent Office, the Ministry of Economy and the Ministry of Trade (Romania), the Ministry of Industry and New Technology, the Ministry of Justice (Kazakhstan), the Investment and Development Agency and the Ministry of Culture (Latvia, Lithuania), the Academy of Sciences and the Agency for Innovation and Technology Transfer (Moldavia), organization for SMEs and the Ministry of Health (Turkey), Patent Office, Ministry of Economy, Ministry of Education and Culture (Russia). In Hungary, economics of IP is handled by the Hungarian Intellectual Property Office, but the issues related to the management of IP at the level of the enterprises are in the main focus of the HIPAvilon, a state-owned agency established by the HIPO helping companies create and manage their IP portfolio.

[*].The State of the Union Address 2011. Winning the Future. http://www.whitehouse.gov/state-of-the-union-2011

Such a situation is in line with the trends in the international IP management practice.* IP management is a complex and multiple-factor process requiring joint efforts by various public authorities, scientific centres and foundations. At the same time, however, it is necessary to clearly identify the spheres of influence and areas of responsibility of every participant of this process, with a simultaneous improvement in the level of coordination of their efforts and results.

To ensure coordination of efforts and achievement of maximum results in the field of IP, the leading countries of the world are developing, at the state level, their national IP strategies (hereinafter referred to as "IP development strategy), and this work is usually done in three stages:
Stage I: elaborating a special state program to devise and implement the national IP development strategy.
Stage II: setting up a working group
Stage III: development of the national IP strategy

At the first stage a program is elaborated, in the framework of which the main objectives and tasks of the strategy, as well as funding structure and volumes, are determined. At Stage II a working group or a body is set up, which will be responsible for devising the national IP development strategy. Stage III is devoted directly to the implementation of the IP strategy. The group may function based on the principle of horizontal cooperation between all stakeholders, or based on vertical responsibility of the employees of the agency to which the group is accountable, or based on any other principle. The one important thing is that this group devises the national IP development strategy, subject to all external and domestic conditions and in line with the *general economic development strategy of the respective country.*

Such practice is of principal importance for countries in transition.

As was already mentioned above, in most countries covered by the survey, the responsibility for IP vests with several state institutions and organizations, each having limited resources at its disposal. Under such conditions, it seems that setting up a single agency (working group) to devise the national IP strategy, using the potential of all those involved in the IP management process and uniting their efforts will be the most effective. Such an agency should also be responsible for implementing the approved strategy by carrying out constant monitoring.

The survey results show that most project participants currently have a Program for Devising the National IP Development Strategy (14 countries) and have set up a special group to devise the strategy (16 countries) (see Table 2).

Table 2
The process of elaborating the state IP development strategy

Stages	Countries
I. Program for devising the strategy has been elaborated	Albania, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Moldavia, Serbia, Turkey, Ukraine, Montenegro, Czech Republic, Romania
II. Working group has been set up	Azerbaijan, Albania, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Moldavia, Russia, Turkey, Ukraine, Montenegro, Czech Republic, Romania

* Grand Challenges of the 21st Century. – Your Ideas Welcome. Posted by Kalin T, 2010. April 13. URL: http://www.whitehouse.gov/blog/2010/04/13/grand-challenges-21st-century-your–ideas–welcome.

III. State IP development strategy has been devised	Albania, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Latvia, Moldavia, Serbia, Ukraine, Montenegro, Romania, Hungary

In 11 countries working groups have devised their state IP development strategies (Table 2).

It should be emphasized that those countries, where the said program has not been elaborated, or a working group has not been set up, either do not have or have not yet implemented their state IP development strategy. The work of those groups is primarily based on the horizontal cooperation of all interested parties.

Respondents specified that the following *resources* are used for devising their state IP development strategies: funds from federal and regional budgets, extra-budgetary funds and moneys provided by certain foundations. They also specify that certain provisions of their strategies have been elaborated and implemented in cooperation with WIPO.

Constant control over strategy implementation is an important tool allowing the implementation to be more effective. In their answers, 7 countries (33%) specified that they have an independent agency responsible for constant monitoring of their policies in the field of IP (Albania, Belarus, Hungary, Georgia, Kyrgyzstan, Moldavia and Ukraine), while other respondents have no such authority.

The state IP development strategy is aimed at effective use of intellectual property. The elements of such a strategy, including a system of promoting innovations and intellectual property, will be described in the following sections. In this section it is important to note that the contents of state strategy, as well as the tools and methods supporting its implementation are determined by the economic situation in the concerned country and the concept of state regulation chosen in this connection.

However, one requirement is common for all countries with economies in transition. The strategy in the field of IP should become *an important tool* in implementing the state's economic policy.

In order to look into the issue of the economic aspects of IP the author considers it necessary to form a complex of indicators, consolidated in a few groups that will be the basis for evaluating the ties between the economic processes taking place in countries in transition and IP.

It is worth noting here that the economic component of the IP phenomenon appears at all stages of the innovation process: starting the birth of the idea up to its implementation into a specific product. Every stage has its group of quantitative or qualitative indicators. It seems appropriate to try to elicit the maximum number of indicators that can act in their own way as indicators of IP because they allow to estimate available resources and conditions for IP, as well as to evaluate the results of creation (generation) and the practical use of IP for the purposes of the country's economic growth.

An extensive set of indicators allows for examining in detail all aspects of the economics of IP. At the same time the established complex of indicators can later on become a basis for developing The Methodology for calculating the integral index of IP that will allow to measure the contribution of IP to the development of the national economy.

According to the assigned objective, after looking into the results of the above statements we can propose the first group of IP indicators. This group is a basic one as it embodies the operation conditions of the IP system at the state level and, consequently, provides for the conditions for the creation and practical use of IP.

Group I contains the following quantitative indicators:

1. State policy in the area of science and innovation.

2. List of priority areas of research-and-technology and innovation policy.
3. Factors hampering the process of country's innovative development.
4. Specific factors contributing to the process of innovative development.
5. Government strategy of IP development.
6. Existence of monitoring of the quality of government services in the area of IP.

2. The Intellectual Property Economy

2.1. Provision of Resources for Research and Development

In the context of the innovation economy, achievements in the field of science, technology and innovations have become decisive factors of economic growth. Due to these reasons, the place of any country in today's global economic system is determined by the research intensity of its economy.

Accordingly, countries with economies in transition will be able to successfully integrate into the system of global economic relations only if they are able to increase the research intensity of their national economies.

To comply with this requirement, special attention in innovation policy should be paid to research and development (R&D), especially in top-priority areas. R&D requires, first of all, financial support, which affects the budget of the concerned country.

A steady growth of R&D financing has been observed in world practice. This trend is determined, first of all, by the leading countries of the world, where absolute R&D expenditures have doubled or tripled over the last 20 years (Table 3). Relative R&D expenditures of the world's leading countries as a share in their GDP have also shown positive dynamics (Table 4).

Table 3
Domestic R&D expenditures in leading countries
(USD million)

Country	**1991**	**2000**	**2010**
Brazil	-	12,451.2	21,649.4
United Kingdom	19,322.2	27,855.0	40,384.4
Germany	39,158.4	52,341.9	82,730.7
India	-	12,275.6	24,439.4
Italy	12,489.5	15,246.6	24,752.6
Canada	8,633.0	16,689.6	23,991.1
China	7,532.4	27,182.5	154,147.4
Korea	7,140.8	18,558.5	43,906.4
United States	161,387.8	268,121.0	398,194.0
France	24,417.2	32,957.1	47,953.5
Japan	73,377.9	98,896.0	137,908.6

Source: Statistical book "Indicators of Science: 2012", Moscow, Higher School of Economics

Table 4
Domestic R&D expenditures
expressed as % of GDP in leading countries

Country	**1991**	**2000**	**2010**
Brazil	-	1.02	1.08
United Kingdom	2.03	1.81	1.82
Germany	2.47	2.45	2.78
India	-	0.77	0.76
Italy	1.19	1.05	1.27
Canada	1.57	1.91	1.80
China	0.73	0.90	1.70
Korea	1.80	2.30	3.36
United States	2.72	2.71	2.79
France	2.32	2.15	2.21
Japan	2.93	3.04	3.33
OECD	-	-	2.33 (2008)
EU27	-	-	1.81 (2008)

Source: Statistical book "Indicators of Science: 2012", Moscow, Higher School of Economics

In line with the current requirements, countries with economies in transition are also *increasing* their share of domestic R&D expenditures, as a ratio of their gross domestic product (Table 5).

However, notwithstanding the overall growth trend, the absolute values of R&D expenditures in these countries are not even close to those of the world's leading countries. For example, in 2010 Moldavia spent on R&D ~ USD 25 million, Turkey's expenditures were ~ USD 8,819 million, Russia spent ~ USD 39,752 million, while the United States spent USD 398.194 million.

Table 5
Domestic R&D expenditures in countries with economies in transition (% of GDP)

Country	2000	2005	2010
Bulgaria	0.51	0.46	0.52
Hungary	0.81	0.94	1.16
Georgia	-	0.27	0.25
Kazakhstan	0.26	-	-
Cyprus	0.24	0.40	0.5
Kyrgyzstan	-	-	0.12
Latvia	-	0.7	0.6
Lithuania	0.59	0.75	0.79
Moldavia	0.18	0.37	0.49
Russia	1.05	1.07	1.16
Serbia	-	0.48	0.76
Slovakia	0.65	0.51	0.63
Turkey	0.48	0.59	0.85
Ukraine	0.96	1.03	0.82
Montenegro	0.13	0.16	0.21
Czech Republic	1.21	1.41	1.61
Romania	0.37	0.41	0.4

* Table shows data obtained during the survey

Under the conditions of limitedness of resources, countries with economies in transition have two challenges:

- finding additional funding of R&D;
- more effective use of the available resources.

To find additional resources, the structure of R&D funding should be revised. In the world's leading economies, investments into R&D come primarily from two main sources: the state budget and private business. The share of business steadily exceeds the amounts allocated by the government, which is confirmed by the data provided in Tables 6 and 7.

Table 6
Structure of R&D expenditures in the leading countries by sources of funds (%) in 2000

Countries	Share in R&D funding (%)		
	I	II	III
United States	66	31	3
Japan	74	18	8
Germany	62	35	3
France	50	40	10
United Kingdom	50	30	20
Italy	44	51	5
Canada	49	32	19

Note: I – private companies; II – state; III – other organizations;
Source: Bulletin of Foreign Commercial Information, №6, 11, 2001

Table 7
Structure of domestic R&D expenditures in the leading countries by sources of funds in 2010 (%)

Countries	Domestic R&D expenses	Funds provided by the government	Funds provided by business sector	Foreign sources	Other national sources
Russia	100	70.3**	25.5	3.5	0.6
Brazil	100	54.0	43.9	-	2.2
United Kingdom	100	30.7	45.4	17.7	6.2
Germany	100	28.4	67.3	4.0	0.3
Italy	100	42.9	45.2	7.8	4.1
India	100	66.1	33.9	-	-
Canada	100	33.4	47.6	6.9	12.1
China	100	23.4	71.7	1.3	-
Korea	100	25.4	72.9	0.3	1.4
United States	100	27.1	67.3	-	5.7
France	100	38.9	50.7	8.0	2.3
Japan	100	17.7	75.3	0.4	6.6

Source: Statistical book “Indicators of Science: 2012”, Moscow, Higher School of Economics

As far as the structure of R&D expenditures in countries with economies in transition is concerned, the analysis of answers did not allow us to identify any trend common for all countries, so it is appropriate to divide countries into two groups.

The first group includes those countries where the share of the state in the structure of R&D expenditures, from 2000 to 2010, *increased,* while the second group includes the countries where the share of the state *decreased* (Table 8).

Table 8
Structure of R&D expenditures by sources of funds in countries with economies in transition (%)

Group I	**Share of the state**		**Group II**	**Share of the state**	
	2000	2010		2000	2010
Azerbaijan	45	75	Bulgaria	79	43.3
Kyrgyzstan	43.6	63.5	Hungary	49	39
Moldavia	87	88.9	Kazakhstan	48	46
Russia	53	54.85	Lithuania	61.7	55.7
Serbia	39	44	Slovakia	57	49
Ukraine	30.9	42.5	Turkey	50.6	34
Montenegro	33	61	Czech Republic	45	40
Romania	41	53			

Source: data resulting from polls

Notwithstanding the general dynamics, there are certain differences inside each group: for example, in Serbia and Ukraine, the structure of R&D expenditures financed by the state has increased, although it is still below the share financed by business and other sources. The same is true also for the second group. In Lithuania, the share of expenditures financed by the state has dropped, although it still exceeds the share of R&D financed by business or other investors.

Limited volume of these figures makes it impossible to describe in detail the special characteristics of every country, although it makes sense to dwell upon the activity of business and foreign investors with respect to R&D financing. Similarly to the previous case, here the countries also fall into two groups. The first group comprises those countries where, from 2000 to 2010, the share of foreign investments in R&D *increased*, while the second group includes the countries where this share *dropped* (Table 9).

Table 9
Share of foreign sources in the structure of R&D expenditures in 2000 to 2010 (%)

Group I	Share of foreign sources		Group II	Share of foreign sources	
	2000	2010		2000	2010
Hungary	11	12	Kyrgyzstan	32.7	0 (2005)
Cyprus	9	12	Moldavia	1	0.1
Lithuania	6.7	20	Russia	12	7.6 (2005)
Slovakia	6	14	Turkey	1.2	1.0
Ukraine	23.3	25.7	Romania	5	4.8
Czech Republic	3	10			

Source: the table presents data resulting from polls

As can be seen from Table 9, foreign capital most actively participates in R&D funding in Ukraine, where the share of foreign investments in 2010 made 25.7% of the total domestic R&D expenditures. The lowest activity of foreign investors can be seen in Moldavia, where in 2010 the share of foreign sources in R&D funding dropped by 0.1%. In Kyrgyzstan, foreign investors changed their policies abruptly and in 2010 stopped R&D funding.

As far as involvement of national business in R&D funding is concerned, the highest activity of business is observed in the Czech Republic, where in 2010, the share of private enterprises in total R&D expenditures made 49%, and then follow Hungary – 48%, Turkey – 41%, Kyrgyzstan – 36.5%, Slovakia – 35%, Bulgaria – 30.58%, Ukraine – 31.5%, Lithuania – 24%, Azerbaijan – 19%, Cyprus – 16%, Moldavia – 9.89%, Russia – 7.6%.

The data provided above, with respect to the involvement of national business and foreign investors is indicative, first of all, of the investment climate in those countries. Therefore, in search of additional resources for R&D and the entire innovation process, the governments in countries with economies in transition should focus their efforts primarily on improving the investment climate. Only in this way, will the involvement of national business and foreign companies in the innovation process increase, which will attract additional financial resources into R&D.

2.2. Effectiveness of Research and Development

Under the conditions of limitedness of resources, the only way to make the country's economy more knowledge-intensive is to increase the effectiveness of R&D. The most important indicators of R&D effectiveness include the following: share of R&D implemented in all R&D, number of publications and issued patents, as well as information about licenses and patents sold.

