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Zh.S. Utegenova

L.N. Gumilyov Eurasian National University, Astana, Kazakhstan
(E-mail: juldyz_kokshe@mail.ru)

Enhancing innovation capacity as a key factor of innovative breakthrough

Prevailing recent global economic trends prove the fact that all the advanced countries of the world are on an innovative path of development that allows them to maintain their economic and political domination. Moreover, among the world's leaders are joining more and more new countries from developing, have achieved leading economic growth rates due to the high innovativeness of their national economies. In this regard, the formation of a new, improved model of management of innovative development of the Republic of Kazakhstan can most effectively and quickly ensure the stable development of the economy faster pace. The changing context for innovative development has highlighted a strong need to understand and adopt innovation systems thinking. Science, technology and innovation policy has equated countries development to innovative development. The main objective of this paper was to examine the role of innovation capacity in a whole innovational sector. Also the paper is to review and to describe, innovation system and state innovation policy so it deals with the problems of innovation activity, increase innovation capacity and presents proposals to improve the whole country's innovation development.

Keywords: innovation, innovation capacity, innovation management, innovative development, knowledge-based economy, research and development, gross national product, investment resources, services, technologies.

A knowledge-based economy in our country is one of the key priorities set by the President of the Republic of Kazakhstan Nursultan Nazarbayev Strategy "Kazakhstan-2050" [1]. Current long-term goal promote the trends observed in the modern world, which at this stage has amassed sufficient scientific, technical and socio-economic potential for transition to a new technological order. Today it is possible to outline the most important components of the knowledge-based economy:

1. The main sources of the growth factor and the knowledge-based economy are the new knowledge and innovation embodied in new products and services, as well as in advanced technologies. A considerable part of the GNP of developed countries is formed by the innovation sector, which not only develops dynamically, but also provides a flow of billions of dollars of revenue through the sale of outside innovation, education and consulting.

2. The generation and commercialization of research works integrated national innovation system conducive to continuity of innovation development of economy. The main elements of the innovation infrastructure are the universities and research institutions in cooperation with business, including transnational corporations.

3. Successful development of an innovative economy is provided accordingly formed an institutional structure that combines government regulation and competitive market forces. As a rule the main methods of state management of innovation processes aimed at creating a competitive environment for scientists, inventors and entrepreneurs as well as for domestic business, in order to awaken their innovative interests. Very important aspect of the knowledge economy is the protection of intellectual property rights and the possibility of its inclusion in commercial circulation.

Implementation of an integrated and more flexible management of innovation processes in the system primarily focused on the development of promising products, as well as the restructuring of the administrative functions of innovation management, organizational forms and methods of management. This mechanism provides that the departments and services involved in innovations, distributed across all levels of the management structure, and between them is active established system of coordination and cooperation.

As the object of the paper relied to human resources, effective management of innovation depends on close system of coordination and cooperation. The innovation capacity of communities is strongly related to their capacity to use their traditional knowledge for innovative practical solutions for everyday life problems. Hence, to foster local innovation it is important to understand the particularities of how knowledge is generated and transmitted.

As noted B.S. Tolysbaev and E.G. Skibitskiy, development and implementation of human capital development strategy promotes the formation of the team in which the level of competence, motivation and trust provides support and actively promote the changes accompanying the innovations of any kind [2].

Innovation capacity typically combines technical, institutional, organizational, and other sorts of change. Its broad features include a combination of: (1) scientific, entrepreneurial, managerial, and other skills and knowledge; (2) partnerships, alliances, and networks linking different sources of knowledge and different areas of social and economic activity; (3) routines, organizational culture, and traditional practices that pattern the propensity to innovate; (4) an ability for continuously learning how to use knowledge more effectively; and (5) clusters of supportive policies and other incentives, governance structures, and the nature of the policy process [3].

