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INNOVATIONAL ECONOMY – KEY OF NATIONAL COMPETITIVENESS

Annotation. The article considers the concept of an innovational economy and reveals its features, its role in ensuring the national competitiveness of the country. In particular, the article discusses the theoretical aspects of the innovation economy, the national innovation system and innovation activity.

Key words: innovations, innovational economy, national innovation system, competitiveness, human capital, blocks of NIS, high technology, R&D.

Аннотация. В статье рассматривается концепция инновационной экономики и раскрывается ее особенности, роль в обеспечении национальной конкурентоспособности страны. В частности, в статье рассматриваются теоретические основы инновационной экономики, национальной инновационной системы и инновационной деятельности.

Ключевые слова: инновации, инновационная экономика, национальная инновационная система, конкурентоспособность, человеческий капитал, блоки НИС, высокие технологии, НИОКР.

Annotatsiya. Maqolada innovatsion iqtisodiyot konsepsiyasi, uning xususiyatlari, uning milliy raqobatbardoshligini ta'minlashdagi roli o'rganilgan. Xususan, innovatsion iqtisodiyotning nazariy jihatlari, milliy innovatsion tizim va innovatsion faoliyatning o'ziga xos xususiyatlari yoritib berilgan.

Kalit so'zlar: innovatsiyalar, innovatsion iqtisodiyot, milliy innovatsion tizim, raqobatbardoshlilik, inson kapitali, MIT bloklari, yuqori texnologiyalar, ITTKI.

Innovations and innovation based economy is considered as one of the modern trends in economics theory. The development of the latest technologies, implementation of scientific achievements into production process, globalization and integration tendencies in world economy are leading national economies to the innovative ways of acting. Hence, the theoretical and practical value of innovation based economy is becoming actual issue to be investigated.

Modern theory of innovation development was created by well-known Austrian economist Joseph Schumpeter and for the first time the word “innovation” was used by him. He argued that evolving institutions, entrepreneurs, and technological changes were at the heart of economic growth. But it is only in recent

years that "innovation economy," grounded in Schumpeter's ideas, has become a mainstream concept¹.

J. Schumpeter mentioned that “economic development is the increase of the level and quality of life, its reformation at the expense of great novelties-**innovations**, also accompanying medium and little useful novelties connected with patents and inventions².

Schumpeter's innovation concept covers the following five cases³:

1. The introduction of a new good – that is one with which consumers are not yet familiar – or a new quality of a good;

2. The introduction of a new method of production, that is one not yet tested by experience in the branch of manufacture concerned, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially;

3. The opening of a new market, that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before;

4. The conquest of a new source of supply or raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created;

5. The carrying out of the new organization of any industry, like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position.

Nowadays, modern specialists add innovations to social sphere and to other life activities into this classification.

In the second half of 20th century developed countries of the world created postindustrial society, in which the innovation sphere was dominant. This economy was called innovative, because innovations were created and used in all sectors and spheres of economy and life. Main driver of mass generation of innovations and formation of innovation economy became gathered high qualified and creative human capital. Innovation economy for the first time was founded in USA and famous American futurologist A. Toffler points its beginning from 1956⁴.

Innovation process itself is consists of several stages⁵:

¹ www.fastcompany.com/3005977/3-pillars-innovation-economy/Faisal_Hoque02.18.13

² Корчагин Ю. А. Человеческий капитал и инновационная экономика России. –Воронеж: ЦИРЭ, 2012.– 66-с.

³ Croitoru A. A review to a book that is 100 years old//Journal of comparative research in anthropology and sociology. –Bucharest, 2012.–Volume 3, № 2,–P. 137-148 (available at: <http://compaso.eu>)

⁴ Тоффлер Э. Третья волна. М.: АСТ, 2004.