It should be noted that information pertaining to the use of R&D is the most important economic performance indicator of the innovation process.

Analysis of these responses showed that very this indicator caused difficulties among the majority of respondents. Only four countries – Cyprus, Lithuania, Serbia and Turkey – submitted their answers. Such a volume of data does not enable us to identify any general trends and challenges in the process of R&D implementation in countries with economies in transition.

On the basis of the data received only some comments can be made in relation to every country.

In Cyprus, the results of research conducted primarily in industry, then in universities and other institutions of higher education are widely used.

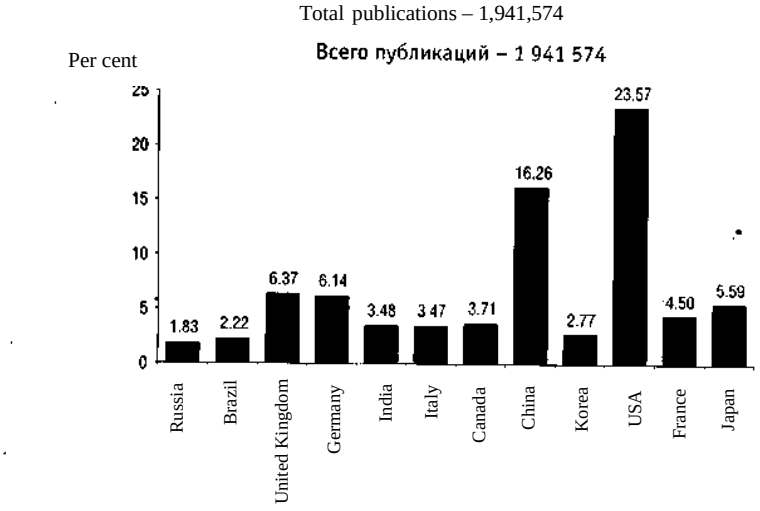
In Serbia it is vice versa, the most effective are R&D conducted in universities and other institutions of higher professional education – 51.7%, then come developments by specialized research institutions – 36.6%, followed by R&D in the industrial sector – 11.63%.

In Turkey, the effectiveness of research conducted by business makes 41%, by state organizations – 34%, and by universities and other institutions of higher education (higher schools) – 20.3%.

If we look at the international practice, we will see that the most effective are researches conducted by large corporations and universities.
Significant indicators of R&D effectiveness include information about *the number of scientific publications* within the country and abroad.

Unfortunately, such indicators, especially those about the relative weight of countries in the total number of publications in the world (based on Scopus citation index) have been left almost uncovered. Such a position of the respondents is erroneous. In today's context, the share of publications in the total number of publications in scientific periodicals and the share of the most frequently cited articles quite adequately reflect the real situation with the global distribution of intellectual resources and show the quality of the country's human resources, especially with respect to people employed in the R&D sector. This is supported by the data provided in Fig. 2.

Fig. 2 Relative weight of countries in the total number of publications in the world scientific journals indexed by Scopus (2010)



Source: Scopus database, 2010

Actually, the strongest scientific potential is nowadays concentrated in the United States, and that is proved by the indicator of the Scopus database - 23,57% of scientific publications in the world belong to US authors. Countries participating in this project have the following statistics: Russia -1,83%; Greece -0,73%; Israel -0,71%; Romania -0,47%; Hungary -0,37%; Ukraine -0,31; Serbia -0,22%; Slovakia -0,20%; Slovenia -0,20.

Legal protection of R&D results

One of the most important indicators of effectiveness and economic significance of R&D is the data concerning the legal protection of the results achieved in the process of conducting R&D. With competition becoming tougher, the leading companies of the world are paying special attention to legal protection of their R&D results, which later are embodied in a particular product or service.

The increase in patenting the results of R&D can be seen as a means of preparation of the companies for the market competition. The companies' endeavor to protect their interests on the market leads to the rise in the number of applications and granted patents for the results of the research and development activity. This being sad, the increase in R&D costs contributes to the rise in such indicator as "patent component of exports", namely the proportion of exported goods in the country's exports.

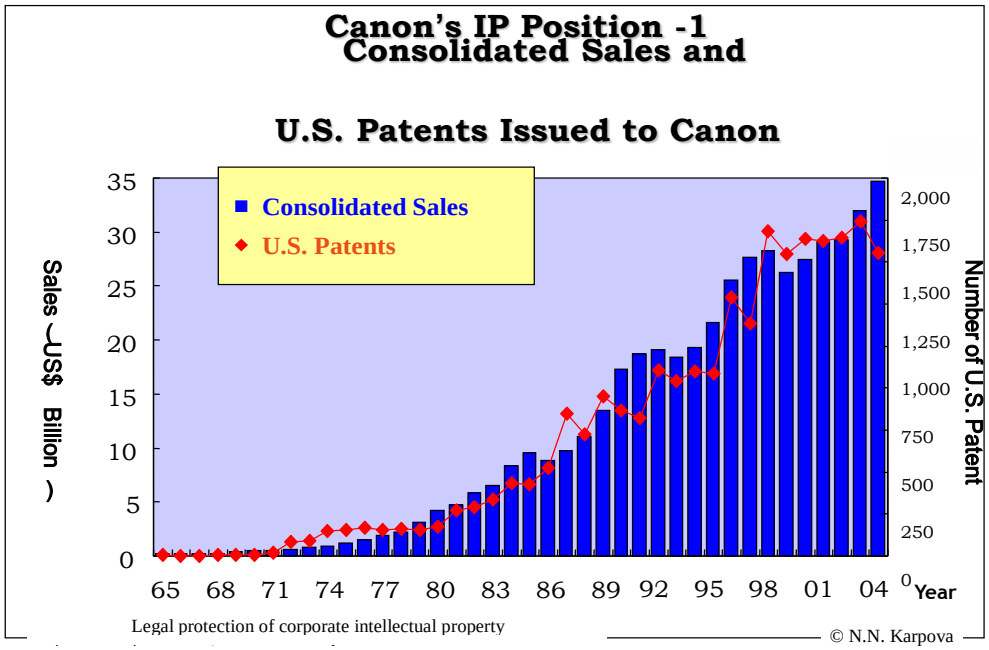
Today, a decision to invest in developments and launch a product is more and more determined by whether or not this particular product can be protected with a patent (Table 10). This is especially true of knowledge-intensive products, where the correlation between sales and the number of patents is the most clear (Fig. 3).

Table 10
Results of survey among the leading U.S. companies, with respect to the influence of intellectual property protection on decisions regarding foreign investments (% of all answers received)

Areas of investment / Industrial sectors	Distribution network	Traditional and assembly production	Manufacturing of components	Manufacturing of finished products	R&D	Average value
Chemical sector, including pharmaceutics	19	46	71	87	100	65
Transportation equipment	17	17	33	33	80	36
Electrical and electronic equipment	15	40	57	74	80	53
Food industry	29	29	25	43	60	37
Metallurgy	20	40	50	50	80	48
Machine building	23	23	50	65	77	48
Average value for all sectors	20	32	48	59	80	48

Source: Mansfield E. «Intellectual Property Protection», Foreign Direct Investment and Technology Transfer», IFC Discussion Paper number 19. IMF, 2005г.

Fig. 3



Source: materials of the seminar LES Russia, Moscow, 2010

Such relation results from the fact that the existence of the patent, protecting the good in question, dramatically increases its competitiveness. As a result, the volumes of patenting new technical solutions, primarily, inventions, increase steadily, which is confirmed by the dynamics of patent applications for inventions in patent offices of the world's most developed countries (table 11).

Table 11
Dynamics of patent applications for inventions in leading countries*

Countries	1991	2000	2009	2010
Brazil	6,944	17,376	21,825	21,825
United Kingdom	27,587	32,747	23,379	22,465
Germany	40,040	62,142	62,417	59,583
India	3,595	8,503	28,940	28,940
Italy	8,054	9,273	9,449	9,717
Canada	23,279	39,622	42,089	37,477
China	11,423	51,906	289,838	314,573
Korea	28,133	102,010	170,632	163,523
United States	172,115	295,895	456,321	456,106
France	16,505	17,353	16,705	16,104
Japan	361,590	419,543	391,002	348,596

* - number of patent applications submitted by residents and non-residents to the patent office of the country

Source: WIPO Statistics Database, January 2011.

From Table 11 it can be seen how abruptly increased the activity of applicants in new industrial countries – Brazil, India, China and Korea.

If we look at the patent policies of the countries covered by this project, we will see that they are not identical. The survey results provided in Table 12 show positive dynamics of the volumes of patenting of inventions in Albania, Belarus, Kyrgyzstan, Moldova, Russia, Turkey, Romania and Israel. The greatest flow of patent applications comes to the Russian patent office (42,500 applications in 2010), followed by Turkey with its 8,343 applications, Israel – 7,324 applications. At the same time, some countries demonstrate an extremely decrease of the patent activity, for example, in Hungary in the period between 2000 and 2010 the number of applications dropped from 4883 to 696, in Cyprus – from 70 to 9, in Serbia – from 981 to 589 and in Ukraine – from 7239 to 5312 applications.

Table 12
Dynamic of patent applications for inventions in countries in transition

Country	2000	2005	2008	2009	2010
Azerbaijan	-	290	233	281	271
Albania	61	387	320	417	341
Belarus	1198	1340	1,730	1926	1933
Bulgaria	313	313	270	267	260
Hungary	4883	1275	772	821	696
Georgia	559	587	576	581	422
Kazakhstan	1607	1523	1474	1,513	1691
Cyprus	70	64	21	13	9
Kyrgyzstan	89	131	138	149	140
Lithuania	122	115	105	107	114
Moldavia	246	401	337	339	344
Russia	28688	32254	41849	38564	42500
Serbia	-	981	623	580	579
Slovakia	2040	250	242	239	282
Turkey	3433	3461	7137	7241	8343
Ukraine	7239	5592	5697	4816	5312
Romania	1292	1,100	1031	1091	1418
Israel	10	6819	7800	6811	7324

Source: data collected during a survey

The revealed tendency points out the decrease of inventors' interest to patenting the results of their research and development in these countries. It is possible that companies do not consider having a national patent as a serious advantage in the competitive struggle in the markets of these countries.

Going to the subject of commercialization of inventions and development of the IP market, the dynamics of the activity of resident and non-resident applicants (table 13) is of particular importance.

Table 13
The number of patent applications for inventions by countries and origin of applicants, 2010

Country	Applications filed		
	Total	National applicants	Foreign applicants
Azerbaijan	271	254	17
Albania	341	2	339
Belarus	1933	1759	174
Bulgaria	260	243	17
Hungary	696	646	50
Georgia	422	242	180
Kazakhstan	1691	159	1532
Cyprus	9	9	-
Kyrgyzstan	140	134	6
Lithuania	114	108	6
Moldavia	344	339	5
Russia	42500	28722	13778
Serbia	579	290	289
Slovakia	282	282	-
Turkey	8343	3250	5093
Ukraine	5312	2555	257
Romania	1418	1382	36
Israel	7324	1543	5781

Source: data collected during a survey

Based on data presented in Tables 12 and 13, all countries can be divided into two groups (Table 14). Countries in the first group demonstrate a steady growth of the number of patents, which is in line with the global trends, while in the second group a reduction in the number of patents is observed. At the same time, however, the activity of domestic and foreign applicants differs in each group.

Table 14
Trends in the field of patent protection of inventions in countries in transition

Group I		**Group II**	
The number of patent applications for inventions is increasing, together with the share of foreign applicants		**The number of patent applications for inventions is decreasing, with the share of foreign applicants**	
increasing	decreasing	increasing	decreasing
Russia	Belarus	Azerbaijan	Bulgaria
Turkey	Romania	Serbia	Hungary
Israel	Moldavia	Ukraine	Georgia
Albania			Cyprus
Kazakhstan			Slovenia
Kyrgyzstan			
Lithuania			

Source: data collected during a survey

The first group includes the following countries: Albania, Belarus, Russia, Moldavia, Romania, Turkey, Israel, Lithuania, Kazakhstan and Kyrgyzstan; as was already mentioned, in these countries the number of patents tends to grow, but the activity of domestic and foreign applicants considerably differs.

For example, in Belarus, the total number of patent applications and patents received thereunder from 2000 to 2010 increased, while the share of foreign applicants dropped from 35% to 7%, and in 2010, foreign applicants received 96 patents, which is almost 2 times less than in 2000 (183 patents).

In Moldavia, the number of patents received during this period by foreign applicants dropped by 3 times, while in Romania the number of applications filed by foreign applicants fell by 8 times. Such behaviour of foreign applicants suggests that the interest of foreign companies towards the markets of those countries is low. At the same time domestic companies try to protect their standing in the internal market that leads to the increase in the number of patent applications submitted by nationals.
A different picture is observed in Russia, Turkey, Israel, Albania, Kazakhstan, Kyrgyzstan and Lithuania, where with the overall dynamics of growth of patenting foreign applicants are more active than domestic applicants.

For example, in Russia the number of applications and issued patents thereunder to foreign applicants grew 2.5 times faster than the number of inventions patented by Russian applicants. As a result of this, the share of applications filed by foreign applicants and patents received thereunder in the period 2000-2010 increased from 18% to 32% and from 17% to 29% respectively.

This trend proves that foreign companies are very interested in protecting their developments in Russia, which testifies to their strong commitment to enter the Russian market. At the same time, however, Russian developers still underestimate the opportunities offered by such IP market tool as patenting.

Similar dynamics is observed in Turkey, where the number of issued patents to foreign applicants in 2012 is 7.5 times greater than that issued to domestic applicants.

In Kazakhstan, the number of patents received by foreign applicants in 2010 increased by 1.8 times vs. 2000, while in Kyrgyzstan and Lithuania it increased by 2.5 times. Similarly to Russia, such trend suggests that foreign business is interested in the markets of these countries.

Special attention should be paid to the situation in Israel and Albania. In those countries, foreign applicants account for a major portion of all applications and patents.

In Israel, the number of applications from foreign applicants is 3 times greater than that from domestic applicants, while the number of patents is 5 times greater, respectively. For example, in 2010, the Israeli Patent Office received 1543 applications from national applicants and 5781 applications from foreign applicants, with 347 issued patents to national applicants and 1946 issued patents to foreigners. Maybe, this is connected with the fact that many developments in Israel are performed under contracts or within joint projects with major U.S. companies and universities. Most applications from Israeli developers are filed first of all in the United States Patent Office.

In any case, such situation suggests that foreign companies are greatly interested in the Israel market.

An interesting situation can also be observed in Albania, where foreign applicant's number for almost 100% of all applications filed and issued patents. In 2010, domestic applicants filed 2 applications for inventions, while foreigners filed 339 applications, with 348 issued patents to foreign applicants and no issued patents to national applicants, i.e. all issued patents in 2010 belong to foreign applicants. This suggests that domestic business shows no interest towards legal protection of new technical solutions in their native country.

