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The Scientific and Cultural Background of the Innovation Development in Slovak Republic, Ukraine, Russia and Hungary

Lujza Jurkovičová[1] - Miroslava Sheverja[2] - Volodimir Kubiniy[3]

Abstract

This article is devoted to the results of the analysis of scientific background in the field of development and research. The purpose of this paper is to assess the employment and financing research and development sphere in Slovakia, Hungary, Ukraine and Russia, which allows to determine the prospects of sectors that include research and development and to explain ways to enhance their effectiveness. The analysis if statistic information allows estimating the level of science support in Ukraine and determining the possible benefits for competitiveness of the national economy.

Key words

Research, development, innovation, analysis, financing

JEL Classification: O30, O31

Introduction

The competitiveness of Ukraine, achieving adequate to modern conditions, is determined by the need to solve the problem to enhance innovations. The last one is largely based on the conduct of research and development work. It should be emphasized, that the presence of analytical recently insufficient attention is paid to the analysis of comparative research in Eastern Europe. The researches form a scientific innovation environment, which produces the conditions of innovation development of the country.

The purpose of this paper is to assess the employment and financing research and development sphere in Slovakia, Hungary, Ukraine and Russia, which allows to determine the prospects of sectors that include research and development and to explain ways to enhance their effectiveness. The analysis if statistic information allows estimating the level of science support in Ukraine and determining the possible benefits for competitiveness of the national economy.

The task of the article is to show, that the level of science support in the country is correlated with the influence of science, what is shown on the chain of the science transformation into the national benefits.

[1] Ing. Mgr. Lujza Jurkovičová, PhD.; University of Economics in Bratislava, Department of Commodity Science and Product Quality, Dolnozemská road 1, 852 35 Bratislava; E-mail: saok@vnet.sk

[2] Mgr. Sheverja Miroslava; Uzhgorod National University, Institute of Economics and International Relations, Department of Business Economics, Management and Logistics, Universitetska Street 14, 88000 Uzhhorod, Ukraine; E-mail: bfc@mail.ru

[3] Mgr. Kubiniy Volodimir; Uzhgorod National University, Institute of Economics and International Relations, Department of Business Economics, Management and Logistics, Universitetska Street 14, 88000 Uzhhorod, Ukraine; E-mail: bfc@mail.ru

The statistics information by UNESCO has been used in the investigation, which makes possible difference with the statistics of national news sources. The comparison method, the relative indicators and other statistical techniques have been used in working up of information.

1 Methodology

The goal of paper is the analysis of scientific background in the field of development and research. The development of the paper we use theoretical - empirical analysis we conducted studies books, magazines and internet literature. The investigation has been used the statistics information by UNESCO, which makes possible difference with the statistics of national news sources. The comparison method, the relative indicators and other statistical techniques have been used in working up of information.

2 The connection between economical growth and innovation

The relationship between innovation and economic growth has been well studied. However, that is not to say that it is well understood. Renowned scholars continue to work with incredibly simplified models of an incredibly complex economy. Consequently, empirical results are usually carefully annotated with caveats noting the limitations of all findings and the great uncertainties that remain concerning fundamental assumptions in the field.

A theoretical link between innovation and economic growth has been contemplated since at least as early as Adam Smith (1776). Not only did he articulate the productivity gains from specialization through the division of labour as well as from technological improvements to capital equipment and processes, he even recognized an early version of technology transfer from suppliers to users and the role of a distinct R&D function operating in the economy:

"*All the improvements in machinery, however, have by no means been the inventions of those who had occasion to use the machines. Many improvements have been made by the ingenuity of the makers of the machines, when to make them became the business of a peculiar trade; and some by that of those who are called philosophers or men of speculation, whose trade it is not to do anything, but to observe everything; and who, upon that account, are often capable of combining together the powers of the most distant and dissimilar objects. In the progress of society, philosophy or speculation becomes, like every other employment, the principal or sole trade and occupation of a particular class of citizens… and the quantity of science is considerably increased by it.* " (Smith, 1776)

Indeed, a key driver of this growth has definitely been innovation. The creation, dissemination and application of knowledge have become a major engine of economic expansion. Corporations have come to rely more and more on this precious tool. It is a practice that has moved from the periphery of many corporate agendas right to the target of their strategies for growth and leadership. Most sectors and industries are

currently experiencing what is called a "Schumpeterian renaissance": innovation is today the crucial source of effective competition, of economic development and the transformation of society (Statistics Canada, 2002, 181 – 187).