⁵ Тўхлиев Н.Т. Глобаллашув жараёнида миллий иктисодиётларнинг инновацион ривожланиши муаммолари//Илмий-техник ва инновацион тараққиёт: глобал, минтақавий ва миллий иктисодий тенденциялар.:республика олий таълим муассасалариаро илмий-амалий конференцияси материаллари тўплами.– Т.:ТошДШИ, 2015.– 26-б.

1. Novelty, new idea, new knowledge that is the result of basic and practical scientific experiences, engineering development projects;
2. Implementation of the idea to the practical activity, commercialization;
3. Innovation diffusion that means spreading and using innovations in a new place and condition.

In microeconomic degree, innovation can be defined as the application of new ideas to the products, processes, or other aspects of the activities of a firm that lead to increased “value.” This “value” is defined in a broad way to include higher value added for the firm and also benefits to consumers or other firms. Two important definitions are:

- *Product innovation*: the introduction of a new product, or a significant qualitative change in an existing product.
- *Process innovation*: the introduction of a new process for making or delivering goods and services⁶.

In macroeconomic degree, innovation economy is considered as the economy of the country, where most of the organizations are occupied with innovation activity (production and usage of innovation product) and innovation product exceeds half of the whole production. In developed countries, nearly 60-80 percent of industrial enterprises and more than a half of service organizations are occupied with innovation activity⁷.

Modern economists give the following definitions to an innovation economy⁸:

- Innovation economy is the economy that is able to use any innovation that is useful for the society (patents, licenses, know-how, imported and own new technologies and etc.);
- Innovation economy is whole innovation system (infrastructure) in the country, which promote the realization of scientists` ideas and embodiment it into innovation product;
- Innovation economy is the economy that is capable to accumulate and multiply positive, constructive human capital and prevent accumulation of negative, destructive part of intelligent capital.

Innovation economics is based on two fundamental tenets. One is that the central goal of economic policy should be to spur higher productivity and greater innovation. Second, markets relying on price signals alone will not always be as effective as smart public-private partnerships in spurring higher productivity and

⁶ Greenhalgh Ch., Rogers M. Innovation, intellectual property, and economic growth.–Princeton: Princeton University Press, 2010. –.384 p. (Chapter 1 is available at: www.press.princeton.edu/titles/9221/html)

⁷ Корчагин Ю. А. Человеческий капитал и инновационная экономика России. –Воронеж: ЦИРЭ, 2012. – С.70

⁸ Above mentioned source.

greater innovation. Innovation economists believe that what primarily drives economic growth in today’s knowledge-based economy is not capital accumulation, as claimed by neoclassicists, but innovation⁹. Economics growth in innovation economics is the end-product of knowledge (tacit vs. codified), regimes and policies allowing for entrepreneurship and innovation (i.e., R&D expenditures, permits, licenses), technological spillovers and externalities between collaborative firms and systems of innovation that create innovative environments (i.e., clusters, agglomerations, metropolitan areas)^{10, 11}.

Theoretically innovation economy includes 6 main components¹²:

1. Education;
2. Science;
3. Human capital;
4. Innovation system that includes legislative base and material components of innovation economy (technology transferring centers, business-incubators, techno parks, technology towns, innovation centers, clusters, territories, venture business and etc.)
5. Innovation industry that realizes novelties;
6. Favorable environment for functioning of human capital, labor and life of innovators.

Human capital, being the most significant element of innovation economy, has always been central to economic development. It is a collection of resources all the knowledge, talents, skills, abilities, experience, intelligence, training, judgment and wisdom possessed individually and collectively by individuals in a population.

As economic activities are becoming more and more knowledge-intensive, there is an increasing demand for highly skilled people. Investments in knowledge, such as in research and development, education and training, and innovative work approaches are considered as the key to economic growth¹³. Knowledge flows are the glue of the innovation system.