The second group of countries, incorporating Azerbaijan, Serbia, Ukraine, Bulgaria, Hungary, Georgia, Cyrus and Slovakia demonstrates a tendency towards decreased volumes of patenting, but similarly to the first group, foreign and domestic applicants behave differently.

While the total volume of patenting in Azerbaijan and Georgia is decreasing, the number of applications filed by foreign applicants is growing. The growth of foreign applicants' activity in these countries is obviously different. For example, in Azerbaijan, the share of applications received from foreign applicants increased in the period 2000-2010 only slightly from 0.3% to 0.6%. However, in Georgia the share of foreigners in the total number of applications filed went up from 33% to 42%, and their share in the number of issued patents grew from 28% to 41%.

Such trends suggest that foreign companies are going to enter the markets of these countries.

A contradictory picture is observed in Ukraine and Serbia. The number of applications filed by foreign applicants to the Ukrainian Patent Office in 2010 dropped by 6 times and made 4% from the total number of applications vs. 22% in 2000. At the same time the number of issued patents to foreign applicants was up from 14% to 47%.

The same trend can be seen in Serbia, where the number of applications from foreign applicants was down by 2.5 times, while the number of issued patents increased almost by 9 times and was 8.7 times greater than the number of issued patents to national applicants (854 patents to foreign applicants and 98 to domestic applicants), i.e. in today's Serbian market, patents owned by foreign applicants dominate.

Bulgaria, Hungary and Slovakia demonstrate a steady trend of reduction both in the total number of applications and in the share of foreign applicants.

In Bulgaria, the number of applications filed by foreign applicants in 2010 dropped by 3 times and made 6% from the total number of applications vs. 20% in 2000. In Hungary, a more considerable drop in the number of applications from foreign applicants can be observed (by 9 times), with their share in the total number of applications decreasing from 83% to 7%. In Slovakia, the total number of applications was down by 10 times.

The dynamics described above suggests that the patent market in these countries is at the initial stage of formation. So far, foreign and domestic companies are not interested in investing money into the legal protection of their developments in these countries.

Foreign patenting

While the national market of a particular country is formed by national patents, integration into the global IP market requires foreign patents.

According to WIPO data, the total number of foreign issued patents recently has considerably increased. The greatest importance in the world market is assigned to patents issued to the so-called "triad". These are the most valuable patents issued by three patent offices of the United States, Japan and the EU for protecting one and the same invention.

The United States, as before, accounts for the greatest share of "triad" patents, although the share of the United States and EU25 in the total number of issued patents has considerably dropped. At the same time, the share of triadic patents from Asian countries has increased sharply, although it started from a low level[*] in 1995.

Analysis of the survey results showed that the issues of foreign patenting are not interested for the respondents. Only four countries, Moldavia, Georgia, Kyrgyzstan and Ukraine, submitted their data. Such sample makes it impossible to judge about the situation with foreign patenting of inventions created in the countries covered by the project. It can be assumed that disinterest in obtaining foreign patents based on two reasons. First reason is the lack of funds necessary for foreign patenting by domestic companies. Second reason is suggests that business circles in those countries are focused only on the national markets, i.e. the patenting policy of the companies concerned does not stipulate entering foreign markets of goods, patents or licenses.

Analysis of the answers submitted showed that from 2000 to 2010 applicants from Kyrgyzstan obtained 9 foreign patents, while those from Moldavia – 19 patents, from Georgia – 25 patents, and from Ukraine – 114 patents.

Of course, these figures are not comparable to the volume of foreign patenting in the leading countries of the world, although they do suggest that developers from those countries are willing to enter the global market of goods and technologies.

On the basis of the results of the conducted studies we can form the Group II of indicators that allow to evaluate the available resources in the country and the productivity of the research and development work:

1. Internal expenditures for R&D, inter alia in US dollars and % of GDP;
2. Internal expenditures for R&D according to sources of financing;
3. The number of employees engaged in R&D, per 10 thousand people employed in the economy;
4. The number of publications in scientific journals (this figure also applies to the number of copyrighted works created in the country);
5. Share of the country in the global number of publications in scientific journals indexed in the Scopus database.

[*] OECD Patent data base, 2010

6. Number of publications and number of citations of national authors in journals indexed in the WEB of Science database (based on 100 researchers);
7. The number of patent applications filed at the national patent office, including:
   - In the name of domestic applicants;
   - In the name of foreign applicants;

   Within the framework of this indicator it seems appropriate to make a detailed analysis of the structure of the patent flows, coming to the national office from domestic applicants that will allow to reveal the correlation between the main areas of science, technology and innovation policy of the country and sectors of the economy, which supply the main flows of applications.

8. Coefficient of inventive activity (number of patent applications for inventions filed by domestic applicants to the national office, based on the 10 thousand people);
9. The number of patents granted for inventions, including:

   - domestic applicants;
   - foreign applicants

   Within the framework of this indicator it seems appropriate to make a detailed analysis of the structure of the patent flows, coming to the national office from domestic applicants. The results of the analysis provide insights on the innovative potential of a particular company and the country, namely:

   - The number of patents granted in priority areas including in the field of nanotechnology;
   - The number of patents granted for pioneering inventions (inventions, which have no analogues or created on the basis of new discoveries);
   - The number of patents granted for inventions in the field of ecology

10. Number of national patents at the end of this year, including those belonging to:

    - domestic applicants
    - foreign applicants

    Within the framework of this indicator it is important to know the relation of individuals and entities acting as patentees. World practice shows that the potential of the use of the patented invention is much higher if the patent owner is a legal entity (for example, a large company). If the invention is created as part of the state program, the probability of its use is higher and vice versa, if the patentee is an individual, the risk of non-use increases dramatically.

11. The average duration of the national patents in various sectors of the national economy; This indicator shows the state of a particular market sector.
12. Amount of patent fees for applications and maintaining patents in force; This indicator shows the state policy in the field of formation of patent fees, which in turn affects the number of applications.
13. The number of foreign patents obtained by domestic applicants, including "triad" patents.
14. Expenses of the state to support enterprises and inventors in the domestic and foreign patenting of inventions (in US dollars).

2.3. The involvement of intellectual property in the economic turnover

The main indicator of the effectiveness of the innovative process is a commercial (practical) use of the results of intellectual work. Commercial use of IP or, in other words, involving IP rights into the economic turnover can be achieved in two ways:

- use of IP in the course of the business activities of the enterprise - strategy of capitalization of intellectual assets;
- entry into IP market - IP commercialization strategy.

2.3.1. Intangible assets of the company

The strategy of using a variety of IP objects (inventions, utility models, software, etc.) in their own production (strategy of capitalization of intellectual assets) enables companies to produce new high-tech products and services. On the one hand, it provides companies with a sustainable competitive advantage, on the other hand - meets the demand of the society in the new products and services. Therefore, in the framework of the strategy of capitalization of IPRs the information on the proportion of the patents applied in the industry to total patents granted is a key economic indicator, so this figure seems appropriate to include in the set of IP indicators.

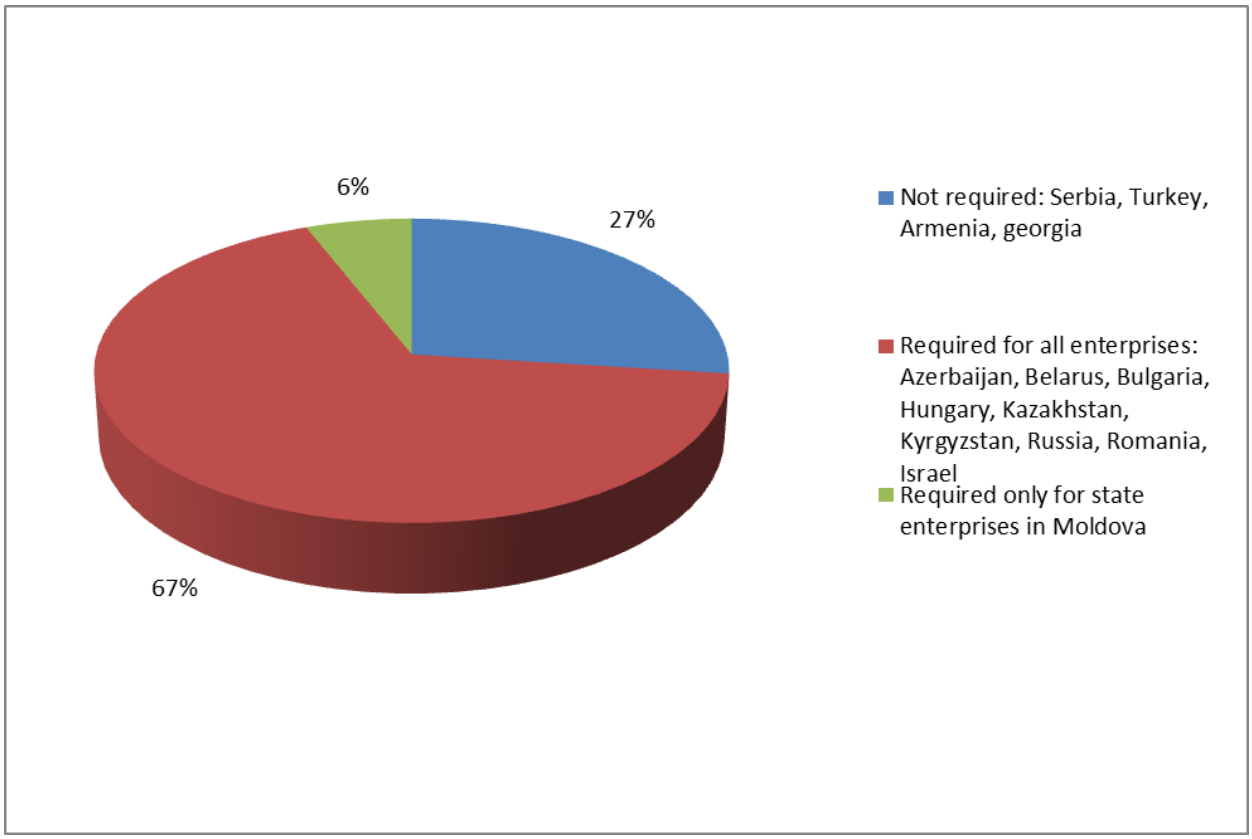
Unfortunately, almost all countries - participants of the project were not able to answer this question.

On the other hand, the implementation of the strategy of capitalization of IP allows companies to create their intangible assets.

In the innovation economy the role of intangible assets (hereinafter referred to as IA) increases significantly. The share of intangible assets in the creation of the market value of the company is constantly increasing for high-tech companies, particularly for IT companies, it can reach 60-80%. Therefore, the leading countries of the world are paying more attention to this important part of modern business. National and international standards, laws and regulations governing accounting, taxation and assessment of IA are being developed.

Such work is carried out in countries with economies in transition. Analysis of the data has shown that in 13 countries that sent their responses, laws and regulations governing accounting and reporting of IA are applied. Typically, these requirements are defined in the Tax Code or in a special regulation in the field of accounting of the Ministry of Finance (Russia, Belarus, Kazakhstan, Moldova) or provided for the «revenue law» (Bulgaria), etc. It should be noted that the lack of regulatory framework is not conducive to the effective use of IA.
Study of the data revealed allowed to find different approaches to the display of IA in the balance sheets of enterprises (Figure 4).

Figure 4. Requirements of the reflection of IA in the balance sheet of the enterprise



As can be seen from Figure 4, in most countries (67%) a reflection of IA in the balance of all forms of ownership is required, in Moldova these requirements apply only to public companies. In Serbia, Turkey, Armenia and Georgia there are no mandatory requirements; the company sets its own accounting policy with respect to intangible assets.

Evaluation of IA

Registration, as well as commercial transactions with IA (sale, licensing, introduction into the share capital, mortgage, insurance, etc.) requires a professional evaluation. Issues of assessment of IA and IP are the subject of separate studies. In this work, we only note the fact of regulations governing the assessment activities. So in Belarus, Kazakhstan, Moldova, Russia, Slovakia and Ukraine have been adopted «Valuation Act», in Hungary, this activity is regulated by the "Accounting law". Moreover in addition to these documents in the above countries also developed national standards for the assessment of IA. National standards have also been developed in Kyrgyzstan, Montenegro, Czech Republic and Cyprus. In Serbia and Romania international standards for evaluation are adopted.

As for the data on the share of IA in the balance sheet and in the market value of the companies, only one country - Moldova provided such information, so the share of intangible assets in the balance value of Moldovan enterprises grew in 2000 by 1%; in 2005 by 0.9%, in 2007 by 1.01%.

The lack of data on the participation of IA in the creation of the book value and market value of companies demonstrates the following:

- businesses either can not work with their IA or do not see the benefits of this;

This assumption has a confirmation. Out of 23 countries, 18 countries did not answer the question about the availability of tax incentives for enterprises engaged in business with IA, also in Moldova, Slovakia and Ukraine there are no concessions in respect to IA, in Russia, there are benefits in respect to IA, including the property tax concession (property of the company, expressed as IA, is not taxed).

- Companies do not seek to increase their market value, as respectively, they do not plan to move into the category of public companies and do not plan to go to the IPO market.

  This situation leads to the lack of competitiveness in the world market of most companies of countries with economies in transition.

This situation requires special attention to the development and implementation of the national IP strategy in countries in transition. Therefore, the indicators of the level of the use of intellectual resources must necessarily be included in the Group III of IP indicators:

- Share of used* patents in the total number of issued patents.
- Share of IA in the book value and market value of companies (by industry sector);
- Existence of preferential tax treatment on IA of the enterprise.

2.3.2 Intellectual Property Market

Another form of using the results of intellectual work is the strategy of IP commercialization.

In the current context, the most important component of the international economic relations is transfer of rights to use various intellectual properties on commercial terms. Today, when trading in IP has become one of the most dynamically developing sectors of the global economy, the competitiveness of any country is determined by the level of its integration into the global IP market. Successful entering into the global IP market is possible only if the national IP market operates effectively.

In this connection, the formation and development of national IP markets is of special importance for countries with economies in transition. Analysis of answers provided in Table 15 made it possible to identify *common* approaches of countries to the organization and operation of their IP markets:

- Almost all countries have legislative provision that regulate transfer of IP rights (hereinafter referred to as "transactions with IP");
- Almost all countries (except for Serbia and Turkey) require state registration of transactions with IP. Such registration can be either mandatory or voluntary (e.g. in Moldavia and Hungary registration of patent and licensing transactions is voluntary);
- Agreements for transfer of IP rights are usually registered by the national patent office;
- Transactions executed in the domestic market are subject to registration. Albania and Greece also require registration of foreign transactions with IP;
- 18 countries register transactions with industrial property, with 9 of them also requiring registration of transactions with objects of copyright (mainly software products and databases);
- Most countries keep statistics about the number of patent and licensing transactions. Such data make it possible to evaluate the dynamics of, and trends in, the development of the national IP market, as well as the contribution of this market segment to the development of the national economy.

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*The use of patents is import into the territory of the country, where the patent is valid, manufacture, use, offer for sale, sale, otherwise introducing into civil circulation or storage for such purposes of the product, in which the invention or useful model are used, or products, in which design is used.