It is difficult to agree on one single definition. However, we can argue without hesitation that innovation has proved to be: 1) an efficient stimulant for building world-leading organizations (such as Microsoft, Rolls Royce and Apple); 2) a discipline of creativity that attracts the best people (look at companies like Dyson, Egg and Google); 3) a message that reinforces a corporate ambition (3M, Toyota or Adidas); and 4) an instrument to foster leadership (think of BP, UPS and H&M). No wonder why every CEO wants some of this "magic dust".

Innovation has also bred a fruitful collaboration between universities and corporations in many parts of the world. Turning a novel thought into a profitable product is a hard thing to do. Every great inventor needs a great entrepreneur and vice versa. Chester Carlson's invention of xerography would never have become the remarkably profitable Xerox photocopying business were it not for what Charles Ellis calls the "extreme entrepreneurship" of Joe Wilson. Very often, this association between universities and corporations becomes the space where the future is invented.

The number of already established university spin-ups like Cambridge or MIT is large, but more and more institutions are pressing forward. Oxford University, for example, is challenging Cambridge as one of the main centers of entrepreneurship and innovation in Europe.

The Modern economies are built with ideas, as much as with capital and labour. It is estimated that nearly half the US' GDP, for example, is based on intellectual property. The EU has set the 'Barcelona target' of increasing R&D to 3% of GDP by 2010 to become "the most competitive and dynamic knowledge-based economy in the world". Look at China: according to OECD estimations, in 2006 for the first time China spent more on R&D than Japan, becoming the world's second largest investor in R&D after the US. Globalization itself is a product of innovation. The application of constantly improved technologies to the massive means of transport and communication has produced an unprecedented level of global connectivity, of global awareness. The economies are becoming interdependent, while cultures are becoming more permeable, transparent and stronger through an intensified exchange of goods, services, ideas, values, experts, problems and solutions.

The innovation is a complex development of discoveries and inventions (e.g. new machinery) brought into the business and social environment (e.g. introduced on the market) that hopefully leads to diffusion (adoption by new users). During the diffusion path, improvements to both the idea and implementation often require further innovation. The successful innovations are often imitated by other players in the same industry or applied in other industries. The innovation is presented as:

1. Product innovation (e.g. new goods or services put on sale);
2. Process innovation, which changes the way a given good is produced within the firm or across a supply chain;
3. Behavioral innovation, when an organizational routine is replaced with a new one (Oecd, 65-67).

There is a large sector of domestic firms, especially in Hungary and Slovak Republic notably small and medium-sized enterprises (SMEs) characterized by low productivity and insufficient innovation capabilities, which typically operate in local markets with relatively unsophisticated demand. In spite of some encouraging developments (e.g. the emergence of sophisticated suppliers in the automotive industry and of some dynamic research- based firms); the quasi-absence of highly innovative medium-sized enterprises leaves a glaring gap.

The participation of knowledge institutions (mainly the universities and the Academy of Sciences, which plays a major role in the Hungarian research landscape) in innovation activities has improved but remains insufficient. Hungary has built a solid core of high-quality scientific research, produces quite good scientific output at costs well below the European average, and has some promising examples of co-operation between business firms and publicly funded public research organizations in some industries and regions (Budapest, but also locations such as Debrecen and Szeged). However, this relatively large sector of public research organizations could contribute more to innovation in terms of the formation of specialized human resources (notably science and engineering graduates) and of market-driven fundamental research. Fulfilling this task requires a research infrastructure of sufficiently high quality.

In summary, insufficient innovation, capability is among the factors preventing Hungary from better adjusting to evolving competition, notably from emerging economies, and from seizing the opportunities arising from technological change and globalization(Eurostat, 2006, 111).

3 Innovation Activity in Ukraine and Neighbors countries

The scientific discoveries and research promote progress (whether the invention of the wheel or the introduction of computers) make it possible to expand the horizons of human consciousness and to raise them to a new level.