It is possible classifying the components of the innovation economy into 4 groups (figure 1.1.1):

⁹ [www.theIngenesistProject/A Definition for Innovation Economics by Dan Roble on November 26, 2009](http://www.theIngenesistProject/A%20Definition%20for%20Innovation%20Economics%20by%20Dan%20Roble%20on%20November%2026,%202009)

¹⁰ Antonelli, C. The economics of innovation, new technologies, and structural change.– London: Routledge. 2003. –67-p.

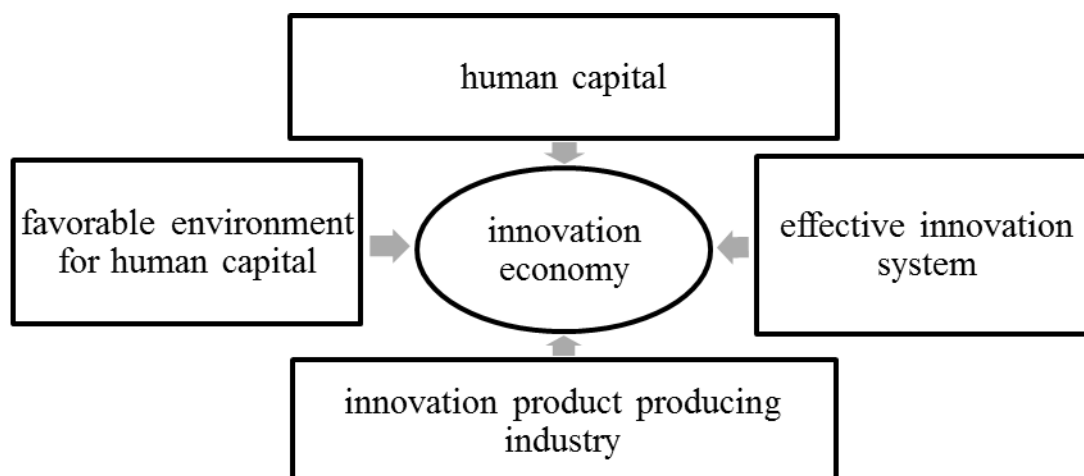
¹¹ Johnson B. (2008). Cities, systems of innovation and economic development//.Innovation: Management, Policy, and Practice.–Volume 10, № (2/3).–146-p.

¹² Корчагин Ю. А. Человеческий капитал и инновационная экономика России –. Воронеж: ЦИРЭ, 2012. – С. 73

¹³ National innovation systems. –Paris: OECD, 1997. –11-p.

Figure 1.1.1

The components of the innovation economy



Source: Корчагин Ю. А. Человеческий капитал и инновационная экономика России –Воронеж: ЦИРЭ, 2012. – С. 73

Furthermore, following indicators determine innovation economy's features too¹⁴:

- 4th - 6th techno-economic structures¹⁵ (4th techno-economic structures (production line, wired telephone connection, automobile industry, aircraft construction, petro chemistry); 5th techno-economic structures (microelectronics, informatics, bioengineering, genetic engineering, new types of energy, materials, space exploration, satellite communication, optic –fibre technique, robot industry) and 6th waves of innovation (Nano electronics, molecular and Nano photonics, biotechnology, Nano biotechnology, cognitive sciences, socio- humanitarian technologies);

- High index of economic freedom. In free economy it is a fundamental right of every human to control his or her own labor and property. In an economically free society, individuals are free to work, produce, consume and invest in any way they please, with that freedom protected by the state¹⁶;

- Competitiveness of the economy. Exactly the competition is considered as an engine of personality, economy, society and human capital, as the main factor of development¹⁷;

- Replacement of the capital. In innovation economy human capital replaces physical capital and this raises national wealth¹⁸;

¹⁴ Корчагин Ю.А. Современная экономика России. - Ростов-на-Дону: Феникс 2008.– С. 403

¹⁵ Лопатников Л.И. Технологические парадигмы//Экономическо-математический словарь: словарь современной экономической науки. 5^е издание.– М.:2003, – С. 520

¹⁶ “Frequently Asked Questions”. Index of Economic Freedom. 2009-01-25

¹⁷ Портер. М. Д. Конкуренция. Пер. с англ. М.: Вильямс, 2003.