In addition to common trends, the conducted study also allowed to reveal the specific features of the IP market in every country. The data provided in Table 16 demonstrate positive dynamics, in terms of the volume of patent and licensing transactions, in almost all countries that have submitted their answers.

Most transactions with IP are effected in Russia, where the number of agreements registered in 2010 exceeded 22,000, then comes Hungary with 1,980 agreements, followed by Ukraine – 1,855; Kyrgyzstan – 989; Latvia – 874 and Belarus – 747. It should be noted that patents and licensing transactions also demonstrated high growth in Georgia, where the number of agreements registered in 2010 was up by 21 times vs. 2000; in Ukraine the number of agreements increased by 7 times, and in Moldavia a 3-fold increase was observed.

Table 15
Operating conditions of the national intellectual property market

Country	Legislation governing transactions with IP	Agency monitoring transactions with IP	Requirements for state registration of patent and licensed transactions			Statistics about patent and licensed transactions			
			General registration requirements, including in the domestic and the foreign market	Industrial property	Objects of copyright	Number of agreements registered	Structure of transactions by sectors	Parties to transactions	Amount of license payments
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Azerbaijan	√	√	+ domestic	+	-	+ Only technical knowledge	-	-	-
Albania	+	General Directorate of Patents and Trademarks	+ domestic, foreign	+	-	+	-	-	-
Armenia	+	√	+	+	√	√	√	√	√
Belarus	+	National Intellectual Property Center	domestic foreign	+ (know-how)	+	√	√	√	√
Bulgaria	√	√	√	√	√	√	√	√	√
Hungary	√	√	-	√	√	+	-	-	--
Greece	+	Industrial Property Organization, Hellenic	+ domestic, foreign	+	-	√	-	-	-

		Patent Office							
Georgia	+	-	+ domestic	+	-	+	-	+	-
Kazakhstan	+	Intellectual Property Rights Committee under the Ministry of Justice of Kazakhstan	+ domestic	+	+	+	-	-	-
Cyprus	+	√	+ domestic	Only trademarks	-	-	-	-	-
Kyrgyzstan	√	√	+	+	+	+	-	+	-
Latvia	+	Patent Office	+	+	-	+	-	-	-
Lithuania	+	State Patent Bureau of the Republic of Lithuania (registration)	+	+	+	+	-	-	-
Moldavia	+	State Agency of IP of the Republic of Moldavia	- (voluntary registration) domestic	+	+	+	-	+	-
Russia	+	Federal Service for Intellectual Property	+	+	+	+	+	+	+

Serbia	+	√	-	√	√	+	-	+	-
Slovakia	+	Industrial Property Office of the Slovak Republic	+	+	+	-	-	-	-
Turkey	√	√	-	-	-	-	-	-	-
Ukraine	+	√	+	+	+	+	√	√	√
Montenegro	√	√	+	√	√	√	√	√	√
Czech Republic	+	Industrial Property Office	-	√	√	+	-	-	-
Romania	+		+	+	+	-	-	-	-
Israel	+	Patent Office	+ domestic	+	-		-	-	-

Note:
(+) – yes;
(-) – no;
(√) – no answer.

Table 16
Dynamics of registration of patent and licensing transactions

Country	**Number of assignment agreements and licensing agreement registered with respect to:** **a) inventions;** **b) trademarks**				
	2000	2005	2008	2009	2010
Azerbaijan					
a)	-	-	2	-	1
b)	72	68	78	82	71
Albania					
a)	-	-	63	20	36
b)	-	-	117	145	210
Belarus					
a)	28	53	54	74	62
b)	154	218	335	531	685
Hungary					
a)	630	488	452	442	488
b)	959	1,312	1,261	1,468	1,492
Georgia					
a)	12	12	38	49	22
b)	4	529	533	551	328
Kazakhstan					
a)	-	28	51	68	27
b)	-	181	256	290	199
Kyrgyzstan					
a)	14	26	32	17	35
b)	310	600	816	890	954
Latvia					
a)	66	33	75	81	65
b)	776	807	919	855	809
Lithuania					
a)	51	25	72	59	44
b)	1,121	866	465	824	611
Moldavia					
a)	48	12	7	12	2
b)	-	125	144	136	145
Russia					
a)	2,114	2,122	2,744	2,365	2,860
b)	5,974	10,114	15,574	15,278	19,146
Serbia					
a)	-	-	13	22	20
b)	-	-	557	773	570
Ukraine					
a)	136	228	268	515	490
b)	111	699	1,581	1,412	1,395
Czech Republic					
a)	75	55	62	74	103
b)	602	593	923	479	595
Israel					
a)	-	-	-	-	-
b)	2,374	2,200	1,680	2,103	2,227

To study the situation in the IP market of every country, it seems reasonable to group the survey results based on certain criteria.

1) By types of legal protection

All countries covered by the survey require registration of patent transfer (assignment) agreements and patent licensing agreements. Non-patent licenses are not subject to registration, except for Belarus, where, in addition to the said agreements, state registration is required also for know-how transfer agreements.

Registration of transactions with IP is in line with the legislation of most countries of the world. All countries, where intellectual property is subject to legal protection, require mandatory registration of patent assignment agreements (contracts); otherwise the new patent holder will lose its right to charge fees from bona fide buyers of patent rights.

As far as licensing transactions are concerned, West European countries (except for Germany), Canada, Japan, China, Brazil, India, Mexico, Algeria, Malaysia, etc. require mandatory registration of licensing agreements.

Out of all developed counties, Japan exercises the strictest control over sale and purchase of licenses.

2) By types of intellectual property

The survey results suggest that all countries, except for Cyprus, require registration of transactions with such industrial property as *inventions and trademarks.* Cyprus requires registration of trademarks only. In addition to inventions and trademarks, Russia also requires registration of transactions with utility models and industrial design. In statistical reports such agreements are aggregated with invention assignment and licensing agreements.

In Serbia, transactions with industrial design are registered and reflected separately in statistical reports.

As far as objects of copyright are concerned, only two countries submitted their data about registration of transactions with software products, databases and integrated circuit layouts. These countries include Russia, where a dynamic growth of transactions with such objects has been observed, and Kyrgyzstan which, in addition to the objects listed above, also requires registration of other objects of copyright. There is In Ukraine also registration of the cession of copyrights, including software products, databases and integrated circuit layouts.

The studies show that only two types of intellectual property are presented in majority of the participating countries – inventions and trademarks. Such a situation is contrary to the trends in the global IP market. Currently, new types of intellectual property enter commercial circulation; proceeds from transactions with objects of copyright are growing rapidly and in some countries (e.g. the United States) exceed those from transactions with industrial property.

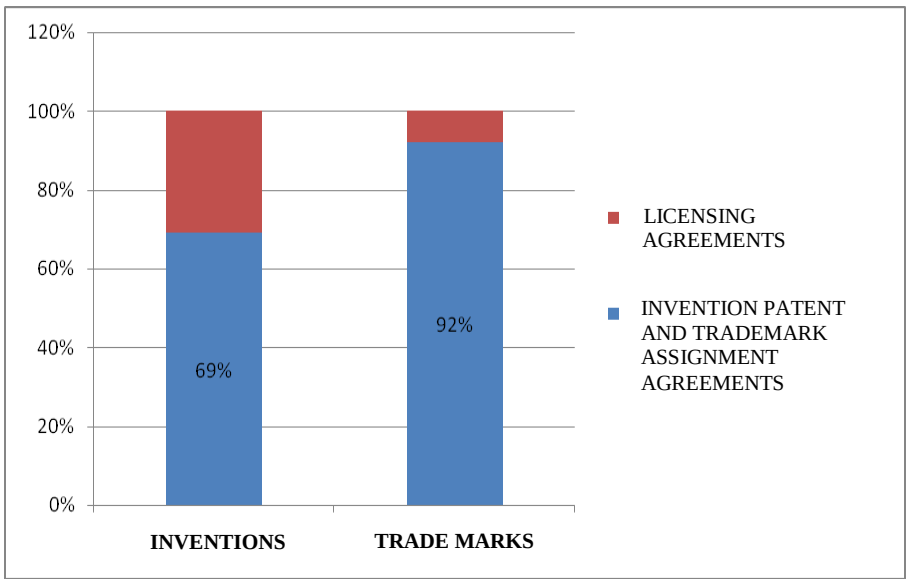
It is advisable that special attention be paid to this process when devising a state IP development strategy.

3) By volumes of transactions with various types of IP

Analysis of the survey results presented in Table 15 demonstrates the following. In all countries the volume of transactions with trademarks considerably exceeds the volumes of transactions with inventions, which is in line with the global market trends.

As far as transactions with *inventions* are concerned, in most countries that sent their answers the number of patent assignment agreements exceeds the number of licensing agreements (Fig. 5).

Fig. 5 Share of assignment agreements and licensing agreements



Analysis of the answers showed that trade in patents prevails in Albania, Hungary, Georgia, Kazakhstan, Latvia, Lithuania, Moldavia, Serbia and Kyrgyzstan. It is important to note that in individual countries, the number of patent assignment agreements considerably exceeds the number of licensing agreements, e.g. by ~9 times in Latvia and Serbia, by ~12 times in Lithuania and by 20 times in Hungary. There is almost no trade in licences in Albania and Moldavia. Such situation sharply differs from global practice, where licensing transactions outnumber invention patent sales.

The market of inventions in Russia, Belarus and Ukraine is developing within such trends. In these countries, licensing agreements outnumber patent assignment agreements by ~ 1.5-2 times.

Analysis of received data on transactions with trademarks showed the same trend as the inventions market. In almost all countries the number of contracts on a trade mark is much higher than the number of licensing agreements (Fig. 4). The only exception is Russia, where the number of licensing deals in the trade marks of 1.5 times the number of contracts of assignment.

4) By nature of transmission of the exclusive rights

As far as transferred rights are concerned, in all countries, except for Belarus, non-exclusive licensing agreements for invention prevail. In Georgia, Kazakhstan and Kyrgyzstan their share in the total number of agreements registered makes 70-90%, and in Russia this share is 60%, while in Azerbaijan it is 100%. In Belarus it is vice versa: the number of exclusive licensing agreements is 6.5 times greater than the number of non-exclusive licenses.

The picture described here sharply differs from the world practice, since in the context of global competition, a licensee, trying to protect its rights, tries to purchase an exclusive license.

We think that the prevalence of non-exclusive licenses in countries with economies in transition is explained by difficulties with enforcement of exclusive rights; besides this, a non-exclusive license is cheaper.

5) By activity of parties to the transactions

To be able to evaluate how effectively the IP market operates, it is very important to know the dynamics of market players' activity. Unfortunately, lack of data (only two countries submitted their answers) makes it impossible to carry out a study. Analysis of the answers received shows that in the Serbian IP market 46% of *licensor* are individuals and 54% of the licensor are large, medium and small enterprises.

Among licensees, individuals account for 1% only, while business accounts for 99%.

Visible changes in the activity of market players are taking place in the Russian IP market. In 2010 vs. 2000, the share of state-owned companies among patent and license *sellers* considerably increased (13.8%), which means that developments financed out of the state budget entered the market. The share of individuals remained almost unchanged at 34.5%, while the share of business decreased to 51.7%.

As far as *licensees* are concerned, the share of individuals and state-owned companies significantly dropped in 2010 and made 9.7% and 7%, respectively, while the share of large, medium and small business considerably went up to 83.3%, including 7% attributable to foreign companies. Such figures suggest that Russian and foreign business is interested in new Russian technologies.

6) Structure of transactions by sectors

The structure of patent and licensing transactions by sectors is one more important indicator of the IP market's development. Analysis of the patent and license market structure by sectors allows us to determine the demand and supply dynamics and to see which technologies enjoy the greatest demand today.

For example, while in the 2000s a major share in Russia was attributable to agreements in the gas and oil refining industry, machine building and tool manufacturing sector, by 2010, the number of patent and licensing transactions in these sectors considerably dropped. At the same time, the number of agreements in the field of medicine, energy, electronics, computers, instrument making and construction increased. Today, far more licenses for life supporting technology are being sold. This trend clearly correlates with the top-priority areas of Russia's innovative development (see section 1.2). As was mentioned above, these priority areas include energy, energy savings, medicine, and information and telecommunication technologies.

7) License fees

Information about the amount of IP license fees is the main economic indicator of how the IP market functions. As the World Bank says, IP rights transfer services are currently the fastest growing item in the global trade in services.[*] Payments from trading patents and licenses represent a considerable part of budgets in many countries. Proceeds from export of technologies in 2010 were as follows: USD 89.056 million in the United States, USD 39.6327 million in the United Kingdom, USD 56.176 million in Germany, USD 21.538 million in Japan and USD 5.188 million in France. As far as the participants in the project are concerned, information is available for one country only. Russia's proceeds from export of technologies in 2010 were USD 627.9 million[*].

Analysing international sources permitted to define the level of participation of different countries in transition in trading patents and licenses. The highest mark is in Israel, then goes Hungary, Poland etc (see schedule 17).

[*] The World Bank, World Development Indicators, 12, 2011.

Schedule 17
Income from export technologies and payments for import technologies in 2010 (millions USD).

Country	Export technologies	Import technologies	Net for technologies
USA	89056,0	55807,0	33249,0
Israel	9339,7	3354,8	5984,9
Hungary	2725,2	3713,9	-988,7
Poland	2270,0	3780,4	-1510,4
Czech Republic	2260,5	2521,1	-260,6
Greece	721,3	1327,9	-606,6
Russia	627,9	1426,0	-798,1
Slovakia	441,1	800,7	-359,6
Slovenia	413,5	565,7	-152,2
Romania	23,6	77,8	-54,2

In conclusion it is necessary to mention that in the frames of national IP strategy licensing and monitoring export and import require additional attention and must be included in III group of IP factors.

Compulsory Licensing

Compulsory licensing is an important IP market regulation tool. A compulsory licensing provision is incorporated in the TRIPS Agreement and is also included in legislation of many countries all over the world.

Issues pertaining to a compulsory licensing were not considered within this survey, but of course they should be covered in the future, since they are of special interest for countries with economies in transition.

Each country independently determines the rules for applying compulsory licensing; and the main thing is that compulsory licensing should be applied in the interests of the given country's internal market only.

Other Transactions with IP

The IP market is dynamically developing, with the range of transactions with IP increasing. In addition to patent and licensing transactions, the number of such transactions as franchising, IP

pledges, IP insurance, contribution of IP to the authorized capital, leasing etc. is also increasing in countries in transition. The volumes of such transactions are steadily growing, that is why they deserve special attention.

Analysis of a small number of answers received allows us to make certain conclusions. The legislation of some countries requires state registration of such transactions. For example, in Belarus an IP pledge agreement is subject to registration (2 agreements related to trademarks have been registered so far). The legislations of Latvia and Kazakhstan require registration of IP pledges and franchising agreements. Russian legislation requires registration of IP pledge agreements, insurance and franchising agreements (commercial concessions).

In the future, these issues, especially the franchising market, should be considered in more detail.