An innovative economy is due to stage the preservation and development of the achievements of the previous stages at a higher level. At the same time information and knowledge are the tools and objects of labor for creative thinking. New ideas with great social and economic impact, as a rule, are the result of manifestation of creativity in thinking. In today's world the economy is largely formed under the influence of global technological shifts, from which including Kazakhstan can not remain on the sidelines. According to Kazakh scientists F.M. Dnishev and F.G. Alzhanova, the challenges of today's technological structure identified timeliness and relevance of applications in the field of management of Kazakhstan model of innovational development, which are as follows:

– An increase in the scope and intensity of the acceleration of the international exchange of knowledge and technology has led to the concept of "tehnoglobalizm";

– The role of external factors, technological development of any national economy strengthened;

– An important element of global economic relations is becoming a multi-country transfers (transfer) technology;

– In its most active part - trade in patents and licenses - it is growing in recent years, much faster than the normal turnover of international trade;

– Practice of co-operation spread widely, in which research and development can be accommodated in one country, production - in other sales - in the third, and management company based in the fourth;

– Technological advances, especially in such areas as information and communication technology, biotechnology and nanotechnology, have greatly expanded the possibility of solving problems of economic development, welfare and quality of life, environmental protection;

– Globalization opens up new ways to overcome the global digital divide, more countries get wide channels of access to new technologies and their application;

– The geography of technological development, a group of technology leaders including only industrialized countries, starts to enter a number of developing countries around the world, new centers and network technology development;

– Building global production chains, global migration centers of industrial production and the subsequent movement of these R & D centers determines the development of global innovation and technology sector;

– The main driving force behind these changes are the transnational corporations [4; 4].

The national innovative capacity framework draws on three distinct areas of prior research: ideas-driven endogenous growth theory [5], the cluster-based theory of national industrial competitive advantage [6], and research on national innovation systems [7]. Each of these perspectives identifies country-specific factors that determine the flow of innovation. These theories share a number of common analytical elements, but differ with respect to their levels of abstraction and the factors they emphasize. Whereas endogenous growth theory operates at a high level of abstraction, focusing on the economy-wide “knowledge stock” and the size of the R&D labor pool, the other two perspectives emphasize more nuanced determinants. For example, Porter highlights the microeconomic underpinnings of innovation in national industrial clusters (including the interaction between input supply and local demand conditions, the presence and orientation of related and supporting industries, and the nature and intensity of local rivalry), while the national innovation systems literature emphasizes the role of the overall national policy environment (e.g. IP or trade policy), higher education, and country-specific institutions (e.g. the funding approaches of specific agencies).

Public policy plays an important role in shaping a country’s national innovative capacity. Beyond simply increasing the level of R&D resources available to the economy, other policy choices shape human capital investment, innovation incentives, cluster circumstances, and the quality of linkages.

Since Kazakhstan has identified the development of an innovative economy as the most important strategic goal for quite some time, then at this stage we can appreciate some of the results of the state innovation policy.

Firstly, with the implementation of the Strategy of Industrial and Innovation Development of Kazakhstan in the country began to form elements of the innovation infrastructure. Actually in the regions began to raise innovative activity of enterprises. Today in Kazakhstan started working 8 industrial parks, 5 national and 15 regional laboratories, 6 venture capital funds. Created 3 design offices and plans to create another 2: Transport Engineering (Astana) and mining equipment (Ust-Kamenogorsk), the oil and gas equipment (Petropavlovsk), agricultural machine (Kokshetau), instrumentation (Almaty) [8].