The discoveries in various fields of human activities, can translate the world into a new stage of development. Recently, research institutions are actively developing, providing a solid basis for technological and cultural development, helping them to develop more quickly and efficiently than ever before. Science has become more and more "switch" for the technological improvement of the practice: the concept of "science-technological revolution" was replaced by the concept of "technological revolution", science has become more practical. Development of science in the past to provide humanity Industrial progress, which led to the transition of humanity into a new post-industrial era of development characterized by instability and dynamism of the political, economic, social, technological, and other situations (Oecd).

Innovation activity – is a form of investment. It is associated with the development and implementation of scientific, technical, organizational, technological and managerial innovations. According to the Law of Ukraine "About innovation activity", innovation activity is activity which is directed at utilization and commercialization of research results and developments. Innovation activity causes the entry of new competitive goods and services. Innovation is newly created or improved competitive technologies, products or services. Innovation - it is also organizational and technical deci-

sion of industrial, administrative, commercial kinds. It improves the structure and quality of production and (or) social issues. Innovation in economic activity is the activity of participants of economic relations according to the Commercial Code. It is based on the sale of investments for the long-term research programs with long payback periods. Innovation activity is aimed at introducing new scientific and technological achievements in production and other spheres of public life.

Innovation activity is innovation which covering scientific, technical, technological, economic and organizational changes with positive environmental and social impacts. It is made in the manufacturing sector. The main characteristics of innovation: quality novelty products, production methods and technologies compared to previous; pace of implementation; dynamic updates, environmental cleanliness and safety, economic efficiency.

There are following criteria of innovation activity: criterion of novelty (there is a qualitative leap in the level of technology), economic criteria, which reflects a significant increase in the economic, social and environmental results.

Depending of subject matter there are:

- Productive innovations. It is focused on the production and use of new (better quality) products;
- Technology – providing new (upgraded) environmentally safe technologies of existing products, improve the environmental performance of production;
- Management. It based on the new approaches and methods of management, especially systemic, ecological.

In terms of impact for natural and social environment:

- Radical (transition to non-waste, saving production);
- Which modernizes production (for example "green" modernization)?

Innovative activity is an important trend of shaping regional competitiveness.

There are following regions depending on the ability to create and innovate according to Slovakian and Ukrainian scientists:

- Innovative regions – represent a small group of regions that are best developed, which create technological and product innovations;
- Adaptive regions – are able to improve innovation that are created in innovative regions;
- Simulation regions – innovation "come" late and it is rarely adapted to regional specificity;
- Passive regions – operate outside the main innovation processes, innovations do not reach them at all or they are not accepted;
- Conservative regions – those that do not show interest in the product or technological innovation through different objective or subjective reasons (for example religious beliefs, traditions, etc);
- Consumer regions – also not interested in innovation. It only consumes goods, works and services. The production of them is at a primitive level, and therefore has no need for innovative solutions.

The realization of the science, technology and innovation policy should be directed to:

- Consolidate the leadership position in scientific and technical fields;
- Growth initiatives scientific and technical intellect and activation works in small and medium businesses;
- Forming a innovation's culture in society;
- Using new knowledge which giving a chance for active and equal participation in the global system of division of labor.

Innovation policy in the region affects the positioning of the region in the national competitiveness of country. Delay the innovation process at the regional level and not high rate of activation is because of low degree of flexibility and adaptability of enterprises to innovate. The main reasons for this are:

- Low activity of domestic and foreign investors;
- Slow growth of updating the fixed assets because of fast depreciation of equipment;
- Inconsistency level of technological development of progressive innovation parameters;
- The high cost of domestic samples of new technology etc.

The research shows that a significant obstacle is the lack of innovation development strategy of the region. Strategy will ensure coordination of individual units and levels of regional socio-economic system. Also it will provide synergistic levers which are a basis for describing the mechanisms of new innovations.

Activation of investment and innovation processes in the region, which aims to strengthen the innovation capacity, should be provided:

- Joint efforts of public authorities, businesses and institutions, whether public or private, to attract investments in the region;
- Coordination interaction between government, enterprises, institutions, banks, consulting firms and information to attract investment;
- Providing information to domestic and foreign investors about the potential enterprises, organizations and institutions of the region;
- Rational use of investment and credit;
- Increase the competitiveness of the region's enterprises and their products in the domestic and foreign markets;
- Development of regional investment and innovation programs, projects, proposals for investment on technical re-engineering enterprises for production of final cycle;
- Development of new technologies and the stabilization of the region's enterprises;
- Increased attractiveness to investors of large enterprises in the region;
- Development of small and medium enterprises, promoting the creation of innovative enterprises.

