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## **THE INNOVATION SYSTEM IN UKRAINE: SOME ISSUES OF HI-TECH DEVELOPMENT**

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**Summary:** *The article considers the purpose and structure of C and we systematized method of analysis in four aspects. Also we developed a solution of the problem of the national innovation system in Ukraine in the following areas: financial support, institutional arrangements, legal regulation, and the main lines of educational potential. The authors elaborated the steps of the state for specified areas and identified the link between innovation system of Ukraine and the development of high-tech economy.*

**Keywords:** *Innovation, innovation systems, high-tech development, infrastructure, innovation policy, public sector, taxation, human capital, intellectual capital.*

### **1. INTRODUCTION**

The intensity of the global economic system at present depends on the efficiency of the processes of creation, development and utilization of high-tech products and technologies of its production. These processes are based on conducting the basic research, transforming them into concrete results of applied research and experimental development.

The problem of rational usage and reproduction of previously created potential high-tech industries remain relevant for a long time without finding a solution. Solving this problem is extremely important because degradation of the nucleus of Ukrainian industry related predictability effects of de-industrialization of the state.

### **2. THE STRUCTURE OF THE NATIONAL INNOVATION SYSTEM IN UKRAINE**

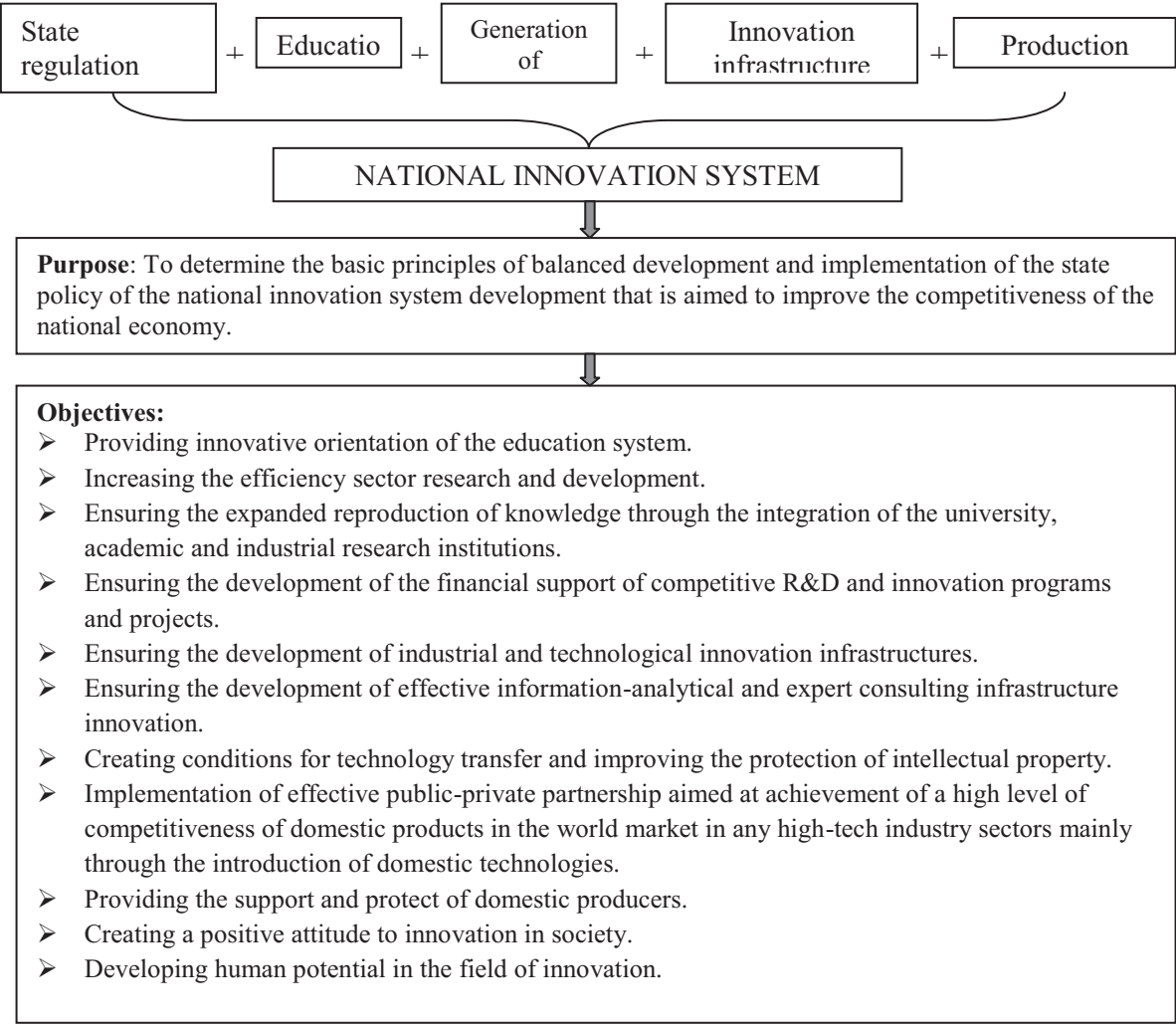
Ukraine is a quite big European country. There are 45.6 million people and 603.5 thousand km<sup>2</sup> in Ukraine. Nearly 1300 scientific organization including closely 140 thousands of employees are intellectual resource of implementation of innovations in industry.

