

Pobirchenko V., Sharova O.

УДК 339.9+339.1

THE INNOVATIVE- TECHNOLOGICAL DEVELOPMENT OF FINLAND
AS THE FORMATION FACTOR OF "KNOWLEDGE ECONOMY"ИННОВАЦИОННО – ТЕХНОЛОГИЧЕСКОЕ РАЗВИТИЕ РЕГИОНОВ ФИНЛЯНДИИ
КАК ФАКТОР ФОРМИРОВАНИЯ «ЭКОНОМИКИ ЗНАНИЙ»

Summary. In this article discusses innovative - technological development as the formation factor of "knowledge economy", on the example of Finland. Identifying of innovation development preconditions in Finland. The main purpose of the study is: identification of assumptions and factors of innovative and technological development of Finland. To achieve this goal in this article, consistently solved the following problems: 1) an assessment of the factors of innovation and technological development of the country in modern conditions, 2) Studied the characteristics of factors territorial distribution of innovation and technological development, 3) defined territorial differences of innovation and technological development of the regions in Finland and trends of their evolution. This article presents the characteristics of the Finnish national innovation systems, and also characterized the development features of modern Finnish national innovation system. Presenting the indicators that describes the competitive stability of Finnish regional clusters, describing typology in terms of innovative - technological development of the regions. And finally forming of conclusions about innovative - technological activities of the regions in Finland.

Keywords: innovative and technological development, cluster, factor of "new economy", an innovative system.

Аннотация. В данной статье рассматривается инновационно – технологическое развитие регионов, как фактора формирования «экономики знаний», на примере Финляндии. Выявляются предпосылки инновационно – технологического развития территорий Финляндии. Особое внимание уделено так называемым факторам «новой экономики», а также образованию инновационно – технологических кластеров. Описывается типология регионов по уровню инновационно – технологического развития.

Ключевые слова: инновационно – технологическое развитие, кластер, фактор «новой экономики», инновационная система.

Анотація. У даній статті розглядається інноваційно – технологічний розвиток регіонів, як фактор формування «економіки знань», на прикладі Фінляндії. Виявляються передумови інноваційно – технологічного розвитку територій Фінляндії. Особливу увагу приділено так званим факторам «нової економіки», а також утворенню інноваційно – технологічних кластерів. Описується типологія регіонів за рівнем інноваційно – технологічного розвитку.

Ключові слова: інноваційно – технологічний розвиток, кластер, чинник «нової економіки», інноваційна система.

Statement of a problem. The concept of "knowledge economy", was developed in 1970s and 80s. Focusing on the new set of growth factors, the main of them is such an integral factor in human capital [2]. Under its provisions the quality of human capital determines the pace and sustainability of the most developed economies in the world. It is essential to optimal territorial organization of the knowledge economy, which is expressed in the process of cluster formation in high-tech industries, where taking place the formation of agglomeration effects of innovation [7]. These trends define the changed conditions of competition. So competitiveness at the global market is not more than on territorial clusters, and therefore the regions in which they are located. Under these conditions, regional clusters of innovation activity is a necessary condition for improving the quality of life and economic growth. Consequently, the socio- economic policy is undergoing major changes - it becomes an essential component of regional innovation and technology policies as providing the stability of the structure area's economy.

Finland as one of the leading countries in the field of Knowledge Economy, and has a great theoretical and practical experience in Innovative management and technological development [10]. Relatively rapid transition to the way of innovative economy has a great scientific and practical interest. These circumstances determine the relevance of understanding the role of various factors and prerequisites for the development of an economy based on knowledge in the context of regional development. However, in Finland there is high regional differences in the level of innovation and technological development. These differences are due to the uneven distribution character of the main innovative growth factors.