4 Analysis of the innovative activity

The level of innovative activity is measured by two groups of criteria: quantitative and qualitative. Quantitative criteria characterize the total number of employees in re-

search and volume of financing. Qualitative indicators allow monitoring of the structural characteristics and analyzing of the level of costs in the amount of the gross domestic product.

Indicators of employment in research and development work are in assessing of the quantitative parameters of innovation activity in the country primarily considered. The data of the countries, which are neighbors of Ukraine and actively involved in research and innovation cooperation, are proposed in table 1.

Table 1 Indicators of employment in research and development (R & D) in Ukraine, Russia, Slovakia and Hungary in 2009, according to UNESCO

	Ukraine	**Russia**	**Slovakia**	**Hungary**
Total employment in R & D full-time equivalents, persons	61858	442263	13290	20064
Employed per million of population	1353	3091	2438	2006
Employed in a thousand, persons	2,71	5,78	4,84	4,70
Employed per thousand total employment, persons	2,97	6,29	5,51	5,22

Source: *UNESCO statistics.* Retrieved April 8, 2013, from http://stats.uis.unesco.org/unesco.

Data from Table 1 show that the largest number of employees in R & D is accounted in Russia - 442,263 people, and the lowest in Slovakia - 13,290 people. However, it has less to do with the scale of research. It depends on the quantity of the country's population. More than 150 million people live in Russia. Less than 5.5 million people lived in Slovakia in 2012. That's why; a more analytically loaded indicator is employed in this area per one million populations. Russia has been ranked the number three thousand to one million inhabitants, Slovakia - 2.4 thousand, Hungary - 2.0 thousand and Ukraine - only 1.4 thousand per million inhabitants. A similar arrangement of the countries can be observed in the indices of employment per thousand labor force and employed per thousand total employments.

Table 2 Structure of R & D employment by sector in Ukraine, Russia, Slovakia, Hungary in 2009, (%)

	Ukraine	**Russia**	**Slovakia**	**Hungary**
Entrepreneurship	37,3	48,9	12,4	44,7
Government organizations	51,8	33,1	20,8	24,6
Higher Education	10,8	17,6	66,8	-
Private for-profit organization	-	0,4	0,1	-

Source: *The strategy of innovative development of Ukraine in 2010-2020 in the Global Challenges.* Retrieved April 8, 2013, from http://kno.rada.gov.ua/komosviti/control/uk/publish/article?art_id=47920.

UN statistics allocate the following sectors: business, government agencies, institutions of higher education, private non-profit sector and uncertainties.

The indexes in the sector of uncertain organizations are absent, that's why this sector has not been indicated in the table. From table 2 we can see that 51.8% engaged in R & D are for government agencies in Ukraine. The business sector has 37.3% employees and higher education has almost 11%. The Russian transshipment employed in the business sector – 49%, to government agencies accounted for 33%, and in high school 17.6%. Less than half percent is engaged in R & D registered private non-profit organizations. The largest share is made in high school – almost 67% in Slovakia, in government organizations, business structures and private non-profit organization. As for Hungary, statistics shows only the business sector 44.7% and government organizations 24.6%.

Human resources have long been a priority subject for attention. According OECD, while human resources remain essential for knowledge-based economies, the skills and competencies required for innovation are broad and may be changing since innovation outputs and processes are characterized by diversity and heterogeneity. While the innovation process was traditionally viewed as relying on researchers inventing new products, this is only one part of the picture. Incremental innovation and the improvement of organizational efficiency and routines, for example, can come from a range of workers, not just managers, researchers' or external consultants, and rely on different skills and competencies. Some innovations clearly come from practitioners operating within communities of practice. Increasingly, innovation is also consumer-driven, and an open question is whether the growing importance of this trend is linked to the emergence of a more educated (and thus demanding) consumer population. Moreover, non-technological innovation (for example, new organizational methods, or marketing innovations) requires specialist skill-sets well beyond traditional science and engineering training. Innovation also involves the capacity to change or to retrain following the introduction of radically new products and processes.Analysis of innovation activities in developed countries shows the dependence of innovative activity from a scientific basis, which is formed in the country (Eurostat, 2006).