The political decision about an innovation way of economy development of Ukraine is declared in the many official documents. In these documents, in particular, it is declared that growth of intellectual potential and scientific-technological innovations is to become a primary factor of sustainable development of Ukraine. It will allow achieving essential changes in output and quality both of production and consumption. The main task for Ukraine is to enter the range of technologically advanced states during the nearest decade. It means that Ukraine should apprehend key rules on which

the scientific-technological and innovation spheres are developing in the world and in Europe in the first place.

However, there are a number of unresolved problems in the sphere of scientific and technological potential. Among them, we can name a major discrepancy is the main task of transforming the structure of the economy, scientific and technological prospects, as outlined in the draft strategy of innovative development of Ukraine for 2010-2020 years under globalization challenges.

Concept of the national innovation system to 2025 year designed for neutralizing the impact of negative trends in the scientific and technological capabilities. Consider its goals and objectives (Figure 1).



**Figure 1:** Purpose of the national innovation system of Ukraine.

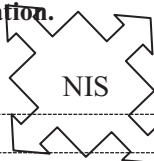
On the basis of analysis of innovation infrastructure there is an analysis that is primarily scientific and technological capabilities, combining capabilities and resources of the national economy for research and technological development. Scientific and technological potential of Ukraine provides world renowned scientific schools, unique achievements in many industrial and social spheres (new materials, electronics, biotechnology, low temperature physics, electrical, nuclear physics, computer science). Analysis of the formation, development and operation of the National Innovation System in Ukraine can be carried out in four main aspects: functional, financial, institutional, and legal (Figure 2).

**Functional aspect**

- The function of government innovation: I-II - development and implementation of innovation policy, III - regional innovation.
- Function Support and encourage scientists, inventors, companies, firms and business infrastructure innovation.
- Function scientific support of innovative development and training for innovative fields.
- Features information of Innovation Development
- The function of public support for the innovation.
- The function of international cooperation.

**The financial aspect**

1. Direct government funding for scientific-technical and innovation.
  - 1.1. Basic targeted funding organizations.
  - 1.2. Competitive funding:
    - 1.2.1. State scientific and technical programs in the priority areas of science and technology;
    - 1.2.2. State Foundation for Basic Research;
    - 1.2.3. Projects intergovernmental scientific and technical cooperation.
2. Indirect public funding of innovation.
  - 2.1. Benefits of the business innovation, enshrined by law.
  - 2.2. Mutual finance credit basis.
3. Initiative and innovative projects carried out by non-governmental organizations.