Important efficiency factor of IP is the amount of *new working places* which were created while and/or as the result of commercial usage of IP. This factor appears as indicator of influence of IP on employment in real economy and definitely should be included in the list of IP factors.

In virtue of all made researches it is possible to figure out III group of indicators which are permitting to estimate efficiency of commercial usage of IP:

1. The amount of used patents for inventions and other types of IP.
2. The amount of IP objects shown on the balance sheet of company as fictitious asset.
3. Part of fictitious asset in net assets value or marketable value.
4. The number of registered assignment contracts.
5. The number of license agreements.
6. The volume of sales revenue (export) of license (in US dollars).
7. Payments for import of license (in US dollars).
8. The number of compulsory licensing.
9. The number of franchise agreements.
10. The number of pledge agreements.
11. The number of new working places, created in connection with the implementation (use) of new technologies.

2.4. Innovation indicators

The economic component of IP includes protectable results of intellectual activity embodied in new products, technology or services, i.e. innovations. Subsequently, the level of development of innovations reflects how effectively the IP is used.

Therefore, innovation indicators can be used as a measure of the impact that an IP has on the country's economic growth.

The level of development of innovation can be determined based on the activity of individual enterprises and organizations. For this purpose, most countries develop key innovation indicators for businesses[*].

The development of such indicators usually corresponds with the development of the state's requirements for statistical reporting of the results of operations.

The survey results showed that only 8 countries (38%) out of 23 have key innovation indicators (Bulgaria, Hungary, Cyprus, Lithuania, Russia, Serbia, Czech Republic and Romania). These countries require submission of statistical reports on innovations of enterprises and have also special forms for such reports. Such requirements also exist in Azerbaijan, Kazakhstan, Kyrgyzstan, Moldavia and Ukraine. In Bulgaria and Serbia submission of these reports is voluntary.

[* *] Reports on innovations in EU and OECD member-states

As far as entities that are required to submit reports, in all countries where reports are mandatory for all state-owned enterprises and for business on a selective basis. For example, in Kazakhstan reporting requirements apply only to state-owned companies, while in Moldavia such requirements apply only to companies implementing innovations.

The requirements for private business considerably differ. In Romania, for example, reporting is mandatory for all private companies, while in Russia reports are mandatory from all private companies, except for small businesses, and in Lithuania and Cyprus reporting is mandatory for all companies employing more than 10 people, etc.

Collection of statistical data about the results of companies' activity in the field of innovations is needed for evaluation of the innovation process in the country and its role in the development of the national economy.

Practice shows that *measuring the effectiveness of the innovation process* is the main challenge in public administration.

This was also confirmed by the survey. Analysis of the answers received, showed that the most difficult questions for respondents were those about the quantity indicators of innovative activity[*]. Unfortunately, less than a half of all respondents were able to give only disconnected information about the dynamics of their innovation indicators.

Among the majority of key innovation indicators presented in different documents and methods it seems reasonable to include in IV group indicators that are more connected with the IP, such as:

- Expenditures for technological innovations (total for industrial production, total for the service sector);
- Relative share of organizations engaged in technological innovations in the total number of organizations;
- Volume of innovative goods, works and services, including volume expressed as % in the total volume of goods shipped, or works or services performed.
- Relative share of innovative industrial products in the total sales of industrial products in the domestic market;
- Level of innovation by different sectors of the economy (total for industrial production, total for service sector, etc.);

Nanotechnology

Research and development connected with nanotechnology is an important indicator to characterize the country's potential in science and innovations.

The survey results showed that research in the field of nanotechnology is being conducted in 17 countries (74%), but the approaches to organizing such research are different.

In some countries, research in the field of nanotechnology is conducted by *numerous organizations,* not united into a single structure. Such organizations include research and academic institutions, universities and individual companies. Research in this field is financed by the government and various foundations.

In Greece, for example, five organizations are engaged in research in the field of nanotechnology, while in Moldavia there are seven organizations (in 2009-2010 they implemented 20 nanotechnologies). In Romania, 11 organizations are engaged in research in the field of nanotechnology, and 15 patents were received in from 2007 to 2010. In Serbia nanotechnology-related R&D is conducted by 46 organizations, and in Slovakia the number of organizations operating in the field of nanotechnology reached 609.

[*] Definitions for the indicators are provided in the appendix to the Guidelines

Another approach is to create a *single national centre,* uniting all organizations connected with nanotechnology, such as academies of science, universities, research centres, large enterprises and SMEs.

In Bulgaria, for example, this is National Center Nanotechnology (NCNI). Russia created a national nanotechnology network uniting 50 different organizations, with the head organization being Open Joint Company «ROSNANO». A total of 128 patents have been received during the period of the ROSNANO operation.

Interesting is the experience of Georgia, where four organizations operate in the field of nanotechnology, with some activities conducted in cooperation with the Swiss Federal Institute of Technology, while other activities are performed in cooperation with the Academy of Sciences of Georgia. All research activities are financed with foreign grants. These research activities have resulted in several patents being issued in the United States, although all of them are owned by a private U.S. sponsor.

The approaches described above are of practical interest in seeking the best ways to organize research to achieve maximum efficiency from the use of nanotechnologies.

Efficiency of inventions in the domain of nanotechnologies becomes more and more significant innovation indicator for innovative economy. By virtue of which, it seems reasonable to include in IV group key innovative indicators, such as:

- The number of companies connected with nanotechnology-related R&D
- The volume of investment in nanotechnology-related R&D
- The number of nanotechnologies implemented for construction.
- The number of innovative goods and services related with nanotechnologies (in U.S. dollars)

Information and Telecommunication Technologies

Today's economy is driven by information and telecommunication technologies (ITT), which is why the indicators of ITT sector play a *key role* in the system of innovation indicators.

Unfortunately, questions connected with activities in the ITT sector were the most difficult to obtain in the survey. Only 6 countries (Hungary, Cyprus, Lithuania, Moldavia, Czech Republic and Romania) submitted some data. Lack of sufficient data makes it impossible to carry out a system analysis of the effectiveness of this sector of the economy.

All countries participating in this survey determined ITT as one of their main priorities in innovative development, and it is to this sector that countries allocate considerable resources.

The ITT sector's performance indicators are of special interest, as proceeds generated by this sector are starting to play a more and more important role in national economy of most of the countries.

In 2010, the share of ITT in the gross value added generated by the Korean business sector made 12,2%; 9% in the United States; 8.8% in Japan, 7.8% in France; 7.1% in Germany; 6.3% in Italy and 5.8% in Canada.

The number of specialists employed in ITT sector is also growing steadily, and the share of the ITT sector, in terms of the number of people employed ranges from 3.0% in Canada to 7.5% in Japan, while in Hungary this figure makes 2.7%, in Lithuania – 2.4%; in Moldavia – 1.4%; in the Czech Republic – 2.9%, and in Russia – 4.0%.

Based on mentioned above, it seems reasonable to include the evaluation of the ITT sector in the IV group of the key innovation indicators:

- Share of those employed in the ITT sector from the total number of employees of all organizations (state-owned, private, etc.)
- Share of ITT sector in gross value added (%).
- The volume of investments into the ITT sector.

The key indicators suggested above will allow us to evaluate the efficiency of innovation processes both in individual sectors of the economy and in the country in general. For internal evaluation country itself defines the required set of quantitative and qualitative indicators, including its goals, objectives and characteristics. Such assessments are required, as they reveal the status of innovation in the country.

At the same time, the country's own (national) indicators will allow us to make comparison with the opinions of international organizations or individual experts, which is very important for maintaining the country's image.

Global Innovation Index

Nowadays, a large number of international researches are conducted and the results of which are forming the various ratings. These ratings evaluate the achievements of the world in specific areas of activity.

In the context of the generation and dissemination of protectable knowledge there are such ratings as:

- KET (Knowledge Economy Index);
- GCI (Global Competitiveness Index);
- BCI (Business Competitiveness Index);
- GII (Global Innovation Index);
- HDI (Human Development Index);
- ISI (Information Society Index).

Under this research it seems reasonable to include in key innovation indicators Global Innovation Index, prepared by international business school INSEAD[2]. Global Innovation Index is a global research of a set of indicators (over 80 characteristics) of innovative development of different countries around the world. The rating of these countries in terms of the level of innovation is made according to the results of this research.

By 2012 the research covered 141 countries and as a result the place of every country in the overall ranking of the world index of innovations was determined, including countries in transition which participated in this project.

[2]This researches are made by international business school INSEAD in Paris annually since 2007 http://www.globainnovationindex.org

Table 18
INSEAD rating of the Global Innovation Index 2012.

Rating	Country	Index
1	Switzerland	68,2
2	Sweden	64,8
3	Singapore	63,5
17	Israel	56,0
26	Slovenia	49,9
27	Czech Republic	49,7
28	Cyprus	47,9
30	Latvia	47,0
31	Hungary	46,5
38	Lithuania	44,0
40	Slovakia	41,4
42	Croatia	40,7
42	Bulgaria	40,7
44	Poland	40,4
45	Montenegro	40,1
46	Serbia	40,0
49	Moldova	39,2
51	Russia	37,9
52	Romania	37,8
63	Ukraine	36,1
69	Armenia	34,5
71	Georgia	34,3
73	Turkey	34,1
83	Kazakhstan	31,9
89	Azerbaijan	30,4
89	Albania	30,4

Source: http://www.globalinnovationindex.org

The result of INSEAD research reveals the dynamics of innovation processes in each country, in comparison with other countries. For example, Russia took in 2009-2010 – the 64th place (of 132 countries) in 2011. – 56th place (of 125 countries) in 2012 – 51 place (of 141 countries).

At the same time, the global innovation index allows to compare the estimates of the level of innovation, obtained in the framework of international and national domestic research.

Thereby the IV group includes the following indicators of innovation:

1. Expenditure on technological innovation (industrial production, service sector) (in US dollars).
2. Share of organizations engaged in technological innovations in the total number of organizations.
3. The volume of innovative products works and services, including % of total volume of shipped goods, works and services.
4. Share of innovative industrial products in total sales of industrial products in the domestic market.
5. Level of innovative activity in the various sectors of the economy (manufacturing, services, etc.).
6. The number of organizations engaged in research and development, associated with nanotechnology.
7. The costs of R&D related to nanotechnology (in US dollars).
8. The number of nanotechnology, embedded in production.
9. The volume of innovative products and services related to nanotechnology (in US dollars).
10. The number of workers employed in the ITT sector of the total number of employees of all organizations (state, private, etc.).
11. The share of the ITT sector in the gross added value (%).
12. Volume of investments in the ITT sector (in US dollars).
13. The value of the Global Innovation Index (of the concrete country).

2.5 Information resources

While exploring the economic aspect of IP it is necessary to pay more attention to the questions of informative provision. The survey showed us that all countries participating in the project have same problem – informative asymmetry of data.

In the field of legal protection of intellectual property there is a large number of databases, they are unified, constantly updated and available to a wide range of users. This situation provided by a clear work of patent offices, so all respondents presented all required information.

As for copyright and related rights, there is a different situation, a *lack of information*. As we know, the objects of copyright are the most dynamic component of the IP nowadays. This is especially true for software products and databases, but this statement can be attributed to other objects of copyright and related rights. Film and television industry are successfully developing; the giant copies of audio, video recordings and computer games are selling. Number of new books, magazines, including scientific is increasing. New genres in literature, art, etc. are rapidly developing. All of these works are the objects of copyright and related rights.

Currently, revenues from the use of copyrighted works are a significant contribution to the national economy.

For example, in Hungary, industry associated with the objects of copyright, shows very high growth. Today, in Hungary among the copyright industries the software and database shows the highest contribution to GDP that is followed by press and literature and motion picture and video. For example, in the film industry this success is achieved due to good policy, which effectively used the specific factors of the country, its good location (in the center of Europe), qualification of personnel, good infrastructure, tax incentives, etc.

In this research, the indicators on which it is possible to estimate the impact of copyright on the economies in transition is making particular interest. Unfortunately, these issues have not been adequately discussed in the participating countries. Only five countries: Hungary, Georgia, Moldova, Romania and Ukraine sent some information on the number of issued new books, music, software, etc. For example in Table 19 shows the number of new books published in these countries for the period from 2000 to 2010.

Table 19

The number of new published books

Country	2000	2005	2010
Hungary	10207	13599	12997
Georgia	107	120	20
Moldova	1300	2386	2366
Ukraine	7749	15720	22557

Source: Information obtained from the survey

As for music and software programs, there is another situation. In 2000 in Georgia 27 musical objects of art were created, in 2005 – 42, in 2010 – 33, and for software in 2000 – 12 were created, in 2005 – 10 and in 2010 – 9. In Romania during this period 1806 software programs were created (2000 – 125, 2005 – 644, 2010 – 1037). In Moldova in 2000 – 3 musical objects were registered, in 2005 – 6, in 2010 – 18. During the same time 34 software programs were created (2005 – 6, 2010 – 28).

According to Ukrainian department of intellectual property 3305 copyright objects were created in 2005, including:

- Musical objects – 610
- Software programs – 592

In 2010 in Ukraine 4744 objects were created, including:

- Musical objects – 1017
- Software programs – 802

According to Rospatent in 2005 in Russia 3641 software programs, databases and integrated circuit layout were created, in 2010 – 8961.

The small volume of the received data, and its disparity, once again confirmed the lack of information in the field of copyright and related rights.

In order to change this situation it is necessary to completely change attitude to such an important part of IP institution as copyrights. In governmental IP strategy (and this funding, tax incentives, labor, etc.) copyright issues should be given the same attention as and industrial property.

As for economic indicator of IP there is a shortage of basic data. Only a small group of countries participating in the project were able to send to the respondents scattered information, even not harmonized, which dramatically reduces the possibility of comparative analysis.

Therefore, one of the priorities of the national development of IP strategy should be establishing a single database, where must be submitted all harmonized reports and practice in the IP domain. This database should represent all microeconomic and macroeconomic indicators, which allows estimating country's level of IP on the level of single company and on the level of a whole country. An institutional body responsible for this work should be defined by governmental IP strategy as well.

A set of IP indicators proposed in section 1.3 could be used as a basis to start formation of such database. As mentioned, this complex is a broad set of indicators which could reflect the relationship of IP to country's economy.

In this case the approach to the selection of indicators is very important. Quantitative dependences could be calculated only based on large number of indicators, and they will help to define IP key indicators. Based on these key indicators, in turn, could be calculated IP integral index (IIPR).

It is important to note that during formation and subsequent measurement of IP information traffic it is necessary to ensure the *comparability* of basic data. To do it, in most cases, you need to compare the relative but not the absolute indicators. For example, USA is the first for the number of scientific publications as an indicator of effectiveness of R&D, China is the second. If we will divide this by 1 million of inhabitants, first place is Switzerland, followed by Singapore, Finland, Sweden and Austria.

Israel is taking the sixth place, Slovenia – 13, USA -18, Greece – 19, Czech Republic – 27, Hungary – 31, Slovakia – 32, Poland – 33, Turkey – 35, Romania – 37, Russian Federation – 39, China – 40, Brazil – 41, Argentina – 42, India – 45 place.