The groundless growth of postgraduate study, PhD study does not give positive effect in Ukraine. A huge number of post-graduate students (more than 33 thousand people) are inefficient, because of many reasons. For example, in Ukraine there is no proper scientific basis. In many universities, where the majority of future researches are concentrated, there are no any important research topics. Therefore, the result of their work is mostly the compilation of dissertation. Accordingly, there is very little practical importance of such work. There is low share of defended theses. Many of graduate students in the future are not engaged in scientific work (Sheverya, 2012).

An important indicator of scientific and technological innovation and development are the R & D expenditures, which are shown in table 3.

Table 3 Gross domestic expenditure on R & D in Ukraine, Russia, Slovakia and Hungary in 2009

	Ukraine	**Russia**	**Slovakia**	**Hungary**
Expenditures, thousands of USD	2 486 500	33 541 895	595 326	2 333 267

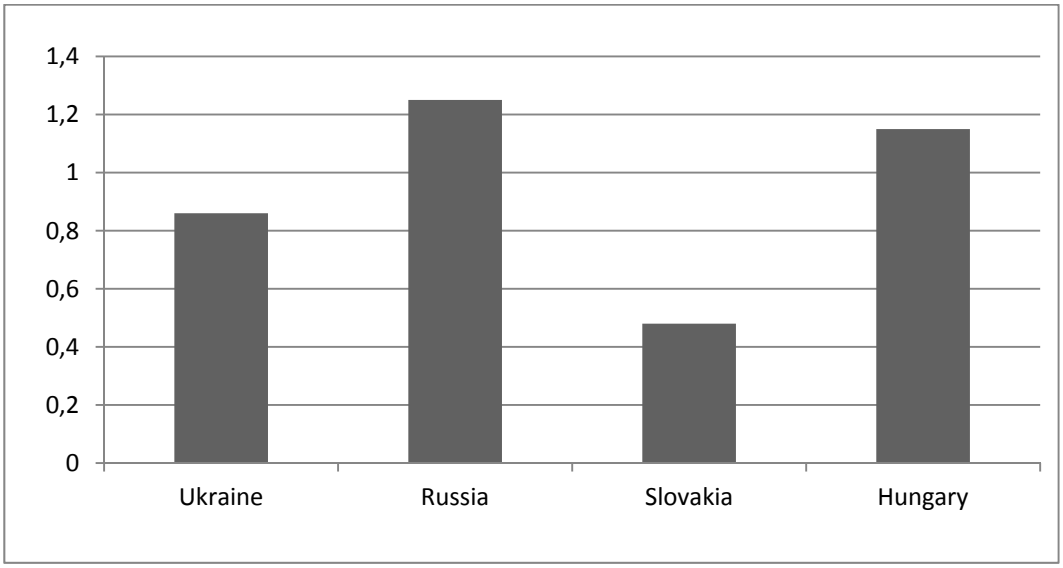
As a percent of GDP	0,86	1,25	0,48	1,15
Per capita, in USD	54,4	234,5	109,2	233,3

Source: *The strategy of innovative development of Ukraine in 2010-2020 in the Global Challenges.* Retrieved April 8, 2013, from http://kno.rada.gov.ua/komosviti/control/uk/publish/article?art_id=47920.

Russia has been spending the greatest amount of gross domestic expenditure on R & D $33.5 billion. Ukraine used $2.5 billion on research and development in 2009, Hungary - $2.3 billion, and Slovakia covered the costs of only $0.6 billion. So, Russia $234.5 is the leader in calculation of gross domestic expenditure on R & D per capita. Hungary - $233.3 behinds slightly. Slovakia spent $109.2 and only $ 54.4 per capita is in Ukraine.

An important index is the share R & D expenditure in the gross domestic product. This indication is shown on the figure 1.

Figure 1 Share R & D expenditure in the gross domestic product of Ukraine, Russia, Slovakia and Hungary in 2009



Source: Sheverya, M. (2012). System approaches to the factorization of strategic recourses. In Social and economical problems of the region in terms of innovation development: International conference, 27 April 2012 (pp. 158-162). Nizhnevartovst, Russia: NGTU.

The highest share of expenditure on R & D is in Russia - 1.25% of GDP, in Hungary - 1.15%, in Slovakia - 0.48%, in Ukraine - 0.86%.