**Institutional aspects**

<b>I level</b>	<ol style="list-style-type: none"> <li>1. Verkhovna Rada of Ukraine.</li> <li>2. Committee on Science and Education. The device performs the functions of the office of the Committee.</li> <li>3. Subcommittee on Science, Subcommittee on innovation, Subcommittee on Intellectual Property Subcommittee on liberal education, research and information.</li> </ol>
<b>II level</b>	<ol style="list-style-type: none"> <li>1. Cabinet of Ministers of Ukraine.</li> <li>2. Central executive bodies (ministries and departments): State Agency for Investments and Innovations.</li> <li>3. Ukrainian State Innovation Company. Ministry of Education and Science. Department of innovation. National Centre for Scientific, Technical and innovative expertise. State Department of Intellectual Property. Department of Industrial Policy. Department of Science and Technology innovation and support. Ministry of Economy. Department of investment. State Committee for Statistics. Institute of Statistics. State Committee for Regulatory Policy and Entrepreneurship. Interdepartmental Commission for the provision of parks (with Vice Prime Minister on humanitarian issues).</li> </ol>
<b>III level</b>	<p>Local executive bodies: local (regional) council members. Standing Committee on Science and Education. Local (regional) administration. Management and departments of economy, science and innovation, regional development. Regional structure of state institutions. Research Center of the National Academy and the Ministry of Education and Science. The regional branch of the Ukrainian State Innovation Company. Infrastructure innovation: technology parks, innovation centers, business centers, business incubators.</p>

**Legal and economic aspects**

- CMU (Cabinet of Ministers of Ukraine) Resolution "On Approval of the Concept of National Innovation System"
- CMU Resolutions "On approval of the list of priority thematic areas of research and scientific and technological development for the period till 2015", "On the establishment and functioning in Ukraine parks and other types of innovative structures", "On Approval of the State Target Economic Program" "Development of innovation infrastructure in Ukraine for 2009-2013"
- Resolution of the Parliament: "The recommendations of the parliamentary hearings "The strategy of innovative development of Ukraine for 2010-2020 under globalization challenges", "The Concept of scientific, technological and innovation development of Ukraine. "
- Law of Ukraine "The innovation activity", "Priority directions of innovative activity in Ukraine", " Scientific and Technological Activities", "The scientific and technical expertise", " Basic Principles of the Information Society in Ukraine 2007-2015 ", " On special investment and innovation technology parks ", " On industrial parks, laws protecting intellectual property.
- Decree of the President of Ukraine "On Approval of the State Agency on Science, Innovations and Informatization of Ukraine."
- Economic Reform Program "Prosperous society, competitive economy, effective government."

**Figure 2:** Aspects of the analysis of national innovation of Ukraine

The results of the concept are primarily dependent on the integrity of its implementation, the relationship of all components of the system and focus.

Now Ukraine is ready for real market of innovation production providing. The role of the Government in such market organizing is certain technologies transfer managing. That means that technologies are created of cost of budget. Besides, the concept on venture financial system in Ukraine has been designed.

The major trends of forming the national market of innovative products are as follows:

- encouragement of regionalization of innovation policy, which would intern encourage the transfer of technologies and innovative products, development of regional innovation strategies, building up of technoparks, business hatcherers as well as other type innovation structures;
- creation of conditions for forming the scientific and industrial clusters;
- encouragement of phased formation of national network for commercialization of innovative products and transfer of technologies. The network has to cover primarily 2-3 and then 5-7 regional Centres of commercialization and transfer of innovative products and technologies in Kyiv, Donetsk, Kharkov, Dnepropetrovsk, Lvov, Odessa, and Simferopol. While forming the Ukrainian network, it is necessary to use the foreign experience at the most, in particular, of USA and other countries of far abroad as well as Russia and Belarus;
- execution of search and selection of the most current inventions of Ukrainian authors for their further commercialization and implementation in the economic circulation. With this purpose forming of database «Promising Ukrainian Inventions», which has to be continuously replenished;
- initiation of development of program on scientific and technological partnership between public organizations, academician, branch and college science sectors and the industry on the ground of state contracts or cooperative agreements to carry out works at all stages of innovative cycle. Such programs will found the base for forming a new system of partner cooperation between the state and private sector to develop and apply new technologies;
- encouragement of intermediary institution development and of preparation of technological managers for science-intensive economy sector.

Intermediary firms and technological brokers must render advisory services, including patent&license ones and to be responsible for the ultimate results of commercialization of innovative products and technologies.

## **2.1. The ways for problem solution of development national innovation system in Ukraine.**

### ***Financial Support***

To structurally transform the economy in compliance with the requirements of innovation model, it is necessary, primarily, to create a new *structure of the state order*, to strive for the high tech innovative production to occupy an adequate place in it, as well as it is reasonable to introduce a separate state order for innovative production.

