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## CAPABILITIES OF USING EXPERIENCE OF INDIVIDUAL COUNTRIES OF THE EUROPEAN UNION IN THE DEVELOPMENT OF NATIONAL INNOVATION SYSTEM IN KAZAKHSTAN

*The article describes the features of the development of the national innovation system of individual countries of the European Union to determine capabilities of using this experience in Kazakhstan. It identified the key features of the development of national innovation systems of EU member states, like Germany, France, Norway and Finland, through the establishment of the basic functions of government and institutional organization of the support system of science and innovation. The findings are discussed from the standpoint of their capability of using in the current development conditions of the national innovation system of Kazakhstan.*

**Key words:** national innovation system, European Union, innovative development of Kazakhstan, innovative infrastructure.

**The problem formulation.** In modern conditions the level of innovation development has a huge impact on the economic development of the country. Accordingly, in the global competitive fight benefit the countries, which provide favorable conditions for the development of innovation. Therefore, the question of increasing innovative activity is very important and one of the main tasks to ensure the country's competitiveness in the global economy.

The study of foreign experience shows that the system of incentive and support innovative activities will be effective only if in the country developed business and society, psychology of perception of innovation, which is generally referred to as the national innovation system. That the results of the national innovation system in the form of new knowledge, products, technology, services, management and organization methods of production are a major factor in ensuring competitiveness. In recent years, despite the increase in the level of innovation activity in Kazakhstan to 8.1%, it should be noted that in Germany, this figure reaches 80%, in the United States, Sweden, France – 50%, in Russia – more than 10%.

**Analysis of recent research and publications.** In the modern theory the national innovation system (NIS) is defined as "such a combination of different institutions which jointly and individually contribute to the creation and dissemination of new technologies, form the basis of serving governments for the development and implementation of policies that affect the innovation process. As such – this is a system of interconnected institutions, designed to create, store and transfer the knowledge, skills and artifacts which define new

technologies" [1]. Thus, the effectiveness of innovative development of economy depends not only on how effective the activities of independent economic agents (companies, research organizations, universities, etc.) in individually, but also on "how they interact with each other as elements of collective creation system and use of knowledge, as well as public institutions (such as values, norms, right)".

The transition from linear (the chain of "science – production – consumption") to the system description of the innovation process in practice marked the re-evaluation of the determinants of economic growth, focusing on institutions and relationships. Another fundamental characteristic of the NIS is the central role of enterprises in the innovation process. Science can produce knowledge and even stimulate demand for them, offering a new, previously unknown technology to master that provides amplification of the competitive position of enterprises, but the last carried out the practical implementation of innovation and their promotion to consumers and forming feedback [2].

Also there would like to acknowledge the research of Peshina E. and Avdeeva P. [3] in which the further development of the concept of "national innovation system" is considered from the perspective of the need for deeper theoretical understanding of today's highly complex modalities of innovative systems under the influence of a huge number of internal and external factors. Among such factors should be noted separately observed trends are creating a different kind of integration associations of the countries. In this context, issues of functioning of the national innovation system of Kazakhstan on standard models is complicated by problems of the country's

accession to the WTO, as well as the formation of the Eurasian Economic Union (EEU) with Russia and Belarus, which also includes Armenia, Kyrgyzstan.

Except mentioned authors, issues of formation and development of the national innovation system of Kazakhstan in comparison with other developed countries, also more detailed studied by Kenzheguzin M., Dnishev F., Alzhanova F. [4], Barlybaeva N. [5] and other Kazakhstan's authors dealing with problems of innovative development of the former Soviet Union.

**Highlight of unsolved parts of the problem.** Thus, the prospect of further development of the national innovation system of Kazakhstan will be considered in the light of the experience of the European Union (EU) and the individual countries belonging to this integration association. The field of innovation as the basis for the development of competitiveness of the national economy in terms of integration associations on the one hand can serve as a factor of integration and interaction between policy makers and national structures. But, on the other hand, especially for national entrepreneurs have not yet repaid their expenses on science and innovation, there are some difficulties to turn their possession of the entire integration association. Therefore, for the "beautiful facade" of universal union, often can't see the internal contradictions in the development of mutually beneficial innovative cooperation. And evidence of this is the fact that despite the high innovative activity of the entire Union, there neighboring countries, and with a very high innovation activity, and countries with a low level of innovation activity. For example of it the European Union, which has the country's innovation leaders such as Germany, and innovative outsiders (Eastern European countries) and the prospects for the alignment of this differentiation is not visible [6].