As noted in the Strategy of Innovation Development of Ukraine Draft for 2010-2020, under globalization challenges, Ukraine received a legacy from Soviet period ineffective system of financing of Ukrainian science. Since independence the situation has not changed, remaining highly depended on public funds. However, there was a significant reduction of investment in science both from government and from business. The investments that invested in domestic science are very little. This reduces the opportunity of researches to realize functions effectively. To fulfill the function of

economical development, research needs must be financed at the level over 1.7% GDP (Eurostat, 2006).

By sector, costs are shown in table 4.

Table 4 Percentage of gross domestic expenditure by sector in Ukraine, Russia, Slovakia and Hungary in 2009, (%)

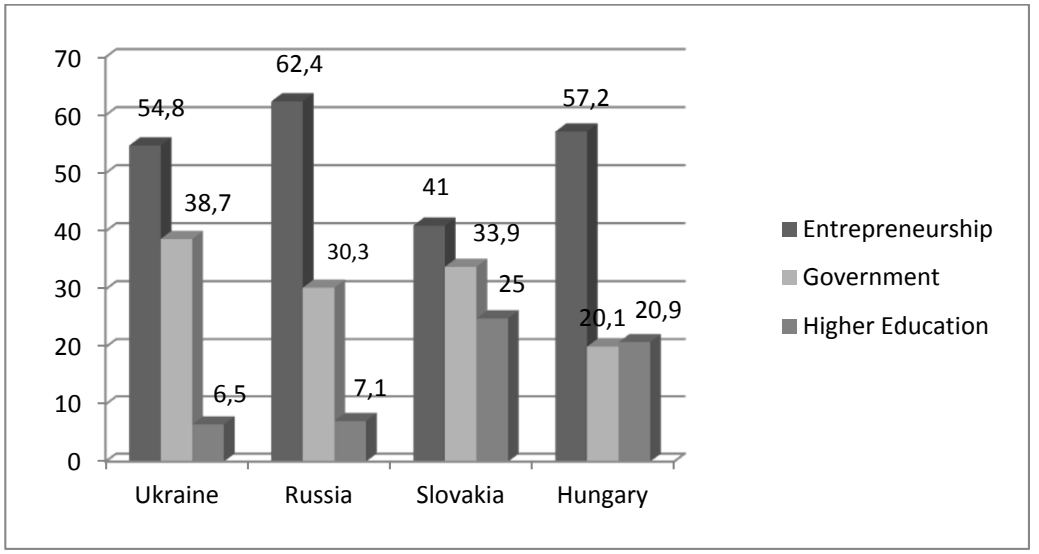
	Ukraine	Russia	Slovakia	Hungary
Entrepreneurship	54,8	62,4	41,0	57,2
Government organizations	38,7	30,3	33,9	20,1
Higher Education	6,5	7,1	25,0	20,9
Private nonprofit	-	0,2	-	-

Source: *The strategy of innovative development of Ukraine in 2010-2020 in the Global Challenges.* Retrieved April 8, 2013, from http://kno.rada.gov.ua/komosviti/control/uk/publish/article?art_id=47920.

Share of private commercial organizations is shown only in Russia - 0.2%. Comparing the data in table 4 and table 2 we can determine the following. Thus, the share of employed in R & D sector entrepreneurship in Ukraine is 37.3% and the share of the cost comes to almost 55%. 52% is employed in the government organizations employ and the share of costs in this sector is only 39%. There is underfunding of higher education. A number of R & D employees in the higher education sector are 10.8% in 2009, and the cost structure of the sector is only 6.5%.

The comparison of R & D expenditures in the countries analyzed are shown in figure 2.

Figure 2 Gross domestic expenditure on development activities by sectors during 2009, %



Source: Sheverya, M. (2012). System approaches to the factorization of strategic recourses. In Social and economical problems of the region in terms of innovation development: International conference, 27 April 2012 (pp. 158-162). Nizhnevartovst, Russia: NGTU.