Actual task is the creating a qualified audit of efficient spending of the public funds allocated in this respect.

*The steps of the state in the field of public sector human capital development:*

1. Funding from the state budget the formation of new industries, including high technology, based on state enterprises.
2. Diversification of funding sources and mechanisms, depending on the stages of the innovation process.
3. Using the most competitive investment vehicles research and innovation, the creation of research centres.
4. Public interest-free or concessional loans and grants.
5. Increasing the government orders for R&D and the industrial development of high technologies and products.
6. Purpose subsidies priority sectors or industries.
7. National Insurance of bank interest intending the investment in the technological innovation changes.
8. Financial incentives from the state budget of the leading research centres and researchers.
9. Compensation research institutions cost for improving the information security.

10. The formation of the ideology of innovation investment for the country as a promising and cost-effective for investors.
11. Creating the favourable conditions for co-financing of investment projects by domestic and foreign investors.

*The steps of the state in the tax area:*

1. Benefits of pay income tax: 50% of the income tax rate of profits from the sale of innovative products, the registration of the claimed innovation centres, 50% of the statutory income tax rate on income from the performance of innovative projects credited by taxpayers to fund innovation and the amount of tax Income from performing Technological parks projects in the priority areas included on the bill for funding of scientific and technological activities.
2. Benefits of pay land tax: 50% effective tax rate of innovative enterprises.
3. Benefits of pay VAT: VAT exemption on the value of basic research, R&D financed from the state budget, the cost of design work to be performed under the contracts with companies belonging to high-tech industries, the cost of imported goods in Ukraine Technological parks to meet innovative projects, the cost of imported certain goods in Ukraine to implement innovative projects credited to the account of the payer of VAT on transactions in the investment and innovation parks to finance scientific and technological activities, 50% VAT on the sale of goods (works and services) related to the implementation of innovative projects for funding payer innovation.
4. Benefits of pay taxes: the importations into Ukraine are exempt from import duty raw materials, machinery, equipment and components for using technoparks, their members, subsidiaries and joint ventures for innovative projects.
5. Accelerated depreciation of fixed assets innovative companies: annual rate of 20%.
6. Other tax incentives: for enterprises with foreign investment in priority sectors for investments exceeding a certain size or performance objectives of innovation activities, for the enterprise funds aimed at the development of high technology, research and development, the early stages of production of a new competitive products, to reduce energy and capacity resources and application of sanctions for producing the obsolete products and the using of inefficient resource and energy intensive and also environmentally hazardous technologies.

A powerful leverage of the state authority in the sphere of acceleration of the highest tech branches innovation development has to be realized as active *innovation funds* formed by direct budget investments and off-budget and personal contributions. Such funds (at public, sectional and regional levels) have to encourage the involvement of funds from the industrial and private sectors of economy in financing the innovation projects and programs. Matured becomes a need to involve pension and social security funds in financing innovations, including through venture structures as it is done in the world's developed countries.

A share of expenditure for SRWFB in Ukraine should be increased to reach 2,5% of GDP mainly at the expense of private sectors appropriations, further vertical and horizontal coordination of innovative policy; contribution of domestic share in financing the international SRWFB projects carried out under the EU programs.

### ***Organizational Measures***

The development of *innovative activity infrastructure* should directly support high tech production. This primarily includes a *modern system of scientific-technical information* which has to ensure not only the wide access to familiarization with new scientific and technological achievements, to patent information in all regions of the country but to enable the users to engage modern information technologies in the interests of development and optimization of their enterprises' activities. The establishment of national register of electronic information resources is also on the agenda.

The state has to provide the financing of large-scale forecast-analytical researches performed *to determine priority directions of scientific-technological and innovative activities*. It is necessary to involve not only the overall capacity of domestic scientific-technical potential in the researches of such kind but *capacities of Ukrainian representative offices abroad*.

It feels an exigency to found such entities of innovation infrastructure as centres of hire of modern instruments and devices, and of leasing of equipment.



The direct state support is required by establishment of *network innovation structures* on the base of cluster approach in the regions, which would foster the development of cooperation between enterprises, scientific organizations, financial institutions, administrative bodies technologically linked with each other.