Therefore, within the framework of integration associations the national innovation system is in their own distinctive and, above all, focused on the innovation potential of the country and its economy.

**The aim of the research** based on a study of the experience of the national innovation systems of the individual countries of the European Union to determine the most appropriate country-model for the further development of the national innovation system of Kazakhstan in terms of its functioning in the conditions of the Eurasian Economic Union.

**Main results of the research.** Based on the aim, in this article we consider the key features of the development of national innovation systems of the individual EU member states: Germany, France, Norway and Finland.

**Germany.** The German Government attaches great importance to the development of science and technology, supporting the financial commitment of German companies and research organizations in the European and world leadership. According to ratings of many world universities in 2004 Germany ranks 5th in the world and 3rd in Europe for innovation potential, which is a solid foundation for long-term economic growth. Despite the excellent performance of Germany in the ranking, the government was criticized by the German academic and business circles of insufficiently active innovation policy compared to other smaller European countries such as Switzerland, Finland, Denmark, Sweden and Norway. The report "Germany 2020. Future Perspectives for the German economy", prepared by McKinsey & Company in 2008, the main conclusion was the need to achieve an annual GDP growth of 3% in order to remain the leading European economies. If the German economy will continue to grow by only 1.7% per year, by 2020, will have difficulties with the financing of social payments and lose attraction for international business. In

order to achieve GDP growth of 3%, its necessary new approaches and state support of innovation activity [7].

German innovative infrastructure is a complex network of various federal and state values of the organizations:

- research institutions and society,
- industrialists alliances
- funds and other organizations.

In Germany there are four scientific societies (Fraunhofer, Leibniz, Helmholtz and Max Planck), incorporates a variety of institutions and research centers into a single network. These societies were created in the 40-50s to conduct applied research to restore shattered postwar economy. Experience and tradition of scientific societies do nucleation centers for the German world-class innovation.

Universities in Germany, as well as and universities in the United States, Britain and Japan, are important elements of the research system, since they do not only educational function, but also carry out their own research in many areas. On the level of university education in Germany is the fact that Germany is the third most attractive country for foreign students.

The total number of universities in Germany is equal to 400, and only 38 of them receive funding from the federal budget, 130 universities are funded from the budgets of the land, all the other universities are private. 200 universities from 400 are technical and applied orientation.

Actions of the Federal Government aimed at strengthening the universities as centers of origin of innovation and commercialization. In May 2007, the program "*EXIST-Grunderstipendium*" was launched, the aim of which is to support the start-up initiatives. Additionally, in support of this program, the program "*EXIST-Forschungstransfer*" was launched, aimed at commercialization and transfer of research results.

Innovative alliances are a new instrument under the High-Tech Strategy 2020, initiated by the Federal Ministry of Education and Research. Currently, there are 9 innovative alliances with a total annual budget of EUR 3.1 billion.

The German offices of science and innovation (ger. Deutsches Wissenschafts und Innovationshaus) represent the foreign offices of the Federal Ministry of Education and Research. To date, there are representative offices in New York, Moscow, Tokyo, New Delhi and Sao Paulo. The main objectives of the German Office of Science and Innovation is to promote abroad the German development, the establishment of a dialogue between science and industry, the search for and promotion of joint projects, providing information on the research and development of countries where the offices are located, for the German industrialists.

**France** is one of the world leaders in the field of research and development and is in the top thirty rankings "Global Innovation Index 2013". At present, the development of R&D and innovation in France is the top priority of the state policy and is seen as a major factor in the future economic growth of the country. By the development of this sphere are linked future and the country's place on the world stage [8].

In France, the stimulation of innovative activity in the country for a relatively long time is an essential element of public policy. However, the legislation in the field of innovation for a long time was impulsive, local in nature and concerned only a limited range of problems associated with this process (for example, the introduction of a new legal status for public research institutions, facilitating partnerships with businesses, the creation of specialized care system, the development of industrial parks, patent legislation, etc.).