The analysis of the last publications and studies. Both domestic and foreign scientists developed different questions of the economical scientific concept which is based on different knowledge's, especially its spatial organization theory, theory of competitive areas, complex elements and factors of competitiveness of the territory in the paradigm of the knowledge economy, the theory of territorial organization and institutional innovation technological activities, growth pole theory, the theory of innovation systems, the theory of regional clusters and so forth. Of particular note is the work D. Bell, Toffler, M. Kastelsa, M. Porter, F. Perry, H. Meynandera, P. Himanen, A. Anokhin, O. Moskvina, S. Krotov, T. Danilova, MI PilipenkoInozemtseva V., V. Baburina A. Gorkin, M. Polovitskii, Chistobaeva A., A. Pilyasova, Y. Gladky, etc.

And at the same time, enough attention is not given to the identification of socio-economical characteristics, factors and territorial laws which is also developing in scientific papers. Unfortunately domestic scientist are not given enough attention to the research of socio-economic development of Finland.

The main purpose of the study is: Identification of assumptions and factors of innovative and technological development of Finland. To achieve this goal in this article, consistently solved the following problems: 1) an assessment of the factors of innovation and technological development of the country in modern conditions, 2) Studied the

characteristics of factors territorial distribution of innovation and technological development, 3) defined territorial differences of innovation and technological development of the regions in Finland and trends of their evolution.

The main part. Economy of Finland can be described as one of the most highly organized and dynamically stable economic systems. Strong performance of the economy and social sphere was largely achieved through the country's transition to the innovative type of development in the last 20 years [4]. Among the main structural components of the country's transition to the different type of economic growth should be noted:

1. Increasing of the international competitiveness of the country's economy on the new basis, involving a new set of economic development resources - human resources, scientific and educational infrastructure, supportive environment for innovative development, etc.
2. Formation of the new base of export-oriented sector during the 1990s. - Production of information technology and telecommunications.
3. The appearance of new economic development agents - major technology companies, with a global presence on the high-tech markets with high growth rates (telecommunications, etc.).
4. Leading role in the structural transition has played an active state policy: the government embarked on an innovative component and increase efficiency in all sectors of the economy [10].

Despite the fact that innovation was typical of the Finnish economy over the years of its development, it is possible to assert that it was the late 1980s. innovation has become the main driving force of economic growth and the basis of access to foreign markets [2]. If previously the innovation process could not be separated from production, it is currently in the country established independent knowledge-based innovation economy, which is the base for the country and for export oriented. Thus, the modern type of Finland can be called an economy based on knowledge.

For further economic development in these conditions becomes crucial new set of factors - the so-called factors of the "new economy"[4]. From the dynamics of these factors and their territorial organization depends the development of the economy of the country and its regions.

The main factor is the human potential [3]. Among the major trends shaping the human potential of the latter years, it should be note the high level of growth dynamics and indicators of human development in comparison with the world average (main of them are the proportion of people with higher education), a high level of income and their innovative activity (formed domestic consumption market of innovative products), one of the world's best quality of life and environment, the high attractiveness of Finnish cities for highly qualified personnel. At the same time in Finland increasing structural social problems, such as demographic aging society and relatively high level of unemployment in the labor market.

The next most important factor of innovation and technological development - is the level of development of educational infrastructure [10]. Finland is one of the world's leading countries in the level and quality of education, largely thanks to the reform of the education system, implemented in the 1990s. Universities and polytechnics at this stage is the heart of innovation, technological and economic development [6]. They form a knowledge management system of the regional economy and is closely associated with the business. It can be argued that the higher education regional network has become such of the national innovative, technological and network infrastructure. The country has a wide network of post-graduate education through an active policy of lifelong learning. This policy provides the flexibility of the labor market and the ability to quickly change the qualification, which is especially important in the context of structural changes in the economy. The main feature of the territorial placement of this factor by region can be called significant regional disparities in network of education and science.

Specialization of the Finnish economy and territorial organization of the economy is also a key factor of innovative and technological development. Formed in the country's economic structure, which is dominated by the service sector. High-tech industries and companies have a strong position in foreign markets, with high expectations growth: Telecommunications and information technology (IT), electrical engineering, and biotechnology. In addition, the country has a strong position in the global shipbuilding market, large-scale engineering, chemical and food industry, metallurgy and timber industry. The main trend in these industries is shifting a large part of manufacturing operations abroad, while domestic jobs are saved in the most intensive areas: engineering, development and management. Since Finland is a small country whose economy is highly integrated into the global market, macroeconomic stability is determined by the pace of global economic recovery from the recession in 2008 – 2009 [3]. At the same time, we note that after the financial crisis, science, technologies and innovations can make a major contribution to the economic recovery of Finland.