Some attention is required by extension of *intellectual property protection infrastructure* which should include not only those bodies who issue relevant protecting documents but patent libraries and general public database which would enable domestic authors to search for patents at the modern level, patent courts etc. Patenting of inventions and production samples of domestic developers in the world's developed countries (*foreign patenting* and retaining of intellectual property rights in favour of Ukrainian developers and manufacturers) for them to emerge on the world market is taking special significance.

*The steps of the state in the field of institutional sphere:*

1. Ensuring projects venture investor: the development of markets and industries in increasing economy, the development of the stock market.
2. Increasing the "transparency" of Ukrainian corporations, promotion and support of innovation-related investments and loans.
3. Transparency of tax incentives for innovation.
4. Promoting the formation of small innovative enterprises.
5. Promoting the creation of financial-industrial groups with direction of resources to implement long-term innovation projects, construction of business centres.
6. Formation of a nationwide information network of special institutions, auditing, consulting firms and others.

*Referenced Legal Measures*

It can be said on the basis of developed countries experience that the innovation activity fosters the competitiveness of a country in the case where such points are legally regulated:

- favourable taxation of production entity funds aimed at mastering new technologies as well as costs of scientific researches and designs;
- introduction of favourable system of amortized deductions and investment loans, that is a reduction in income taxes for a certain part of total cost of investment in equipment (especially, at the stage of an entity upgrading);
- favourable taxation of innovative enterprises at initial stages of mastering by them new technologies and of organizing a new product manufacturing;
- introduction of the state insurance of private bank loans lend for implementation of innovation projects;
- the state support of venture entrepreneurship;
- financial participation of Ukraine in European scientific-technological programs.

It is important for Ukraine the harmonization of (elimination of controversies) provisions of effective legal and referenced acts and primarily, «Law on Scientific and Scientific-Technical Activities», «Law on Innovative Activity», «Law on Priorities of Innovative Activity in Ukraine», «Law on Special Regime of Innovation-Investment Activity of Technoparks».

The steps of the state in the regulatory sphere:

1. Improving legislation on copyright and patent relations.
2. The introduction of certification and standardization that encourages the consumption of innovative products and quality.
3. Regulatory limitations on the commodity sector.
4. Stimulating demand for domestic and foreign customers for domestic innovative products.
5. Control of the monopoly producers of innovative products and companies that implementing the innovative technology.
6. Ensuring the development of economy based on market principles, strategic planning for economic development.
7. Control of the rational use of all resources and national wealth.
8. Non-tariff regulation of export-import operations to the projects of domestic producers.
9. Improving the legal mechanisms of international technology transfer.

### *Major Guidelines of Education Potential Development*

To achieve within next few years a balance between the general secondary and vocational education level, this corresponds 12 years of studying and retaining of growing level tendencies in the education: to provide the conditions for every child of 8 years old being proficient in reading and all graduates from school – in computer literacy; coverage of studying the natural history and technical professions at higher educational institutions by up to 20% of young people under 24;

- forming of equal conditions for development of educational institutions of different forms of ownership. At that, a share of public educational institutions should be not less than 90%, which allows to gradually approximate to the ratio of the most developed countries of Europe;
- harmonization of levels of natural history and humanitarian studies in the curricula of educational institutions;
- optimization of higher scientific qualification staff training system;

To strengthen links between the education, science and production, to adjust an instrument for determination of optimal volumes and directions of the state order for staff training to comply with the labour market requirements.

To introduce the basic studies generating know ledge of innovative activity management in the curricula of higher educational establishments.

The steps of the state in the development of human capital:

1. Formation of innovation competencies in the population of youth for innovation in the economy and the formation of the prestige of scientific activity.
2. Supporting and development of education: general education institutions, universities, specialized vocational training, lifelong learning system and retraining of the workforce, training courses and profile management.
3. Formation and development of information infrastructure, access to the information networks, databases and libraries.
4. Increasing the effective demand end-use sector as a dynamic and responsive way to new standards of products and services.

## **2.2. Expected results of implementation of conception provisions**

Making of purposeful structural-functional changes to the economy has to result in fundamental change of state of all economic branches, inclusive of services sector and at the same time in increase of innovative factor in GDP growth. It should be not less than 35-40% of total GDP growth within the first five years.