A key element of the effective functioning of the sphere of science and technology foresight in France – the development of institutional mechanisms. Projected activities well represented at all levels of the supreme

bodies of legislative and executive power to the independent expert futurists. A particularly important role in prognosis plays institutions of higher authorities (specialized committees, services, ministries, etc.), forward operation which underlie the state science and technology and innovation policy of France. In most cases they are the leading coordinating organization in the projections, their main function – to attract high-level professionals from various areas of public life (administrative authorities, science, high school, industry, media, etc.) for prognostic evaluation on actual problems of social-economic, scientific and technological development.

By 2008, France became one of the most attractive countries in the investment plan. Many foreign companies choose France for the organization of private industrial and research activities. Their choice is largely due to the presence in France quite tax efficient instruments of influence.

The main view of the tax aid in France is a research tax credit (*Credit d'impôt recherche-CIR*), which now accounts for over 80% of the total amount of the tax assistance allocated in the country for R&D development.

In recent years, the scale of funding and effectiveness of the research tax credit, France stands out among OECD countries. According to many experts, the mechanism of research tax credits of France today is the best in Europe in the field of tax instruments to stimulate the development of R&D in industrial enterprises. In general, the entrepreneurial world of France high enough evaluates effectiveness of the research tax credit as a tool to stimulate R&D funding at the expense of own funds of enterprises.

*Norway.* In the process of building an information society, Norway has become one of the world leaders of innovative development.

The high efficiency of innovation policy in the country is provided by the following three features. First, it is closely intertwined with other areas of state action – the social, investment, regional, education, taxation and others. Secondly, a high level of development of cooperation between the various links in the innovation chain, forming a national innovation system, which provides a higher return compared to if the links of this chain acted separately. This allows turning science and innovation in the direct productive force of society. Another feature of the Norwegian innovation policy is a course on the use of regional capacities. The responsibility for the implementation of innovation policy rests with the regions and the central government is developing an innovative strategy and conducts other activities supporting innovation. Most of the national innovation agencies and innovation programs have a strong regional component [9].

High demand for many innovative products supported through purposeful activity of the state, releasing substantial funds for the procurement of goods and services related to the existence of a system of free education, medical care, a variety of social services, operating under the municipalities.

At present, in Norway widely used tested in practice, well-proven organizational forms and methods of financing innovation: science parks, clusters and venture capital financing and etc.

Norwegian management measures in the area of improving the structure of the economy and development of human resources consistently aimed at stimulating research and development, technological modernization of the national economy and the development of innovative activities. Norway has a well-formed and effectively functioning system of incentives and support for research and development and innovation. The *complex state innovation policy measures* include items such as:

- special organizations and bodies responsible for the development and implementation of science, technology and innovation policy;
- the system of international scientific and technological cooperation with other countries (primarily the EU and the US) in terms of exchange of best practices and technologies;
- network of technology parks, innovation clusters and centers of technological expertise;
- a significant direct budget financing of R&D in various forms, including tax benefits system. It is noted that in order to achieve long-term high-tech tasks more important is sustainability planned financing than large one-time infusion of funds.

Norwegian law does not provide for specific regulations concerning the regulation of research and innovation. This area is regulated under separate documents (strategies, development plans, letters, reports), which are issued by line ministries and state controlled organizations

The main institutions of the innovation infrastructure such as science parks, business incubators, innovation centers and etc., in Norway they play an important role in the process of commercialization of research results, technology transfer from the initial stage until the commercialization of the project. They work directly with universities, inventors, scientific research centers, private companies and entrepreneurs. In this case, their functions include peer review of proposed projects, market analysis, leading to the international standards, patents and search for potential buyers. It is further assumed that a company either operates alone (leaving the incubator) or sold to investors, either displayed on the venture market. Thus, the main objective of these organizations is bringing to market new and competitive innovation. So, in 2011, 7154 new enterprises were established in Norway, the scope of which relates to science and technology (Professional, scientific and technical activities), representing 14% of the total number of new businesses in the country.

In Norway, 42% of the total expenditure on research and innovation activities funded by the state. The Government and the Stortinget set the structure of public expenditure on this area and define the main objectives and policy priorities in this area.