In summary databases and access to them are the necessary conditions for improving the efficiency of IP use for economic growth.

3. Innovations and Intellectual Property Support System

3.1. State System for Fostering Innovations

Encouraging innovations and developing the scientific and technological potential are the most important objectives of the state innovation policy. Different mechanisms and methods for encouraging innovations are used for achieving this objective.

In international practice, these methods are divided into direct and indirect methods. The special characteristics are determined by the economic environments in the country and by its concept of state regulation.

Analysis of the received answers showed that most of the participating countries (69%) have a complete system to support innovations and intellectual property or have developed the core elements of such a system. For example Israel has an effective system to support innovations. Azerbaijan, Albania, Armenia, Latvia, Slovakia, and Montenegro do not have such a system yet (Table 20).
Such a system uses direct and indirect methods for supporting the innovation process. *Direct methods* include, first of all, legislative acts and regulations that exist in all countries specified in Table 20.

Then follow methods implemented by the state in the form of direct subsidies for R&D. The dynamics and structure of R&D expenses in countries with economies in transition was described in section 2.1.

Moreover, most countries in transition have national and international programs, various projects and grants. For example, Serbian the Ministry of Economy and Regional Development provides special grants to support innovative projects implemented by SMEs. Ukraine, Belarus, Russia, Kazakhstan, Turkey and other countries have a set of target programs, as well as regional and sector-specific programs for fostering innovations, SMEs, inventions, etc. Bulgaria provides special benefits for projects implemented within EU programs, and Hungary has a special program called JEREMIE, Greece has the European Program for Foster Innovation in Business, etc.

Table 20
Systems for supporting innovations and intellectual property in countries with economies in transition

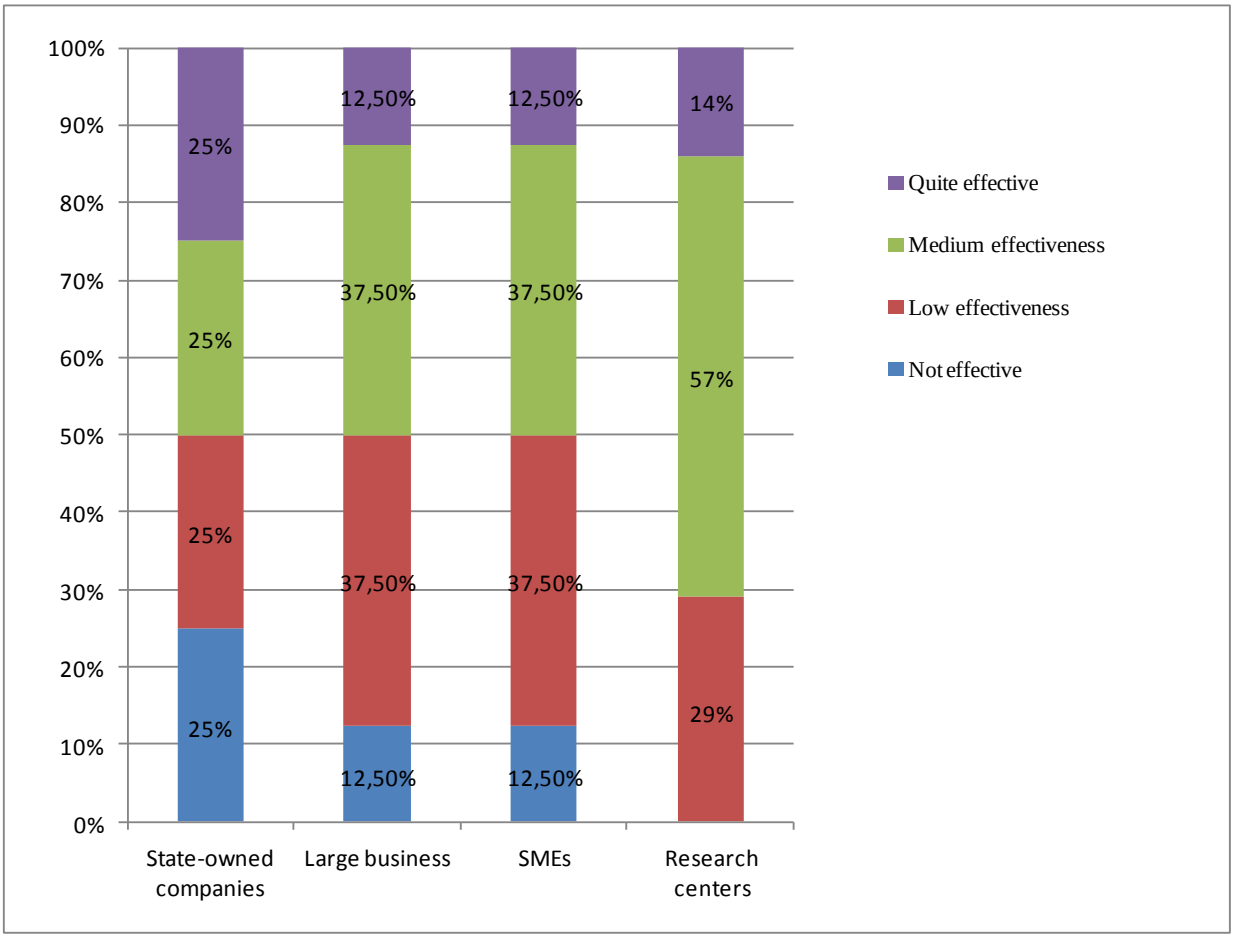
Country	State system for fostering innovations	Bank support for new technologies, support for SMEs	Tax benefits for inventors	Tax benefits for enterprises, including SMEs	Tax benefits for commercial transactions involving IP
1	2	3	4	5	6
Azerbaijan	-	√	-	-	-
Albania	√	√	√	√	√
Armenia	√	+	-	√	√
Belarus	+	√	+	+	+
Bulgaria	+	+	+	+	√
Hungary	+	+	+	+	+
Greece	+	+	+	+	+
Georgia	+	-	+	-	-
Kazakhstan	+	√	√	√	√
Cyprus	+	+	-	-	-
Kyrgyzstan	+	-	-	-	-
Latvia	-	+	√	√	-
Lithuania	+	+	+	+	+
Moldavia	+	+	+	+	-
Russia	+	+	+	+	+
Serbia	+	+	-	-	-
Slovakia	-	-	-	-	-
Turkey	+	+	-	-	-
Ukraine	+	+	-	+	-
Montenegro	√	√	√	√	√
Czech Republic	+	+	√	+	√
Romania	+	+	+	-	-
Israel	√	+	√	+	√

Note: (+) – yes; (-) – no; (√) – no answer

All measures of state support for innovations are aimed, first of all, at achieving more effective use of intellectual property, i.e. at supporting the IP commercialization process. The main issue here is how effective such measures are.

Figure 6 shows the effectiveness of state support for IP commercialization in countries with economies in transition.

Fig. 6 Effectiveness of state support of IP commercialization



As can be seen from Figure 6, performance indicators for different business entities vary considerably. The respondents' opinions regarding the efficiency of state support provided to state institutions were divided almost equally:

25% think that this support is not effective;
25% point out low efficiency;
25% think it is effective, but not enough;
25% think it is effective enough.

As far as business, whether large, or medium or small, is concerned, 73% of respondents point out to medium or inadequate efficiency of state support of IP usage. We believe that such situation is caused by the low interests of business towards the creation of innovation environment. The survey results show that in 9 countries the business community is not involved in devising and implementing an effective mechanism for the use of IP; and in 7 countries business acts very carefully, while for 6 countries it was difficult to evaluate the actions of business, and only in Turkey is the business community highly active.

Such assessment of the actions of business sharply differs from the practice seen in industrial countries. Their business community very actively participates (or plays the central role) both in devising the scientific-technological and innovation policy, and in selecting mechanisms to ensure that IP is used effectively.

Therefore, countries in transition should involve their business community in the innovation process, and the process of creation and use of IP should become a top-priority task for the governments.

In addition to direct methods, the countries covered by the project widely use *indirect* methods for state regulation of innovations. Such methods include, first of all, liberalization of tax legislation, in particular, the following tax benefits:

- "Tax holiday", i.e. reduced tax rates for profits generated by innovation projects, or a refund of R&D expenditures; such measures are used in Israel, Czech Republic, Ukraine, Russia and Lithuania. In Belarus, such measures apply to the residents of its High-Tech Park;
- Special benefits for SMEs. This measure is used in Moldavia, where SMEs operating in the field of science and innovations enjoy certain benefits by paying only 5% of all fees required by law for a period of 5 years. Special benefits for SMEs also exist in Russia, Ukraine and Israel.
- Research and investment tax credits are provided in Russia and Ukraine, i.e. a grace period is granted for corporate income tax on the part of expenditures for innovations;
- Preferential taxation for intangible assets exists, for example, in Kazakhstan, Ukraine and Russia; (issues related to intangible assets are covered in section 3.1).

An important element in the system of fostering innovations is providing *bank support* to operations connected with R&D and the development of advanced technologies. In most of the countries that submitted their answers to this question, there exist special credit measures. In Ukraine, for example, a special program was adopted for providing state guarantees to banks, or interest-free or partially interest-free loans to innovation projects; in Greece, benefits are provided by private banks; Cyprus, Czech Republic, Serbia and Romania provide special loans to SMEs, Lithuania provides micro-loans and soft loans, Moldavia has special simplified loan scheme; in Russia, all governmental support is provided through Vnesheconombank, and in Israel special loans and credits are provided by the Chief Scientist Office.

Indirect methods for supporting innovations also include *tax benefits in intellectual property domain:*

- Tax on commercial transactions
  In Belarus and Russia, patent and licensing transactions are exempt from value added tax. In Israel royalties from selling license are not taxed.
- Corporate income tax
  In Israel and in Greece there is preferential income tax treatment for patent and license usage, and in Greece, if a company buys a patent license and manufactures patented products; profits generated by such products are exempt from tax for 3 years. In Belarus, all income received by a company from the exercise of industrial property rights is exempt from corporate income tax;
- Exemption from patent fees
  in Lithuania, patent holders pay 50% of patent maintenance fees, if they sell a license under the relevant patent; in Russia patent maintenance fees are reduced if an open license is sold.

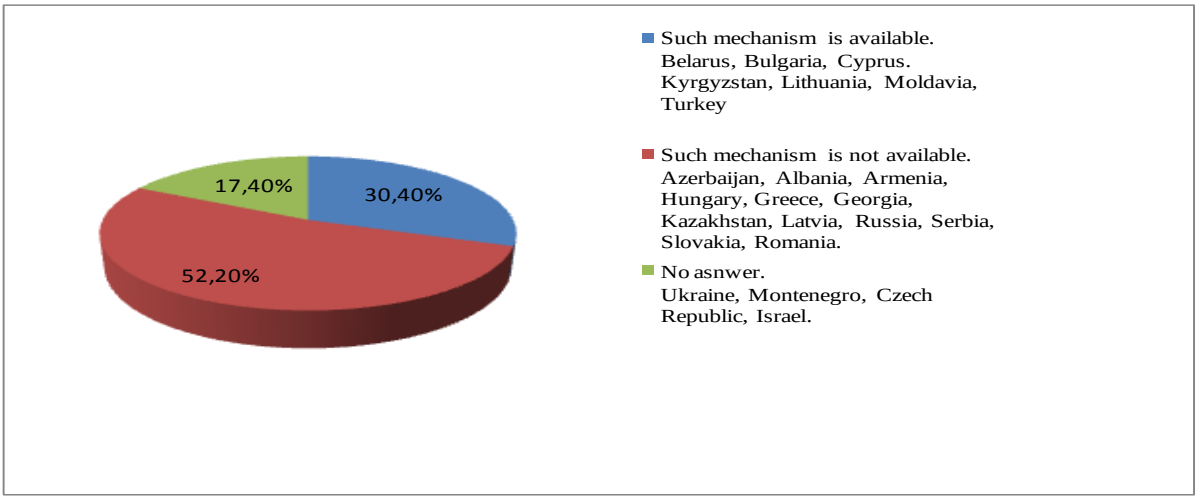
3.2. Maintaining the Balance of Interests in the Field of IP

Maintaining the balance of interests between all those who create and use IP is, probably, the most difficult issue in the entire system of fostering innovations.

The leading countries of the world, within their state IP development policies, elaborate a mechanism to take into consideration the interests of all stakeholders, such as the state, business, holders of rights and society.

The survey results showed that most countries in transition have not developed such mechanisms so far, which undoubtedly does not promote the activity of those involved in the innovation process (Fig. 7).

Fig. 7 Mechanism for taking into consideration the interests of innovation process participants



Analysis of the answers received allowed us to identify *common* approaches that the countries use to tackle the issue of maintaining the balance of interests. All countries use, first of all, the approach of distribution of intellectual property rights among all those involved in the creation and commercialization of IP. However, there are certain special characteristics related to:

- Distribution of rights to scientific and technical results financed out of the state budget;
- Distribution of rights between the investor and the university (research institute, company) who lead R&G.
- Distribution of rights between the university (research institute, company) who lead R&G, and an author (authors).

These issues are examined in detail in WIPO materials. In this work it would be great to pay more attention to author's rights.

The author is the most vulnerable party in the innovation process; very often he or she is separated from the goods production and sale processes, in which his or her invention or other intellectual property is used. Consequently, the author is also separated from cash flows generated by sales of protectable goods and services. As a result of this, most countries also use a second approach to maintaining the balance of interests between the innovation process participants, which involves encouraging the activity of authors. Usually, three types of incentives for authors are used:

- A fee for the creation and use of an invention. Usually this issue is governed by an R&D contract or a contract for the creation of scientific-technological products. The amount of such a fee is chosen by the concerned company or university at its own discretion. For example, Israel universities have their own characteristics, but there are some legal requirements. Researcher should inform about the results of his research if it has got commercial value. University becomes the owner of these results, so he become the owner of IP and decide if he wants to commercialize it. Money received from commercialization of such IP are shared by university and researcher. For example in Weizmann institute in Israel 60% of income goes to research institute and 40% goes to researchers.

In some countries the amount of author reward is fixed on legislative level. For example, in Belarus authors of intellectual property obtain not less than 40% of income received by a company from transfer of intellectual property rights under contracts.

- Tax benefits.

Eight countries, from all participants in the project, pointed out to the existence of special tax measures to support authors. Belarus, Bulgaria, Russia and Moldavia provide personal income tax benefits. If an author receives a fee for the creation or use of IP, the tax base is reduced. For example in Russia all expenses that author bore are not included in tax assessment. In Moldavia, authors and inventors pay only 5% of all amounts required by law.

- Special benefits connected with the patenting of industrial property. Such benefits exist in Georgia, where schoolchildren and students have a 70% discount, while pensioners have a 90% discount, if they are patent authors and applicants. In Lithuania and Romania patent fees are reduced by 50% if a patent application for an invention or industrial design is filed by an individual in his or her own name.