¹⁸ Несторов Л., Аширова Г. Национальное богатство и человеческий капитал//Вопросы Экономики, РАН–М.: 2003,.– №2. (available at: www.historyofeconomics.narod.ru/16.09.02-23.06.03)

- Initiation of the new market. In new markets of ideas, developments, intellectual property, innovation goods old structures of the economy are replaced and moved to a new quality;
- markets diversity principle (market of innovation products, services, proposals, supply and demand, intellectual property, intellectual labor, knowledge and ideas, innovative scientific organizations, business angels and others);
- Demand for innovations;
- Excess of the innovations.

Also, it is important to pay a great deal of attention to venture scientific-technical and technological business. This business is directed to the realization of scientific discoveries, inventions, large scale and medium sized technologic innovations. In terms of entrepreneurship this activity goals getting high profit. In the term of development process it is directed to the creation of breakthrough innovation and new powerful companies- leaders in world high technology market.

The global innovation economy is primarily driven by ideas, and is different than the industrial economy of the past (figure 1.1.2).

Figure 1.1.2

Differences between industrial and innovation economy

	INDUSTRIAL ECONOMY	INNOVATION ECONOMY
RAW MATERIALS	Natural Resources, Labor: Capital	Ideas
CUSTOMER FOCUS	Mass Production	Mass customization based on information technology and product design
ORGANIZATION	Large Corporations, Economies of Scale	Entrepreneurs, Small Scale, Free Agents, Networks
SUCCESS FACTOR	Labor; Quality; Low Cost Stability; Control	Talent Speed, Innovation Flexibility; Customization

Source: The innovation driven economic development model. A practical guide for the regional innovation broker. Collaborative Economics.– California, 2008.–5-p. (available at: www.InnovateCalifornia.com)

Dr. William F. Miller of Stanford University has outlined a new world business structure that is characterized by global sourcing and distributing, extensive direct foreign investment, and the development of technology and industry clusters. And he contrasts two types of globalism:

- Old globalism -based on the search for low factor costs where international businesses invested in regions with low-cost land and labor to serve as export platforms to produce high-volume commodity products

- New globalism - based on the search for the best locations to host high-value, specialized, and innovation-related activities where businesses invest in regions to gain access to specialized workforces, research and development and commercialization capacity, innovation networks, and unique business infrastructure¹⁹.

In order to elaborate innovation economy and stimulate the process of the formation of the new markets, it is necessary to create special innovation infrastructure and institutions that support innovation processes. Here, national innovation systems of the countries become a decisive factor. The national innovation system means the flow of technology and information among people, enterprises and institutions and it spurs innovative process on the national level.

Economists give different, but originally similar definitions for a national innovation system:

- NIS is the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies²⁰;

- NIS is the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge ... and are either located within or rooted inside the borders of a nation state²¹;

- NIS is a set of institutions whose interactions determine the innovative performance of national firms²²;

- NIS is the national institutions, their incentive structures and their competencies, that determine the rate and direction of technological learning (or the volume and composition of change generating activities) in a country²³;

- NIS is set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and

¹⁹ The innovation driven economic development model. A practical guide for the regional innovation broker. Collaborative Economics.–California, 2008.–6-p. (available at: www.InnovateCalifornia.com)

²⁰ Freeman C. The National System of Innovation in Historical Perspective//Cambridge Journal of Economics.–Cambridge, 1995. – No. 19.P. 5-24

²¹ Lundvall, B.A. National Innovation Systems: Towards a Theory of Innovation and Interactive Learning. –London: Pinter, 1992. –45- p.