A special role in providing of innovative and technological development of the territory belongs to institutional factors [9]. Due to continuous and consistent growth strategy of innovation in Finland fully formed integral and stable structure of the national innovation system. Finland was the first country which is adopt the concept of the national innovation system as a basic element of policy in science and technology. Innovative and technological policies consistently passed several stages of its development. From 1970, Finland performed either as part of an industrial or scientific policies, and basic measures directed at ensuring the upgrade of the basic branches of the economy and ensuring financial flows in the sphere of science and technology, respectively. However, in this period laid the technological growth foundation of the country: an agency TEKEC, the main purpose of which was to increase the share of high-tech industries of economy, implemented the reform of higher education and science, established a number of institutions for development of innovations [1].

Since the middle -1990s, innovation policy is separated on independent fields: the country adopted a new model of the national innovation system, the objectives of which were to develop a balanced NICs supporting a number of key areas of fundamental research, extra budgetary resources in innovative sphere, minimizing investment risk in innovation [9]. Created the necessary institutions for development – of technological and competence centers, network of technology parks as well as the mechanisms for the allocation of funds in research and development.

It can be argued that in Finland formed national innovation system, with stability dynamic. In development terms of innovations Finland takes one of the first places in the world, because of funding levels, including patents, export high-

tech products, the share of employment in the sector of R & D, Finland significantly exceeds the average for the OECD indicators, second only to the amount of foreign capital invested in research and development, as well as service providing innovative companies [6]. Among the main characteristics of the Finnish NIS should be allocated as follows [3]:

1. Tight integration, common goals and principles (values) of all the participants - universities, research institutions, businesses, institutions, innovative development and government.
2. The crucial role of research centers and universities in creating and spreading to the real sector of new knowledge. And the basis for cooperation are as formal communication (collaborative research) and informal interaction - information flow, exchange of ideas in personal contacts.
3. Organizational development of institutions to support innovation.
4. Project and program approach, accompanied by high cooperativity in the programs and projects, as well as clear roles and tasks in collaborative research.
5. The presence of broad regional (municipal) authority.

Besides innovation and technology policy, it should be noted social policies aimed at the construction of the "welfare state" that would create an internal market, which is "test" platform for innovative products [10].

In Finland, formed a model of innovation, oriented not only external but also on domestic demand: about ½ enterprises employ innovation or the introduction of innovations, ¼ implements internal research projects, high consumer activity in segments of innovative products (population's consumption of high-tech products) [3].

At the same time, to increase the country's NIS calls for further development. They are associated with the occurrence of the structural problems of the Finnish economy, associated with the reduction in growth potential and efficiency of the sector, which previously specialized in NIS countries - the telecommunications industry [4]. Among the main indicators that characterize this problem, we emphasize a competitiveness loss of Finnish innovative products in external markets slump of products and technologies (the share of high-tech products in total exports falls), falling impact of innovation on productivity indicators economy slowing of scientific and innovative activity in Finland.

These barriers and risks may effect on the competitiveness development of economy [2]. Develops so -called "Finnish paradox" - a situation with high developed of innovative economy is key factor of economical stability, but growing number of problems showed that innovative system is still unable to resolve them [5]. It can be argued that NIS of Finland is on the threshold of a new development stage where a new group of high-tech industries will create the innovative growth.