*Finland.* Over the past 20 years, the Finnish economy is reoriented to natural resources in the high-tech industry. And today, Finland is one of the recognized leaders in innovation. The world has developed a model of successful states which, not having its own database of fundamental science, were able to achieve significant results in innovation. Finnish experience proves once again that the economy based on knowledge, it is possible to build. Finland managed to become one of the world's post-industrial leaders (as well as Sweden, Israel and some other countries) due to the purposeful policy of the state, effective interaction with business and long-term investments in science, innovation and education.

The main trend seen in the Finnish innovation system is a further development of innovation policy, which involves a closer involvement of the country's existing research and development, including the regional infrastructure in the global economy, as well as the establishment of close contacts with the relevant EU institutions. At the same time the Finnish leadership is considering the development of innovative activities within the country and abroad as one of the main levers of increase of competitiveness of the national economy [10].

Against the backdrop of the EU countries, Finland has traditionally been among the most successful countries in the development of high-tech sectors of the economy and the share of expenditure in GDP on R&D is among the leading countries of the world. Since 1995 export of high-

tech products in Finland exceeds its imports, while the share of such products from the total exports of Finland is about 21%. With 80% of exports of high-tech products accounted for the electronic and electrical industry. However, since 2005 in Finland there are tendencies to reduce the production of high-tech products of large business enterprises and the transfer of production facilities in other countries. The growth of Finnish exports continue to be carried out through the activities of the Finnish subsidiaries abroad, where work for over 37% of all employees of Finnish companies.

In recent years, Finland has slowed down the growth of industrial investment in the country. According to the statistical agency of Finland, investment in innovation sphere and the expansion of production in the territory, with the direct participation of European experts analyze the country's innovation system was carried out, which, on the whole, confirmed the high level of its development. This was marked by a number of its shortcomings, related primarily to the irrational use of allocated to R&D budget, low levels of foreign investment, managing the complexity of the existing system of innovation and lack of cooperation with leading European and international research centers.

The analysis carried out a number of Western researchers, shows that over the last 25-30 years scientific and technological policy of Finland is not a rigid and centrally planned mechanism for the development of scientific – technological and innovation complex. An important element of liberalization in this area was the construction of the so called *network economy*, which has become structurally based on information and communication network of technology developers and users, namely industrial firms. Building a "network economy" has become one of the priorities, the key

element in the development of scientific and technological complex and innovative system of the country.

Finland, according to Eurostat, has achieved the highest index in the world on the use of information and communication technologies and the Internet, particularly in the creation of collaborative networks for the implementation of innovative activities between universities, public research institutes and industrial companies. In fact, "network economy" in this sector includes more than 50% of university networks and more than 40% of the networks between public research institutes and industrial firms.

The modern role of government in Finland in science, technology and innovation sphere, increasingly switched to supporting the private sector to stimulate growth in their R&D funding, targeting firms in perspective, the priority for the Research Society on the medium and long term from 5 to 15 years. On the other hand, according to some Western experts, the Finnish Government takes certain "laziness and procrastination" on the use of tax incentives to attract foreign investment in R&D.

In Finland, there are no specific laws on innovation activity, legal and regulatory framework is based on the legislation on small and medium-sized enterprises, as well as the protection of intellectual property, the issue of which it is one of the most important. Finland does not apply the tax incentives for R&D, and using other forms of state support.

In general, based on the analysis of the features of national innovation systems of individual EU countries, we have built the following summary table 1, which reflects the strengths of NIS analyzed and compared with the characteristics of the innovation system according to the parameters of Kazakhstan.