Analyzing above mentioned forms of author stimulation showed that the most effective is a payment of royalties for usage of this invention of other object of IP. In most countries in transition a significant number of companies ignoring interests of authors in their effort to come to market and they do not include article about royalties in their contracts.

That's why in order to enhance creativity, at our point of view, it is necessary to solve the issue of protection of the author's rights for remuneration, determine the conditions and amount of payments.

Summarizing the above mentioned it can be noted that for most of the participating countries of the project providing the balance of interest for all parties is one of the critical factors determining the success of innovation processes, which in turn determines the dynamics of growth of the national economy. Therefore, it is advisable to form a group of IP indicators V, which should include the following:

- Existence of legislation on the distribution of IP rights generated by the state budget;
- Existence of statutory author's remuneration guarantees in the case of IP commercialisation indicating the amount and terms of payment.
- Existence of tax remissions for authors.

3.3. Public Attitude to Science and Innovations

The activity of innovation process participants depends not only on whether or not their interests are taken into consideration by the state, but also (at least to the same extent) on public attitude to science and innovations, as well as on how prestigious professions in this field are. If a society is interested in creating something new and advanced, it will value accordingly its scientific, engineering and pedagogic reserve, as well as good education.

Such interest is manifested through certain actions, when the general public supports certain programs, public movements and political parties. In the long run, all this is manifested in the amount that the voters are ready to pay.

This statement can be illustrated with the following example. In developed countries, especially the United States, people, to a considerable extent have lost interest towards space exploration programs. However, interest towards innovations in medicine, environmental protection and genetically modified products, i.e. everything related to human life, has considerably increased. Today, elections are won by the party offering a program with more research aimed at improving the quality of people's lives. This means governmental funding, involvement of business and new educational programs.

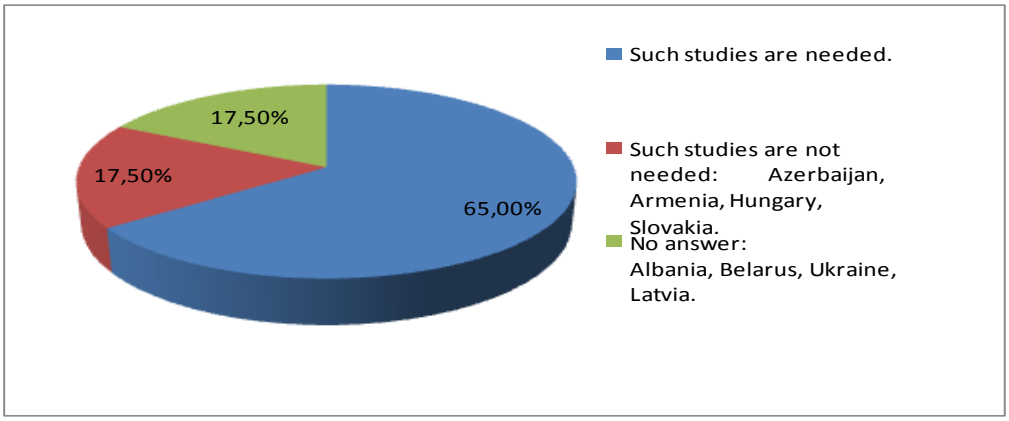
Therefore, when devising the state policy in the field of innovations, it is necessary to study public attitude to innovations, invention and those who create and embody innovations.

The number of such studies in the leading countries is growing steadily, and their results provide the basis for the country's innovation and budget policy.

The survey demonstrated that the attitude to such studies in participating countries is the following. Experts from 15 countries (65%) believe it is *necessary* to conduct studies to find out public attitude to science and innovations, prestige of professional activity in the field of science, applied research, IT and education. The remaining countries either gave no answer (17.5%) or think that such studies are inexpedient (17.5%) (Fig. 8).

It should be noted that such studies have not been carried out in all countries, where experts said that they are needed. When such studies were performed, opinions on their importance were as follows.

Fig. 8 Study of public attitude to innovations



In Israel and Greece, the results received *do not affect* the state policy in the field of science, innovations and education; a minor influence can be seen in Montenegro; major influence in

Israel, while Georgia, Lithuania, Turkey, Czech Republic and Romania demonstrate a high degree of influence of such results on their respective state innovation policies.

Therefore, it seems reasonable to include public attitude to science and innovations in V group of IP indicators.

Education

It is known that the attitude to new things is shaped in the process of upbringing and education. New knowledge in the field of IP can be acquired only in the course of education. In the context of a knowledge-based economy this process is continuous. The relevance of this issue is confirmed by the survey results. Almost all countries (91%) have a system of training and education of IP specialists, which includes:

- a mandatory course in IP in all higher education programs;
- professional development courses;
- training of patent attorneys;
- retraining courses, etc.

In addition, some countries also point out that they organize joint programs in the field of IP together with the European Patent Office, the European Patent Academy and WIPO.

It should be noted that training of IP specialists is a part of the general system of education.

In a continuously changing environment, the level of education becomes a critical factor affecting the country's welfare. A high level of education allows for the creation of national scientific schools able to develop leading edge technologies, as well as to effectively use knowledge of foreign scientific schools and research teams.

This means that countries in transition should increase their investments in education, i.e. in human resource.

Today, level of education (educational index) is one of three indicators of the quality of people's lives (human potential development index). Therefore, this educational index shows the existence of human potential – innovation generator.

However, while growing need in highly-skilled professionals in global employment market, education could transport from item of expenses to independent and important item of income. Leading universities of USA, India, Austria, and Great Britain due to education of foreign students are preparing not only young professionals but also refilling state treasury. In 2006 in USA education earned 13 billion US dollars[*].
Therefore, there is a direct relation between the level and quality of education and the country's welfare. As a result, the issues of education, including education in the field of IP, should be among the priorities when state innovation policy is devised.

Unfortunately, if we analyze the received answers we will see that none of the countries covered by the survey chose education as a priority area of its innovative development.

That is why it seems reasonable to include in V group of IP indicators the following data:

1. Educational expenses for 100 000 of people (in US dollars),
2. The level of education (educational index),
3. The part of contribution of education to GDP (%).

The V group of IP indicators consists of:

1. Educational expenses for 100 000 of people (in US dollars).
2. The level of education (educational index).
3. The part of contribution of education to GDP (%).
4. Results of research of public attitude to science and innovations.
5. Existence of legislation on the distribution of IP rights generated by the state budget.
6. Existence of statutory author's remuneration guarantees in the case of IP commercialisation indicating the amount and terms of payment.
7. Existence of tax remissions for authors.
8. The volume of state support in foreign patenting of domestic invention, useful models, designs (in US dollars).
9. Existence of state nets.
10. Existence of state system of rendering of services in registration of different types of IP in e-form (including copyright).

4. Protection of Intellectual Property Rights

In the context of growing globalization, the protection of IP rights is among the most difficult issues in today's market. Legal aspects of IP protection is a subject of other researches. In this work we will briefly analyze economic aspects of IP protection.

The definition of IP protection includes the variety of questions like anti piracy campaign, free competition interests and parallel import.

4. 1.Piracy in IP

Today ccounterfeit and pirate products have become important factors hindering the development of the national economy. The enforcement of IP rights is among the core requirements of the TRIPS Agreement.

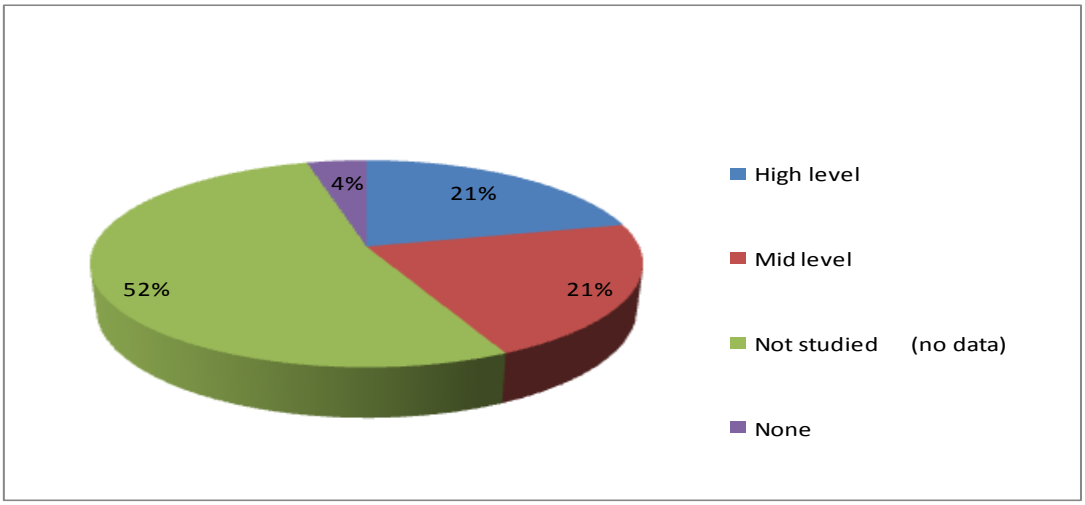
The leading countries of the world are elaborating a set of measures to protect IP rights in line with the requirements of the TRIPS Agreement and their internal conditions.

[*] Ilumginov V. New world power. Journal "economic strategies"-2008.

The issues of IP protection are the most urgent for countries with economies in transition. Most of these countries have industries connected with innovations and creations, which will benefit from protection of IP rights.

Analysis of the answers received shows that almost all project participants point out to the *existence of IP rights protection systems* (except for Cyprus, Latvia and the Czech Republic). However, the composition and the structure of these systems are very different, and not everywhere do the systems function effectively. This is also confirmed by the survey results presented in Fig. 9.

Fig. 9 Level of protection of IP rights in countries in transition.



Out of 23 countries covered by the project, only 5 countries (21%) (Cyprus, Slovakia, Turkey, Romania and Moldavia) ensure a high level of protection of IP rights. In Moldavia a high level of protection of industrial property rights is observed, but the level of protection of copyright is very low.

5 countries (21%) (Armenia, Greece, Kazakhstan, Serbia and Ukraine) provide a medium level of protection and in one country (Kyrgyzstan – 4%) the level of protection of IP rights is low.

The remaining countries (52%) do not study the level of protection of IP. Such positions suggest that no attention is paid to this issue, although the level of protection of IP has a great impact on the countries' investment climate.

A similar situation is observed with respect to information about pirated or counterfeit products in the domestic market of participating countries. Only 6 countries from 23 (Hungary, Turkey, Ukraine, Romania, Latvia and Serbia) provided information about the situation in their markets. For all these countries the highest level of piracy is seen in music and movies, CD/VCD, DVD, followed by software products, games, books, perfume, cosmetics, footwear, clothes, food and toys.

Speaking about the dynamics of piracy and counterfeit products, it should be noted that the volume of pirated products in the markets of these countries has declined. Basing on results of EU project Turkey has got the highest level of anti piracy campaign. In the Ukrainian markets, the volume of such products in 2000-2010 decreased from 90% to 55%, and in the Romanian market, the volume of counterfeit musical products declined from 55% to 45%, the volume of pirated software decreased from 77% to 66% and the volume of pirated entertainment programs went down from 91% to 75%.

This situation is provided by the measures taken by participating countries. In order to ensure legal commercial usage of copyrighted work in Ukraine and Moldova were established some mandatory requirements for labelling copies of audiovisual works, phonograms, video, computer programs and databases.

At the same time experts of all participating countries have noticed the upsurge of copyright violations in Internet.

It should be mentioned here that IP protection and especially copyright protection in the Internet became a great problem in terms of our information-oriented society. This issue requires independent research and adoption of certain documents on international level.

The level of protection of holders of IP rights depends on how effectively the *judicial system* functions. It is known that in world practice different approaches exist to tackling this issue. Some countries have established special courts dealing with IP rights, while in other countries the issues of IP rights are handled by courts of general jurisdiction. The same picture can be seen in the countries that participated in the project.

Special IP courts were created in 8 countries out of 23; there are Belarus, Hungary, Greece, Russia, Slovakia, Turkey, Czech Republic and Romania. In some other countries special boards of judges were created in the courts; in Ukraine, for example, the system of economic courts includes special courts dealing with IP issues, as well as a special board of judges at the Superior Economic Court.

It should be noted here that already developed countries have a powerful system of protection of IP rights with a long experience of application of legislative provisions related to infringement of IP rights. It is this very practice of enforcement of rights that determines the level of infringements in the field of IP.

The issues of operation of the judicial system and establishment of the practice of enforcement of rights are covered by separate studies. In this research it should be noted that effective courts determine the interests of holders of rights to launch leading-edge products and technology in the market of countries with economies in transition, which determine the level of economy.

Customs bodies are an important element in the general system of protection of IP rights. The survey results showed that 18 countries covered by the project have a special agency to control the crossing of their national borders by counterfeit and pirated products (exceptions are Greece and Kyrgyzstan; no answers were received from Montenegro and Belarus). In most countries such responsibility is vested with the state customs authorities.

To make the prevention of importation of counterfeit and pirated products to their territory more effective, 14 countries of 23 have created a State Customs Register of IP banned from import into their territory. The Customs Register of IP is a modern tool to combat intellectual piracy, and it is important that holders of rights in countries with economies in transition be aware about it, and is able to use it effectively to protect their rights.

4.2 Competition policy and IP protection

While speaking about the protection of intellectual property rights, it is necessary to stop on such a problem as the balance between IP policy and competition policy. It should be understood that IP policy is focused on protecting owner’s rights, while the focus of competition policy - is a free and fair competition, i.e. conscientious struggle in a particular market.

The logic of the existence of IP policy flows from the fact of having a legal right for monopoly on the results of intellectual activity, the logic of competition policy is based on the economic substance of a monopoly in each case. In other words competitive policy relied on “principle of rationality”.

Under this logic, competition policy is directed against the abuse of IP rights. Today such abuse or anti-competitive use of IP rights has obtained new forms, as: fraud against the Patent Office, establishment of restrictive measures while concluding license deals, acquisition of patent only for blocking a partner – "patent trolling", requirement to pay the potential, but not actual damage, incurred by the owner after violation of his IP rights.

During last years this phenomenon became an obstacle in the way of effective usage of IP rights which influence in turn on the economic development. Therefore, mechanism of resolving conflict of interests of these two components of urban market should be developed in national IP strategy.

One of the instruments of arrangement of conflict between market claims and the protection of exclusive IP rights is compulsory licensing. In case when the patent hasn't been used during certain period of time, and the market requires goods and services, protected by this patent, the conflict of interests is solving with compulsory licensing.

Therefore, existence of mechanism providing balance of interests of free competition and IP rights monopoly is an important indicator of IP level and should be included in VI group of IP indicators (see Chapter 2.3.2).

Parallel Import

Within the protection of IP rights, there is an issue of parallel import or exhaustion of rights doctrine, which still remains one of the most difficult issues in international business. There are different exhaustion of rights regimes:

- National exhaustion of rights – Brazil, Morocco, Turkey;
- Regional exhaustion of rights – European Union, Customs Union: Russia-Belarus-Kazakhstan;
- International exhaustion – South Africa, Hong Kong, Singapore, Costa Rica, Guatemala, Honduras, etc.