Implementation of national projects is not always considering regional peculiarities territories. In Finland, a favorable combination of factors, technological development in some regions led to accelerate their development, while in other areas (peripheral, border, poorly developed areas) development of "knowledge economy" was hindered by poor infrastructure [8], lack of research centers and skilled manpower. As a result of significantly increased differentiation of areas not only in development terms of innovative industries, but also by general indicators of socio- economic development. Discontinuities in the level of innovative investment achieved tenfold. Require greater attention to the regional component of innovation in development policy, transference of the resulting challenges for innovative development from the national to the regional level to create a geographically balanced NIS. In regions of Finland created institutions for development, so-called Competence Centers. At this stage, regional innovation policy has become a key element of the national innovation strategy, it allows to take into consideration particular territories [7].

The most important economic and geographic development process of innovation and technology in Finland becomes spatial concentration of innovative activity in the largest urban systems - education regional innovation and technology clusters [8]. Innovative companies require intensive interaction between the different agents: universities, researchers and technology developers, manufacturers, as well as operational knowledge and technology transfer to customers and getting feedback. That's why networking and clustering industry is becoming the most effective form of innovation for growth oriented companies. In turn, innovative companies have a significant impact on the regional economy and the urban environment in which they are placed, which leads to the formation of so-called "Innovative cities" or "innovative agglomerations." Formation of a new group in Finland innovative technology clusters changes the geography of innovation, because there are new clusters in a variety of sectors [3].

Development of innovative technology clusters Finland is one of the leading countries in the world [6]. Developed technique to study the existing regional clusters includes the following indicators reflecting their competitive stability: a) Indicators size (total number of people employed in the cluster, the cluster's share of total employment in the industry in the EU), and b) the coefficient of regional specialization in this industry, c) localization of the production rate in the region, and d) export potential. According to the analysis it can be argued that the largest clusters are located in the southern provinces of the country (with the center in Helsinki) clusters telecommunications, finance and business services, education, information technology cluster, power. Province of Uusimaa (metropolitan area) contributes 35% contribution to GDP at 2% share of the total area of the country [11].

In Western Finland formed telecommunications clusters [7], forestry and wood processing cluster, the cluster of electric power, metallurgical cluster, the cluster in the field of education. These clusters represent the country in the global market. Considerably smaller regional clusters are the geographical center in Oulu is a cluster of telecommunications, heavy engineering and construction cluster. In Eastern Finland among the largest woodworking can be called a cluster.

Structural and functional analysis allowed us to determine that, for the development of innovative technology clusters of the country is characterized by a number of these "critical" elements [8]: a) the generation of knowledge and new ideas, and b) developing and testing, production, c) specialized infrastructure and service sector; g) market and the availability of consumer products (local consumers are kind of testing ground, which often are the first to use an innovative product).

Among the modern features of the development of the Finnish innovation clusters should be highlighted:

1. The effects of agglomeration [3]. At the local level support innovative companies closer business ties with each other, as geographical proximity provides inside the cluster constant contact both formal and on an informal basis. Local companies to easily get feedback from users of the technology and product to create a common vision for the development of the clusters, to strengthen trust between the partners.
2. The central element of innovation clusters are strong research universities [6]. Companies create strategic partnerships and alliances with such universities that can form on the cluster model, a pool of developers under the specific project objectives.
3. Innovation clusters are formed not so much as a set of firms, and as a community of professionals [11]. Network interactions cluster consists of two main components: the organizational and social networks, and to analyze the innovation environment last highest value. Important channels of information flows between the parties are largely informal (non-institutional) character. The key elements of infrastructure within the cluster are organizational structures that provide constant contact participants.

Active regional innovation and technology policies, despite significant progress [7], has not reached the goals align socio- economic landscape of the country. Currently still considerable differentiation regions in terms of innovation and technological development. Calculation of the integral index of innovation and technological development of Finland regions on the basis of 15 experts to develop a typology of the regions in terms of innovation and technological development [11].

The first type regions - leading innovation systems. This group includes Uusima and Pirkanmaa province, where the largest cities in the country - Helsinki and Tampere respectively. This is a creation centers of new knowledge, the core of high-tech sectors. This group of regions characterized by the highest levels of human development, there is developed infrastructure for training of the highest category. In these regions the maximum investment in science and innovation coming from both of the state and business, the share of investments in science than 5% of GRP [3]. The dynamics of innovative sectors, manufacturing of computers and services in the ICT sector, selected as indicative, here is small. This allows you to make two basic assumptions: first, that the market for these services is already quite mature, because of low dynamics, secondly that in these regions would be other high-tech sector of a new cycle of innovation engines of growth.