**Table 1. Summary of the key features of the national innovation system of individual EU countries and Kazakhstan**

Country	The level of innovation activity	The level of development of the national innovation system elements	Strengths (key features) NIS	Ability to use the strengths of the countries under the EEU
Germany	High	High, evolutionarily formed naturally with the support of the state and national enterprise	High-performance national innovation system that allows stable to maintain its leadership in the field of innovation, not only in the EU but also in the world.	Due to the low level of innovative activity in the countries of the EEU the possibility of applying this model of NIS unacceptable.
France	High enough	High enough, generated by significant efforts by the state and supported by the academic environment.	Enough high academic potential through targeted research efforts of state institutions has allowed creating a strong triple alliance of state, science and business.	For use in the conditions of the EEU countries need to strengthen the state's role in supporting the NIS on a real level, as well as the need to develop alliances and academic community.
Norway	Middle	Average is typically resource-based economy, only form the basic elements of the NIS. But already established institutions work effectively.	Although raw material specialization of the economy, the development of NIS is focused on the development of high-tech production technology and processing of raw materials.	The possibility of using very high, given the raw materials and agricultural specialization EEU economies. R&D in the raw technology will form a "niche" in the innovation housekeeper.
Finland	Relatively high	High enough, formed as a result of the purposeful policy of the state and with the support of national business	High state's role in the development, implementation and effectiveness of the special Concept of the national innovation system, designed to move away from the commodity specialization and the formation of an innovative economy sectors.	The possibility of using high, on conditions that the State's obligations to the rest of the national innovation system.
Kazakhstan	Low	Average, taking into account that the main elements of the national innovation system formed recently, the results of their functioning is not yet noticeable.	Effectiveness of NIS still low, although the state's role in the program-oriented development of innovative activity is high. For example, SPIIDK, specialized legal framework.	Possibilities of EEU should be used to improve the efficiency of NIS through the implementation of joint innovation projects with researchers and innovators in other countries EEU.

Source: Compiled by the author based on sources Center of analytical and methodological support of JSC "National Agency for Technological Development": [7-10].

**Conclusions and prospects for the latest developments in this field.** Thus, among all examined EU countries by us, especially would like to mention the

experience of development of national innovation systems in Norway and Finland, which, like our Kazakhstan, they are in the commodity-based specialization, but were able to

restructure their economies in the direction of activation of the innovation potential. It should be noted that a significant focus of state innovation policy in these countries has been made towards the formation of innovative industrial production [11]. For example, the Finnish industry has been able to move the production of goods with a large amount of added value through intensive partnerships between governments and the private sector.

Another important point that could be learned from the experience and lessons of Finland – is the institutional construction of the National innovation system. We believe that should be used positively institutional experience of Finland, especially as regards the creation of such organizational structures which finance high-tech Company in the pre-competitive stage of the innovation process. This refers to venture capital and "seed" funding. Apparently, one should consider creating appropriate programs for provision of substantial financial, credit and other support for innovation-oriented small and medium enterprises in Kazakhstan.

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### МОЖЛИВОСТІ ЗАСТОСУВАННЯ В КАЗАХСТАНІ ДОСВІДУ РОЗВИТКУ НАЦІОНАЛЬНОЇ ІННОВАЦІЙНОЇ СИСТЕМИ ОКРЕМИХ КРАЇН ЄВРОПЕЙСЬКОГО СОЮЗУ

*У статті розглянуто особливості розвитку національної інноваційної системи окремих країн Європейського союзу для визначення можливості застосування даного досвіду в Казахстані. Визначено ключові особливості розвитку національних інноваційних систем таких країн-учасниць ЄС, як Німеччина, Франція, Норвегія і Фінляндія, через встановлення основних функцій державних та інституційних організацій підтримки системи науки та інновацій. Отримані результати розглянуті з позиції можливості їх застосування в поточних умовах розвитку національної інноваційної системи Казахстану.*

*Ключові слова: національна інноваційна система, Європейський союз, інноваційний розвиток Казахстану, інноваційна інфраструктура.*

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### ВОЗМОЖНОСТИ ПРИМЕНЕНИЯ В КАЗАХСТАНЕ ОПЫТА РАЗВИТИЯ НАЦИОНАЛЬНОЙ ИННОВАЦИОННОЙ СИСТЕМЫ ОТДЕЛЬНЫХ СТРАН ЕВРОПЕЙСКОГО СОЮЗА

*В статье рассмотрены особенности развития национальной инновационной системы отдельных стран Европейского союза для определения возможности применения данного опыта в Казахстане. Определены ключевые особенности развития национальных инновационных систем таких стран-участниц ЕС, как Германия, Франция, Норвегия и Финляндия, через установление основных функций государственных и институциональных организации поддержки системы науки и инновации. Полученные результаты рассмотрены с позиции возможности их применения в текущих условиях развития национальной инновационной системы Казахстана.*

*Ключевые слова: национальная инновационная система, Европейский союз, инновационное развитие Казахстана, инновационная инфраструктура.*

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