To raise a level of innovative activity management, it should be constantly carried out:

- marketing of innovative products;
- innovation management;
- measure son intellectual property development, use and protection;
- management of innovation projects, programs;
- investment in innovation projects, programs;
- commercialization of results of scientific-technical designs.

To intensify the international cooperation in the innovation sphere, to:

- use the world practice of innovations commercialization, which covers the overall innovation cycle from fundamental researches to sales of finished products on the world market, inclusive of marketing science-intense goods and services;
- provide the support for entering Ukrainian innovation products the world markets with creation of friendly environment for growth in innovative activities of foreign establishments of Ukraine and application of advanced foreign technologies by Ukrainian industry, including those on the ground of foreign licenses;
- involve direct and portfolio investments in high-tech branches of Ukrainian economy as well as in development of domestic innovation system approaching the world standards;
- encourage the establishment innovative-technological and scientific research structures joint with foreign firms in the territory of Ukraine, primarily with participation of venture capital and private

investors as well as support the foundation of affiliates of Ukrainian scientific-technological and innovation firms abroad.

Financial, material and technical, labour resources required to implement the development conception have to be determined in a special purposeful Program.

The government stimulating of innovation through tax incentives without introducing incentives for efficient investment will further wastage of public funds and the gap between science and industry. While increasing consumer demands in domestic market and regulatory barriers to permanence properties of domestic products prevent the entry of Ukrainian producers to the world market. Therefore, without rising standardized requirements for innovative and high technology products should expect a further increasing in import products.

### 3. CONCLUSION

At the present stage of economic growth is the introduction of the most valuable achievements of science and technology into economic circulation. However, in Ukraine, high ratings scientific potential coexists with a low degree of its involvement in solving industrial problems.

Post-industrial society is formed using an innovative type of production, increasing production of high-tech products. Therefore, scientific and technical potential is very important for economically significant socio-economic growth. The purpose of scientific and technical potential is to ensure the effective using of social labour.

Thus, the modernization of the Ukrainian economy on the principles of innovation development should be accompanied by a comprehensive using of all available instruments of economic policy, avoiding conflict between them and the strategic and operational objectives. Only under these conditions, the strategy of innovative development of the country will become a real field for multi-faceted cooperation between business and government, increasing knowledge intensity of the national economy and the transformation of Ukraine on the path of economic growth.

### REFERENCES

- [1] Asheim, B. and Isaksen, A.: Regional Innovation Systems: The Integration of Local ‘Sticky’ and Global ‘Ubiquitous’ Knowledge. *Journal of Technology Transfer*, Vol. 27 (2002), pp. 77-86.
- [2] Braczyk, H.J.; Cooke, P. and Heidenreich, M.: *Regional Innovation Systems*. London: UCL Press, 1998.
- [3] Cooke, P.: Regional Innovation Systems, Clusters and the Knowledge Economy. *Industrial and Corporate Change*, Vol. 10, Issue 4 (2001), pp. 945-74.
- [4] Cooke, P.: Regional Innovation Systems: Competitive Regulation in the New Europe. *Geoforum*, Vol. 23 (1992), pp. 365-382.
- [5] Lundvall, B.: *National System of Innovation: Towards a Theory of Innovation and Interactive Learning*. London: Pinter, 1992.
- [6] Medvedkin, T.: Innovation Development of Ukraine in the Conditions of Technology Transfer and S&T Cooperation. *Journal of European Economy*, Vol. 7, No. 2 (June 2008), pp. 145-153.
- [7] Nelson, R.: *National Systems of Innovation: A Comparative Analysis*. Oxford: Oxford University Press, 1993.
- [8] Poruchnyk, A. and Brykova, I.: The Regional Innovation System as the Basis for Elevating the International Competitive Status of National Regions. Kyiv National Economic University (KNEU), 2006, pp. 130-169.
- [9] Yegorov, I.: Innovation Policy and Problems of Creation and Development of the National Innovation System in Ukraine. *Paper for the Second Session of the UNECE Team of Specialists on Innovation and Competitive Policies*, Geneva, Switzerland, 14-15 February 2008.