Secondly, the legal basis for the development of innovative processes in the country was the Law of RK of 2006 "On state support of innovation", which in 2009 was amended, extending the powers of such development institutions as "Centre of Engineering and Technology Transfer" JSC, "Science Foundation" JSC, "KazAgroInnovatsiya", JSC and "National Innovation Fund" JSC. With the development of innovative processes in Kazakhstan and the need to address new challenges in the development of innovations there was adopted a Law of RK "On state support of industrial innovation" in January 2012. It aims to establish the legal, economic and organizational framework to stimulate industrial innovation activities and determine the measures of the state support. Particularly, the new legislation is designed to stimulate the subjects of industrial innovation for the development of national high-tech and competitive industries and their export potential. Also this law specifies the competence and authority of the government and other authorized bodies and subjects of innovative activity. It is noteworthy that in addition to the authorized bodies such as the National Institutes of state planning and development the new law prescribes the competence of regional executive bodies in the sphere of industrial-innovative development. Cause of the need to get results from innovation, the new law not only refined elements of industrial innovation infrastructure and their functions, but also called financial instruments and institutional mechanisms of state support for innovation. Thus, in Kazakhstan there are elements of the legislative framework for the systematic implementation of all stages of innovation and measures of the state support as well as legal and regulatory framework governing the conditions for the creation of innovative enterprises and the relationship between the subjects of innovation infrastructure.

Thirdly, the purpose of formation of national innovation system and market-type development of a competitive market knowledge transformation initiated leading universities in research universities. The presence of such universities helps to concentrate financial, material and human resources to address major scientific and technical problems. Therefore, according to the new Law of RK "On Science" and amendments to the Law "On Education" in the country began to develop these types of higher education institutions as a national research university, research university. Research universities are called to implement the Government of Kazakhstan approved development program for five years and also have the opportunity to develop educational curricula based on the results of fundamental and applied research to the generation and transfer of new knowledge.

Essential mechanism for the formation of innovation infrastructure in Kazakhstan became legally allow the creation of innovative educational consortia - voluntary peer associations acting on the basis of agreement on joint activities in which higher education institutions, research organizations, and other entities engaged in the production; combine intellectual, financial and other resources to the training of highly qualified specialists on the basis of fundamental and applied research and technological innovation. Innovative and educational consortia in the future will allow integrating education, science and industry through the creation of universities around the area of research organizations, providing educational process of new knowledge.

Fourthly, a significant step in the development of the national innovation system is embedded in the new Law of RK "On Science" model of governance in research activities, which increases the role of scientists in decision-making, eliminated unnecessary bureaucratic units and shared strategic, administrative and expert functions. For this, significantly expanded the powers of the Higher Science and Technology Commission of the Government of the Republic of Kazakhstan, where the leading scientists of the country are conducted and which is identified as priorities for the development of science, and the direction of its funding. National Science Council created by industry knowledge and formed from among local and foreign scientists, designed to occupy a key place in the final decision-making on the implementation of specific research projects and programs. In this decision the National Research Council is binding on the competent authorities - the Ministry of Education and Science, other ministries coordinating research: health, agriculture, etc. The role of the scientific and technical expertise at the National Center of State Scientific and technical expertise (NCSSTE) is vital because it presents results directly the National Research Council. Also in the new Law of RK "On Science" identified new mechanism for funding research. Now it takes place in three forms: grants, basic and target-oriented [9].

Despite a series of taken unprecedented measures in Kazakhstan on the way to the knowledge economy, author would like to highlight some of the systemic failings in the management of innovation which have been identified by experts of the European Economic Commission and reflected in the overview of innovative development of Kazakhstan in 2015. In particular, managerial barriers are the following:

- Vertical innovation management: initiated "from above" state with weak horizontal links between the elements of innovation infrastructure;
- Low commercial orientation of public research segments;
- Underdeveloped scientific base and human resources, their fragmentation and duplication of research;
- The generation of new knowledge structurally and functionally separated from the processes of commercialization and deployment into production, then there is no connection between integration stages of the life cycle of innovation;
- The business has no interest in innovation as in the national economy prevails role of sectors with a low science intensity (resource sector) with a relatively high yield;
- Regional and sectored mismatch management of innovation processes.

The basis of failures in the management of innovation according to analysts is traced key reason: keep vertical management structures at low demand for innovation from the business, not stimulated competition. There was not actually made a qualitative transition to market mechanisms of creation and development of innovations that are objective driving forces of innovative development companies. Thus, an innovative initiative «from above» of the state is unclaimed by "bottom" companies and consumers.