With respect to parallel imports, the TRIPS Agreement provides freedom of choice to countries. Countries decide at their own discretion whether parallel import should be permitted or prohibited. This issue was not covered by the survey, but of course it is of great interest for the development of domestic markets of countries with economies in transition and it should be included in VI group of IP indicators.

Therefore, based on the foregoing VI group of IP indicators include:

1. Level of pirated goods (% of total goods and services in this sector of the economy).
2. The extent of damage suffered by the country's economy because of pirated or counterfeit goods (total, by sector).
3. Existence of specialized courts in IP.
4. The number of court disputes involving violations of intellectual property rights, including addressed in the civil, administrative, and criminal or arbitration court.
5. Existence of state support for private persons in defense of IP rights (free legal assistance for the preparation and litigation, related to IP infringement).
6. Existence of special rules of financing and purchase of goods and services (including software programs and data bases) that guarantee loyalty of IP rights (guarantee of novelty of subject of the transaction).
7. Number of IP objects included in the State Register of Customs.
8. Number* of arrested pirated goods by the customs authorities at border crossings.
9. The presence of state mechanism of prevention the abuse of IP rights.
10. The type of current regime in the country about exhaustion of intellectual property rights (parallel imports).

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* Units of measure of the detained pirated goods depend on the type of product, for example bootleg DVDs - pieces, alcohol - liters, etc.

Conclusion

At the present, there is a significant change of the role of IP in the system of economic relations. From the institute of protection of the results of intellectual activity, IP transformed into the basic resource of economic development. This changes as well the priorities in the system of management of IP in countries in transition. Today, more attention should be paid to the effective use of IP.

In order to achieve the tasks, it is essential:

1. To elaborate the governmental strategy in the field of IP, this should include all issues related to the creation, legal protection, commercialization and protection of IP.
2. IP strategy should be an important part of state innovation policy. The issues of management of IP should be discussed only with the issues of innovation development of the country.
3. The main task of the governmental innovation policy – creation of technology business, which should finance the innovations. The role of state should increase in this situation and not diminish. The State regulates the strategic development, supports the academics that create innovations. The most important is that the State should insure the effective innovation infrastructure.
4. One of the most important goals of IP strategy should be organisation of databases for all domains of IP. These databases should contain homogenous and reliable information collected by certain IP indicators: economic, legal etc. They should be renewable and accessible.
5. To estimate effectiveness of the national IP strategy some key indicators should be defined to estimate the impact of IP to national economy. As the first stage of this work within the framework of this research a set of indicators were formed by which it is possible to judge the connection of IP to the economic processes taking place in the countries with economies in transition (Annex 1). The complex is a wide range of qualitative and quantitative indicators, combined in into six groups, which allow evaluating the resources available in the country and the conditions for the creation of IP and evaluate the results achieved of practical use of IP. Selecting a large number of indicators is fundamental, because:
    a. extensive set of indicators provides a detailed review all aspects of the IP economy;
    b. further, each country may choose the most meaningful IP indicators considering its goals, objectives and characteristics;
    c. only on the basis of a large number of indicators may be calculated quantitative relationships that will identify IP key indicators;

    The proposed set of indicators could be the basis for the development of Method of calculating the IP key indicators. Based on key indicators, in turn, could be calculated IP integral index.
6. In the frames of state strategy of development of IP, the issue of international patenting of the results of R&D should be considered, with the view to allow the national products and technologies to access the Global Market.
7. The attention should be given to the development of national market of IP. The investments climate is very important for the local markets participants. State innovation policy should regulate this issue. In the frames of state strategy of development of IP the issues of governmental support of contracts related to patents and licensing agreements, as well as compulsory licensing issues should be included.
8. Stimulation of innovations and IP should be considered as the general task of state politics concerning innovation strategy. On the governmental level there should be a mechanism that could insure the balance of public interests and interests of other stakeholders.
9. Special attention should be given to the enforcement of IPRs while preparing the state strategy of development of IP. Today the level of enforcement has an important

impact on innovation economy. To ensure the enforcement all stakeholders should consider this issue, i.e. IP Offices, Customs, Judiciary, Police, right holders, authors, etc. Only in this case the effective enforcement system may be ensured.

10. At all stages of implementation of the state IP strategy it is important to use all forms of international cooperation. This is especially true for issues of developing common approaches and joint documents on copyright protection in the Internet.

Thus, the above mentioned activities may ensure the effective use of IP and ensure the sustainable development of national economics.

Set of indicators reflecting economical component of IP

I Group. Basic terms of IP functioning

1. State policy in the area of science and innovation.
2. List of priority areas of research-and-technology and innovation policy.
3. Factors hampering the process of country's innovative development.
4. Specific factors contributing to the process of innovative development.
5. Government strategy of IP development.
6. Existence of monitoring of the quality of government services in the area of IP.

II Group. Resource and R&D effectiveness indicator

1. Internal expenditures for R&D, inter alia in US dollars and % of GDP.
2. Internal expenditures for R&D according to sources of financing (state funds, funds from private enterprises, funds of higher education institutions) (in US dollars).
3. The number of employees engaged in R&D, per 10 thousand people employed in the economy.
4. The number of publications in scientific journals (this figure also applies to the number of copyrighted works created in the country).
5. Share of the country in the global number of publications in scientific journals indexed in the Scopus database.
6. Number of publications and number of citations of national authors in journals indexed in the WEB of Science database (based on 100 researchers).
7. The number of patent applications filed at the national patent office, including:
    - In the name of domestic applicants;
    - In the name of foreign applicants.
8. Coefficient of inventive activity (number of patent applications for inventions filed by domestic applicants to the national office, based on the 10 thousand people).
9. The number of patents granted for inventions, including:
    - Domestic applicants;
    - Foreign applicants.
10. Number of national patents at the end of this year, including those belonging to:
    - Domestic applicants;
    - Foreign applicants.
11. The average duration of the national patents in various sectors of the national economy.
12. Amount of patent fees for applications and maintaining patents in force.
13. The number of foreign patents obtained by domestic applicants, including "triad" patents.
14. Expenses of the state to support enterprises and inventors in the domestic and foreign patenting of inventions (in US dollars).

III Group. Efficiency indicators of commercial use* of IP rights

1. The amount of used patents for inventions and other types of IP.
2. The amount of IP objects shown on the balance sheet of company as fictitious asset.
3. Part of fictitious asset in net assets value or marketable value.
4. The number of registered assignment contracts.
5. The number of license agreements.
6. Income capacity from license export (in US dollars).
7. Payments for import of license (in US dollars).
8. The number of compulsory licensing.
9. The number of franchise agreements.
10. The number of pledge agreements.
11. The number of new working places, created in connection with the implementation (use) of new technologies.

*The use of patents is import into the territory of the country, where the patent is valid, manufacture, use, offer for sale, sale, otherwise introducing into civil circulation or storage for such purposes of the product, in which the invention or useful model are used, or products, in which design is used.

IV Group. Innovation indicators

1. Expenditure on technological innovation (industrial production, service sector) (in US dollars).
2. Share of organizations engaged in technological innovations in the total number of organizations.
3. The volume of innovative products works and services, including % of total volume of shipped goods, works and services.
4. Share of innovative industrial products in total sales of industrial products in the domestic market.
5. Level of innovative activity in the various sectors of the economy (manufacturing, services, etc.).
6. The number of organizations engaged in research and development, associated with nanotechnology.
7. The costs of R&D related to nanotechnology (in US dollars).
8. The number of nanotechnology, embedded in production.
9. The volume of innovative products and services related to nanotechnology (in US dollars).
10. The number of workers employed in the ITT sector of the total number of employees of all organizations (state, private, etc.).
11. The share of the ITT sector in the gross added value (%).
12. Volume of investments in the ITT sector (in US dollars).
13. The value of the Global Innovation Index (of the concrete country).

V Group. Indicators on innovation support

1. Educational expenses for 100 000 of people (in US dollars).
2. The level of education (educational index).
3. The part of contribution of education to GDP (%).
4. Results of research of public attitude to science and innovations.
5. Existence of legislation on the distribution of IP rights generated by the state budget.
6. Existence of statutory author's remuneration guarantees in the case of IP commercialisation indicating the amount and terms of payment.
7. Existence of tax remissions for authors.
8. The volume of state support in foreign patenting of domestic invention, useful models, designs (in US dollars).
9. Existence of state nets.
10. Existence of state system of rendering of services in registration of different types of IP in e-form (including copyright).

VI Group. Indicators of IP protection

1. Level of pirated goods (% of total goods and services in this sector of the economy).
2. The extent of damage suffered by the country's economy because of pirated or counterfeit goods (total, by sector).
3. Existence of specialized courts in IP.
4. The number of court disputes involving violations of intellectual property rights, including addressed in the civil, administrative, and criminal or arbitration court.
5. Existence of state support for private persons in defense of IP rights (free legal assistance for the preparation and litigation, related to IP infringement).
6. Existence of special rules of financing and purchase of goods and services (including software programs and data bases) that guarantee loyalty of IP rights (guarantee of novelty of subject of the transaction).
7. Number of IP objects included in the State Register of Customs.
8. Number* of arrested pirated goods by the customs authorities at border crossings.
9. The presence of state mechanism of prevention the abuse of IP rights.
10. The type of current regime in the country about exhaustion of intellectual property rights (parallel imports).

* Units of measure of the detained pirated goods depend on the type of product, for example bootleg DVDs - pieces, alcohol - liters, etc.

Comment: All indicators are considered at current year-end or according to results of last three, five or ten years, i.e. in dynamics.

Annex 2

Terms, used in this research

Balance of payments for technology - means all amounts transferred in connection with all intangible transactions related to import or export of technology.

Domestic R&D expenditures - means the actual expenditures in monetary terms on research and developments on the territory of a country (including R&D financed from abroad, but excluding payments made abroad). Their estimate is based on accounting of costs for completion of R&D by organizations with their own forces during the reporting period, irrespectively of the source of funds.

Expenditures for innovations - means actual expenses in monetary terms connected with various innovations implemented within an organization (sector, region or country). Expenses for innovations include current and capital costs. Statistics analyzes expenditures for technological, organizational and marketing innovations.

Organizations' activity in the field of innovations - means the degree of involvement of organizations in innovations in general or in certain types of innovations over a certain period of time. The level of activity in the field of innovations is usually determined as the ratio of the number of organizations engaged in technological, organizational or marketing innovations to the total number of organizations analyzed over a certain period of time in a country, industry, region, etc.

Innovational activity - means a type of activity connected with the transformation of ideas (usually R&D results or other scientific achievements) into technologically new or improved products or services launched onto the market, or new or improved processes or methods for the performance (transfer) of services, which are used for practical purposes. Innovations include a whole range of scientific, technical, organizational, financial and commercial activities, which in their entirety bring innovations.

Innovative goods, works, services - means goods, works or services that over the last three years have been subject to a different degree of technical modifications. Based on the novelty level, two types of innovative goods, works and services exist: new (or subject to considerable technical modifications) and improved.

Sources of R&D financing - means the primary sources of funds for research and development, and sources are identified based on direct transfer of money from the customer to the contractor.

In general, R&D funds of a reporting organization are divided into organization's own funds and funds received from other organizations, whether or not they belong to the same business sector.

License - means the provision on certain terms and for certain consideration of a non-exclusive right to any intellectual property by the holder (licensor) to the interested party (licensee), or rights to use the subject of agreement under a special agreement (contract). A patent license grants the right to use a patent (free license – for know-how usage), determines the scope of rights granted, the territory and the term, as well as the formula to calculate payments.

Marketing innovations - means implemented new or considerably improved marketing methods, which include considerable modifications in the design of packaging for goods, works or services, use of new methods to sell or present goods, works or services, or their promotion in the market; elaboration of new pricing strategies. The purpose of marketing innovations is to more fully satisfy the needs and increase the number of consumers of goods or services, or enter new markets to increase sales.

Nanotechnology - means the entirety of techniques and methods used to study, design and manufacture nanostructures, devices and systems, including target control and modification of shape, size, interaction and integration of their nano-scale components (approximately 1-100 nm), the presence of which improves or adds operational characteristics and consumer features to final products.

Research and development (R & D) - means creative activity performed systematically to improve the entirety of scientific knowledge, including knowledge about humans, nature and society, as well as to find new areas for application of knowledge.

Organizations engaged in technological innovations - means organizations that develop and implement new or improved goods, work, services, processes or methods for the performance (transfer) of services or any other activities in the field of innovations.

Organizational innovations - means implemented new methods of business, organization of jobs, external relations. Their purpose is to improve performance of the organization by reducing administrative and transaction costs, improving the arrangement of working places (working time) and achieving increased productivity of labor, getting access to assets not available in the market and reducing the cost of supplies.

Invention patent - means a protective document issued in relation to an invention and certifying the priority, authorship and exclusive right to use it during the patent term.

Advanced production technology - means production processes, including machinery, devices, equipment and appliances based on microelectronics or computer-controlled and used for design, production or processing of products.

R&D personnel - means all persons, whose creative activity, conducted systematically, is aimed at extending and finding new areas to use knowledge, as well as those providing direct R&D-related services.

Applied research - means original works aimed at acquiring new knowledge to solve certain technical problems. Applied research determines possible ways to use the results of fundamental research and new methods to solve problems that have been formulated previously.

Developments - mean systematic work that is based on the existing knowledge acquired in the course of research and/or on practical experience and is aimed at creating new materials, products, devices, services, systems or methods. Such work can also include considerable improvements to the existing objects.

Ratings of innovations - are sources of information for technical innovations, methods for the protection of scientific and technical developments, and factors hindering technical innovations are calculated based on evaluation of organizations engaged in industrial production and services.

Total level of innovations - is determined as the ratio of the number of organizations implementing innovations of at least one type (technical, organizational or marketing) to the total number of organizations analyzed over a certain period of time.

Technological innovations - mean the final result of innovations embodied in a new or improved product or service launched onto the market, or a new or improved process or method of performance (transfer) of services, which is used for practical purposes. An innovation shall be deemed implemented if it is implemented in the market or a production process.

Technological exchange - means the amount of new technologies or individual technical achievements acquired (transferred) by an organization during one year. It covers transactions for purchase and transfer of scientific and technical knowledge and experience for the provision of scientific and technical service, application of production processes, production of goods,

works or services, whether on a gratuitous basis or during the term of a contract made between the parties.

Innovative services – a service shall be deemed a technological innovation, if its technical characteristics or ways of use are either fundamentally new or considerably (in terms of quality) improved in technological respect. The use of considerably improved methods of performance or transfer of services is also a technological innovation. During the study of innovations in the field of services implemented since 1998, different sectors, such as communications, financial mediation, general business related to market operation, were monitored. The communication sector was subject to continuous monitoring during that period.

Fundamental research - means experimental or theoretical research aimed at the acquisition of new knowledge without any definite purpose connected with the use of such knowledge. Their results include hypotheses, theories, methods, etc. Fundamental research can be finalized with recommendations regarding applied research to identify ways for practical application of scientific results or publications.

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