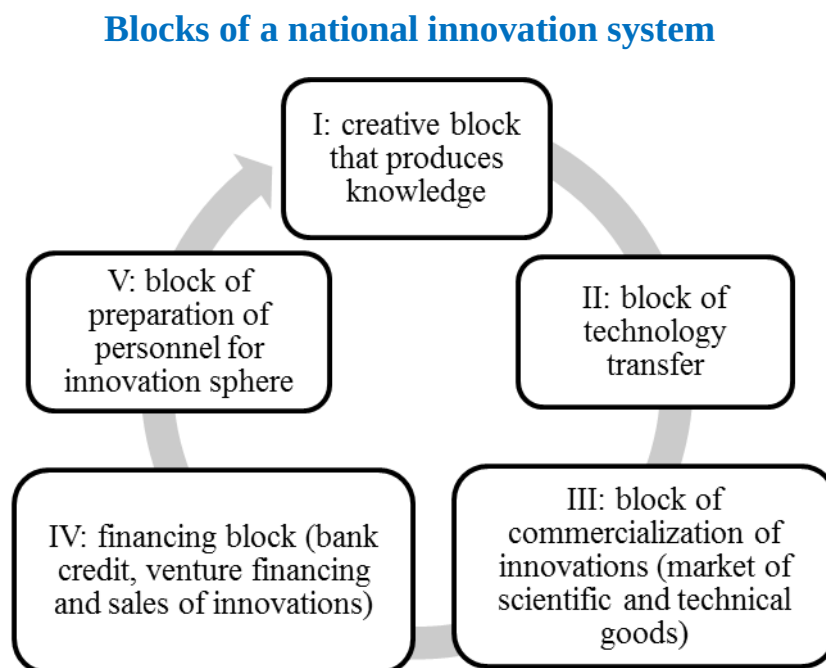
²² Nelson, R. National innovation systems. A comparative analysis. –New York: Oxford University Press, 1993. – P. 102

²³ Patel, P and Pavitt L. The Nature and Economic Importance of National Innovation Systems//STI Review– OECD: Paris, 1994.– №. 14

transfer the knowledge, skills and artifacts which define new technologies²⁴.

Since the early 1990s the concept of a national system of innovation has been introduced, developed and used for policy analysis of the innovative performance of an economy. Researchers highlight 5 blocks of a national innovation system (figure 1.1.3):

Figure 1.1.3



Source: Камилова М.Х., Ходжаева К.А. Модернизация экономики Узбекистана: формирование национальной инновационной системы. (available at: www.ukros.ru>2013/03>камилова_ходжаева)

All these blocks closely function in a certain normative-legal base and generate modern structure of national innovation system.

Initial insights had to do with the importance of different types of institutions in the nation innovation system, and that in particular innovative activities linked a firm to many other types of agents:

- universities;
- R&D institutes;
- consultants;
- legal institutions;
- marketing agencies;
- suppliers, consumers and so on.

With regard to innovation, these links operate essentially through knowledge flows. Researchers now emphasize the centrality of knowledge in the innovative

²⁴ Metcalfe, S. The Economic Foundations of Technology Policy: Equilibrium and Evolutionary Perspectives. Handbook of the economics of innovation and technological change. – Blackwell Oxford, 1995

process, and in the innovation performance of an economy. A widely diffused minor innovation will have a much bigger impact than a dramatic knowledge advance that is kept secret. This implies an important place for distribution or diffusion in the understanding of the workings of an innovation system²⁵.

Nowadays, there is no universal practice of forming national innovation system. But, experts highlight euro Atlantic, eastern Asia model and the model of developing countries. The development of all models bases to the below mentioned conditions²⁶:

- sufficient level of economic development that is defined by GDP and GDP per capita, that permits appropriate funds for financing innovation system;
- technological and innovation potential that is sufficient for forming and developing national innovation system;
- presence of innovation development oriented institutions;
- demand of households for innovations and receptivity to innovations in this socio-economic system.