In addition to the lack of objective competitive forces to enhance innovation in the country, there are administrative errors in the implementation of each stage of the life cycle of innovation, which is known, in its traditional model comprises the steps of generating ideas, fundamental and applied research, experimental development and commercialization of innovations with subsequent transition to commercial development. In fact, a more detailed study of the practice of innovative development of Kazakhstan classical management functions containing such basic elements as planning, organization, control, motivation, regulation and coordination at every stage of the life cycle of innovation is not being fully realized. If generating the ideas can be traced functions of planning, organization and control, the function of motivation, management and coordination implemented poorly. For example, there are still no clear legal mechanisms for the protection and inclusion of intellectual property in economic turnover. Also there are duplicated directions and subjects of scientific research institutes and universities scattered on the rising personnel "famine".

If you move to the analysis of the existing processes of innovation management in our country at the macro level, it can be stated that the functions of planning, organization, management and coordination of all phases of the life cycle of innovation divided between two key ministries: Education and Industrial development and carried out in parallel with other industry ministries. With this control, oddly enough, is not specifically attached to any particular government agency, as well as, respectively, blurred responsibility for the results of innovation. Who (which organization or entity) to whom (or what organizational structure) is responsible for the failed or implemented innovative projects? A special place in this whole mess occupies processes of innovation financing that are carried out by various funds and development again with uncertain liability for the results.

In the planned economy, as we know, there was a logical completeness vertically organized management structure and the "fulfillment of the state plan was the law" with all functioning measures of control and responsibility. Today symbiosis of state innovation initiatives in conjunction with the lack of entrepreneurial dynamism demonstrates errors in the management of innovation processes which do not implement the elements of innovation infrastructure as coordination, control, responsibility, motivation and communication. One of the prevalent point of view is that necessary to ensure the development of new high-tech and knowledge-intensive industries due to poly-ticks "Raw in exchange for the introduction of new technologies" [10; 82].

Each of the above components of innovation management provides the necessary result of the whole managed process, so the absence or neglect of one of the elements not only violates the integrity of the management system but also leads to unexpected results. These results are surprising because the innovation process associated with specific factors such as:

- Spontaneous formation of new knowledge;
- Lack of information about the opportunities and risks of implementation and application of innovation;

- The need for long-term investment resources.

With the transition of developed countries to the post-stage of industrial development the above factors are complemented by such features as:

- Availability of vast amounts of knowledge and information;
- Rapid technological change (shortening technologies life period);
- Wide spread of information technology in all spheres of public life;
- High level of complexity of innovation that requires highly skilled personnel.

This paper introduces the concept of national innovative capacity to integrate previous perspectives on the sources of differences in the intensity of innovation and R&D productivity. Our results suggest that the empirical determinants of international patenting activity are: (a) amenable to systematic empirical analysis motivated by our framework and (b) more nuanced than the limited factors highlighted by ideas-driven growth theory. We find that a set of additional factors also plays an important role in realized R&D productivity. Further theoretical and empirical research in growth theory may benefit from incorporating the role of industrial organization and the national policy environment (e.g. the role of the university system or incentives provided for innovation). Country-level R&D intensity and productivity seem to be amenable to quantitative analysis (though with some caveats), a finding that should be of particular interest to researchers in the tradition of the national innovation systems literature. In particular, future research can usefully distinguish between those phenomena that are reflected in observable measures of innovative output and those with more subtle effects that may not be subject to direct observation (such as institutions or mechanisms encouraging non-patented process innovations). At the very least, our results suggest that quantitative research can play a larger role in distinguishing among alternative perspectives in this field.

Our results suggest that public policy plays an important role in shaping a country's national innovative capacity. Beyond simply increasing the level of R&D resources available to the economy, other policy choices shape human capital investment, innovation incentives, cluster circumstances, and the quality of linkages. Each of the countries that have increased their estimated level of innovative capacity over the last quarter century - Japan, Sweden, Finland, Germany - have implemented policies that encourage human capital investment in science and engineering (e.g. by establishing and investing resources in technical universities) as well as greater competition on the basis of innovation (e.g. through the adoption of R&D tax credits and the gradual opening of markets to international competition).