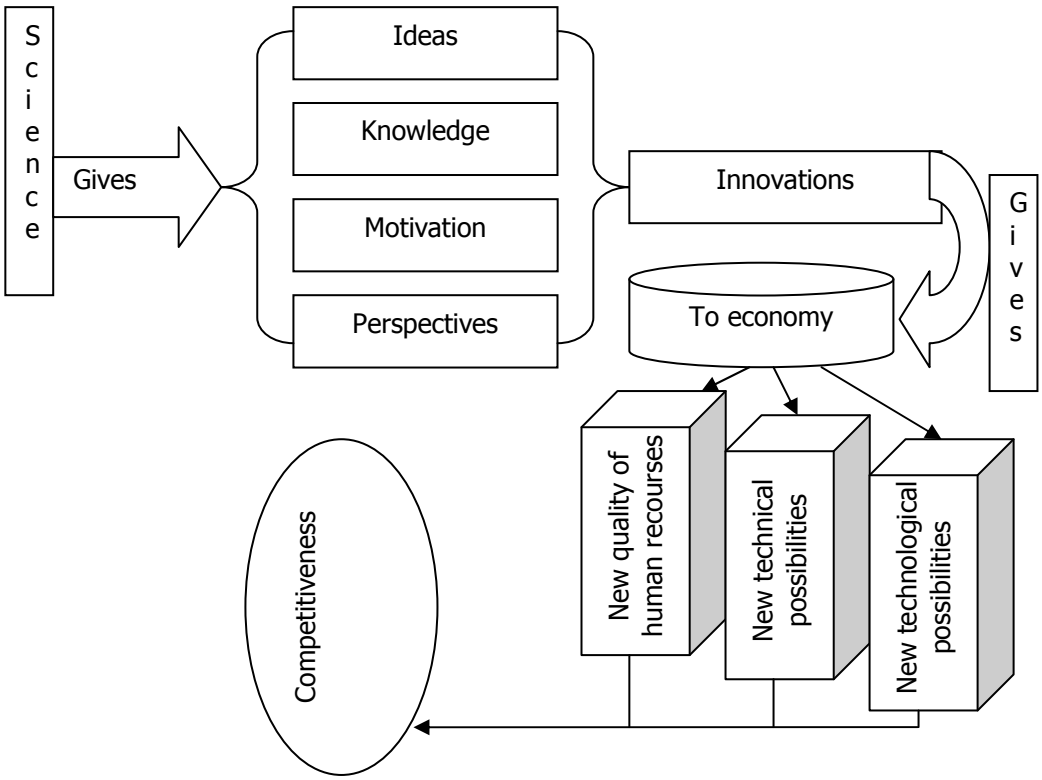
The analysis of figure 2 allows suggestions to increase the proportion of high school studies, in which science is combined with the educational process; students are involved in scientific research, which increases the level of training of scientific personnel in the country.

The analysis of statistic information, which if offered in previous materials and other resources, allows suggesting the following.

Developments in science and technology are fundamentally influence not only on the style of life in the society. It is the engine for new researches, which needs of new thinking style, new systems of communications, and new ways of knowledge exchanges and so on. To promote science researches countries should invest in quality education for youth, and continuous skills training for workers and managers.

Science and technology are key points and basic background to development, because new technological and scientific decisions support advances, improvements in health systems, education and infrastructure. As an engine of growth, the potential of science and technology is 1) endless, 2) constantly increasing. The science is influenced on technology and later on the economical competitiveness through the following links (picture 3).

Figure 3 The chain of science influence to innovations and national competitiveness



Source: *For immediate measures to enhance innovation activity in Ukraine.* Policy Brief. Retrieved April 8, 2013, from http://www.niss.gov.ua/articles/654/.

Computing for example, through unlocking infrastructure backlogs and managing integrated supply chains, can transform economic performance by enabling affordable and accessible services in education and healthcare. The combination of computers and the Internet, and mobile devices and the "cloud", has transformed human experience, empowering individuals through access to knowledge and markets, changing the relationship between citizens and those in authority.

The attention to science as the background of innovation activity is determined by the problems of cultural influence on the researches and through them – on the innovation. As C. Rusbult considers, the some cultural-personal influence is due to a desire for personal consistency between ideas, between actions, and between ideas and actions. For example, scientists are more likely to accept a scientific theory that is consistent with their metaphysical and ideological theories. All of cultural-personal factors vary in different areas of science and in communities within each area, and for different individuals, so the types and amounts of resulting influences (on the process of science and the content of science) vary widely. In each field of science, there are expectations (which can be influenced by cultural-personal factors) for the types of entities and actions that should (and should not) be included in a theory. These "expectations about components" can be explicit or implicit, due to scientists' beliefs about ontology (what exists in the world) or utility (what is useful in science) (Rusbult, 1997).