One very important point in innovation system is financing the innovation activity. Under the financing the innovation activity we understand receiving necessary financial resources in order to transform ideas and knowledge into final product and introduction them into practical activity. According to the source of financing innovation activity economists differentiate two types: state financing and private financing.

For the embodiment of innovation project it is necessary financing it in each stage of life-cycle of innovation. Thus, there are four types of innovation expenditures²⁷:

- Research and development (conducting basic and applied researches, experimental-design works and creation of final product ready to the introduction to the market);
- Productive (producing the first part of the ready product, expansion of production and its assortment, modernization of the fixed assets and insertion of new production processes);
- Marketing (diffusion of the innovations and implementation of it into practical activity)
- Liquidation expenditures.

²⁵ Cowan R. and Gert van de Paal. Innovation policy in a knowledge-based economy. The Commission of the European Communities, Luxembourg. –ECSC-EC-EAEC:Brussels-Luxembourg, 2000.– 21-p.

²⁶ Камилова М.Х., Ходжаева К.А. Модернизация экономики Узбекистана: формирование национальной инновационной системы. (available at: www.ukros.ru>2013/03>камилова_ходжаева)

²⁷ Купричев М. А. Анализ системы финансирования инновационной деятельности в России// Политематический журнал научных публикаций “Дискуссия”. – Екатеринбург, 2013. №3 (33) (available at: www.journal-discussion.ru>publication)

The creation of the normative and legal base that would control the relations in this sphere is regarded as the most significant task of the government. Also, national innovation system policy should ensure conditions that promote innovation and entrepreneurship in the private sector, leverage the digital economy in a way that boosts government services and makes agencies more efficient and effective, enhance digital infrastructure and providing data that allow the proper measurement of the innovation economy and lay the foundation for a strong, educated, and innovative workforce²⁸.

In order to encourage innovation economy, some of foreign economists give the following proposals²⁹:

- using better metrics for measuring worker productivity. Past approaches based on worker hours or total employees in relation to Gross Domestic Product (GDP) ignore the transformational nature of digital technology;
- encouraging entrepreneurship by expanding small business administration credit for startups, adding entrepreneurial skills to school curricula;
- rising government`s innovativeness and collaboration, new approaches to service delivery, transparency, and participation. This includes placing more data online and employing data analytical tools, social media, mobile technology, and search results that improve decision-making;
- strengthening infrastructure by investing in broadband, data centers, and mobile cell towers, and improving access to spectrum for wireless applications;
- protecting vital digital assets, developing procedures for monitoring threats to critical infrastructure;
- improving knowledge transmission through faster adoption of digital textbooks, more widespread use of creative commons licenses for instructional materials;
- increasing technology transfer and the commercialization of knowledge from universities and local laboratories so that public and private investments translate into jobs and economic activity as well as better health, security, and well-being;
- harmonizing cross-border laws to promote global innovation and freedom of expression.

To sum up all mentioned above, it could be said that innovation economy which is a new tendency in world economy is considered to be the next stage of development. The concept of innovations and innovation driven economy which was

²⁸ West D., Friedman A., and Valdivia W. Building an innovation-based economy. Governance Studies at Brookings, – November 2012.– 1-p.

²⁹ Above mentioned source.

created by J. Schumpeter has reached its importance in our days. Innovation based economy is the sum of human capital and research, institutions' effectiveness, infrastructure, market and business sophistication, knowledge and technology outputs. It is an economic system where knowledge, creativeness of scientists and inventors perform as the main resource of socio-economic development. Each country's innovation policy acts according to its national innovation system, main directions of which are formed by the government and supported by private sector. National innovation system determines how innovative the country is and if it can compete in world economy.

Only the countries, which have implemented the theoretical principles of innovation economy into practice, created favorable innovation environment would take the advantage of others. Government and private collaboration in the sphere of financing and supporting the fundamental sciences, patents and inventions will lead to the long-term development.