Enhancing innovation capacity management in Kazakhstan is advisable to adjust not only in accordance with the identified experts' system errors, but also taking into account the above factors. There is a preponderance of in-country partnerships in the areas of innovation, while important for solving technological problems need to activate the connection with the best in terms of technology partners from abroad, resulting in the greatest transparency in all the functional areas of our control.

To implement the most efficient model of enhancing innovation capacity in the Republic of Kazakhstan there is a vital need to improve the system of public administration, namely in all functional areas of companies. Note the relationship of factors hampering the development of Kazakhstan's innovative companies use to formulate the innovative economy principles.

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Ж.С. Утегенова

Инновациялық әлеуетті арттыру инновациялық серпілістің негізгі факторы ретінде

Соңғы кездегі әлемдік экономикалық дамудың басым үрдістері барлық дамыған елдер өзіндік экономикалық және саяси басымдықтарын сақтап қалуға мүмкіндік беретін дамудың инновациялық жолында екендігін дәлелдей түседі. Бұған қоса әлемдік көшбасшылылар қатарына ұлттық экономикаларының жоғары инновациялылығы арқасында экономикалық дамудың озық деңгейіне қолжеткізген дамушы елдер арасынан жаңа елдер қосылуда. Осы орайда Қазақстан Республикасының инновациялық дамуды басқару моделін қалыптастыру экономикалық дамудың озық деңгейін едәуір тиімді және тез қамтамасыз етеді. Инновациялық дамудың шарттарының өзгеруі инновациялық ойлау жүйесіне де өзгерістер енгізілуінің қажеттілігін айқындап берді. Ғылым, технология және инновациялық саясат елдің инновациялық дамуымен теңдестірілді. Жұмыстың негізгі мақсаты инновациялық әлеуеттің жалпы инновациялық сектордағы ролін анықтау болып табылады. Сонымен қатар авторлар инновациялық жүйе, мемлекеттік инновациялық саясат, инновациялық қызмет мәселелері, инновациялық әлеуетті арттыру жолдарын қарастырып, бүкіл елдің инновациялық дамуын жетілдіру бойынша ұсыныстарын берген.

Кілт сөздер: инновация, инновациялық әлеует, инновацияны басқару, инновациялық даму, білім экономикасы, зерттеулер мен құрастырулар, жалпы ұлттық өнім, инвестициялық ресурстар, қызметтер, технологиялар.

Ж.С. Утегенова

Повышение инновационного потенциала как ключевой фактор инновационного прорыва

Преобладающие в последнее время тенденции мирового экономического развития доказывают тот факт, что все передовые страны мира находятся на инновационном пути развития, который позволяет им сохранять свое экономическое и политическое господство. Более того, к числу мировых лидеров присоединяются все новые и новые страны из числа развивающихся, добившиеся опережающих темпов экономического развития благодаря высокой инновационности своих национальных экономик. В этой связи формирование новой, усовершенствованной модели управления инновационным развитием Республики Казахстан может наиболее эффективно и быстро обеспечить стабильное развитие экономики опережающими темпами. Изменение условий для инновационного развития подчеркнуло острую необходимость понимания и принятия инновационных систем мышления. Наука, технология и инновационная политика приравняли развитие страны к инновационному развитию. Основная цель данной работы заключалась в изучении роли инновационного потенциала в инновационном секторе в целом. Кроме того, в работе рассмотрены и описаны инновационная система и государственная инновационная политика, вопросы инновационной деятельности, повышение инновационного потенциала и представлены предложения по совершенствованию инновационного развития всей страны.

Ключевые слова: инновация, инновационный потенциал, управление инновациями, инновационное развитие, экономика знаний, исследования и разработки, валовой национальный продукт, инвестиционные ресурсы, услуги, технологии.

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