The public understanding of, and engagement with, science – in the sense of our ability to integrate the findings of the sciences within our overall worldview – is one in which the arts and humanities play an essential role. Arts and humanities research can help us answer questions such as:

- What are the nature, value and scope of scientific research?
- What roles do culture, imagination, argumentation, creativity, discovery and curiosity play in scientific enquiry?
- How might the arts and humanities engage with the sciences as systems of knowledge from the perspective of their cultural context, development and impact?
- How might such interaction enhance public engagement and educational approaches, and inform policy debates (Oecd)?

There are some problems of innovations, which can be solved with the help of science.

First, innovation is a fashionable term that has entered the development vocabulary in so many ways that it speaks to everything and nothing. Science can help transform innovation from sphere of fashion in the worldview, the culture of the people.

Second, innovation implies risk-taking. The science and researches give new methods of decision-making.

Third, innovation is a distinctive, intensive activity, and may be costly. The science gives a big number of opportunities to choose the cheapest or more expensive way of innovation development.

Fourth, particularly in the development context, innovation may be inefficient and represent poor value for money. The science allows the innovations to be viewed as tool, not master.

The discussion about thought styles influence on the science and innovation is very active. In discussion are offered the following conclusions: the activities in science, mental and physical, are affected by thought styles that are influenced by cultural-personal factors, operate at the levels of individuals and sub-communities and communities, and involve both conscious choices and unconscious assumptions. A collective thought style includes the shared beliefs, among a group of scientists, about "what should be done and how it should be done". Thought styles affect the types of theories generated and accepted, and the problems formulated, experiments done, and techniques for interpreting data. There are mutual influences between thought styles and the procedural "rules of the game" that are developed by a community of scientists, operating in a larger social context, to establish and maintain certain types of institutions and reward systems, styles of presentation, attitudes toward competition and cooperation, and relationships between science, technology and society. Decisions about which problem-solving projects to pursue – decisions (made by scientists and by societies) that are heavily influenced by thought styles – play a key role in the two-way interactions between society and science by determining the allocation of societal resources (for science as a whole, and for areas within science, and for individual projects) and the returns (to society) that may arise from investments in scientific research 6 (The strategy of innovative development of Ukraine in 2010-2020).

Except this, the science supports the formation of the innovation culture. It will be realized through the following:

1. Focus on outcomes in science must be the principle of innovation activity.
2. Develop reciprocal trust and collaboration between the members of innovation process (National Institute for Strategic Studies, 2012).
3. Challenge the status quo in science is the basic of challenge the status quo in innovations.
4. Be inspiring in science is to be inspiring in innovations.

The main cultural imperatives in science will be transferred on the innovation sphere and the society in the Ukraine.

The innovation culture will support creative class (Science in Culture), which is moving force of future progress.

Conclusions

The phenomenon of the spiritual life of society is science. The science is embodied in its material life. It is a special area of human activity, both theoretical and practical. The most important law of historical development of science - increase its role in the production and management. It is took place through innovations. The study reveals the following problems that hinder the development of the scientific sphere in Ukraine.

Firstly, the labor market for scientific personnel has not developed, which in the future will reduce the supply, and therefore, the training of scientists in Ukraine.

Secondly, there is a non-conformity between funding and employment in areas of research and development work. It is advisable to expand the business sector of re-

searches, which have a practical orientation and subordinate objectives of the commercialization of innovation in the economy of Ukraine.

Thirdly, there is a lack of funding of research areas, which necessitates increasing the share of expenditure on research and development to 1.7 percent of GDP in Ukraine.

Increasing the role of science in society has created its special status in modern innovation culture and new features of its interaction with various layers of social consciousness and practical activity.

This result gives opportunity to make the following proposals.

1. The government of Ukraine must pay more attention to the sphere of science to provide the place of Ukraine in the civilized, developed and innovation oriented world. The gross domestic expenders for science and development must be upper than the level in the technological leaders. It is connected with the gap, which must be overcome.
2. The increasing of the people potential in science sphere will be the basic for formation of the innovation culture in Ukraine. The creativity focused on development should be the basis for the formation of labor resources, which needs to make changes in educational system in Ukraine. The formation of the generation of the innovation-oriented people needs not only financial support, but also institutional changes in the country.

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