The second type is a strong innovative and technological system. There are innovative regions - Itä-Uusima, Satakunta, Ostrobothnia and Central Finland [9]. Development of a science and innovation in this group of regions occurs largely due to real economy demand for technological modernization. It should be noted that business financing research activities of this group of regions.

Despite the elaborate system of higher education, the share of employment in the economy with higher education is only about 30% [10]. Regions in this group have developed a high-tech manufacturing sector, which employs about 6% of the labor market, but in the development of knowledge-intensive services sectors regions are lagging behind the leaders - about 7%. In the areas of academic science clearly lose territory leaders. Probably, further development of innovative systems in these regions should include the development of nuclear knowledge creation - and university research facilities.

The third type of regions that can be described as the centers of science and high-tech average. This province Ostrobothnia and Kainuu provinces [7]. These provinces a characterized by favorable labor market indicators. It is the attraction center of investments from the state and business, but with a high degree of state involvement. In these regions, a high concentration of public research centers and large public spending on science. Industry is investing heavily in research and technology, acquires patents. In this case, the regions have a relatively low amount issued patents. Likely to achieve leadership for this group of regions requires provision of simultaneous development of science, innovation and real sector (customers technologies).

Regions of fourth type demonstrate below average of innovative and technological development systems. This includes the large group of provinces - Varsinais - Suomi, Pyyat - Häme, Kymmenlaakso, South Karelia, Etelä-Savo, Savo, Kainuu [11]. They develop innovative system largely due to government support. Promising task for this group of regions may be to promote technological upgrading of local sectors and industries, the development of innovation and technology infrastructure.

The fifth type - Lapland, South Karelia, Southern Ostrobothnia - regions which is at the initial stage of construction of the innovation system [5]. Issue of higher education institutions in this group of regions is slightly higher than the national average, but it could be argued that the spread of higher education, when all most people prefer to receive a diploma regions, stimulated the development of these regions is not high-tech sectors, but rather the development of the tertiary sector - a service economy (education, health, public services, etc.). This cluster areas characterized by low compared to most regions, the investment in research activities - about 1 % of the GRP [9], there are large public spending, and orders for business research and development are almost absent. The fifth cluster is characterized by low values employed in knowledge-intensive sectors.

The sixth cluster has got only one area - Central Ostrobothnia province [5]. This territory has almost no elements of the knowledge economy.

Thus, the greatest potential for the development of high-tech industries, as well as potential for innovation have regions with extensive and diversified labor market and the education system, a high proportion of highly qualified personnel among the employed. In addition, significant importance is the presence in the region, a city or agglomeration (in Finland is a city of more than 100 thousand people). Regions having these features have a high level of innovation activity. In such regions, actively develop high-tech enterprise sectors with a high proportion of qualified staff. Forms part of the territories innovation belt by modernizing basic industries - timber, metal, wood. Innovative development here requires special infrastructure and personnel. In some areas, the process of innovation development only started.

Territorial concentration of the economy in recent years deepened. Feature further spatial development factors of innovation and technology activities in Finland - a growing concentration of human potential and the economy in the

metropolitan area - the formation of " Southern Corridor growth" expansion are determined by both external and interregional migration. In addition, the following "axis of economic activity" [11]: a) Hanko - Helsinki - Kotka b) Turku - Tampere - Jyväskylä - Kuopio, Vaasa - Kokkola - Raahe - Oulu - Kemi.

Conclusions:

1. Currently, innovation and technology activities is a separate branch of the Finnish economy, claiming the formation of basic export-oriented sector. The country has formed an economic system in which knowledge is the key driver of economic growth.
2. Leading role in shaping the economy based on knowledge, played priorities of state economic, social, educational and regional policy. Due to continuous and consistent policy of innovation and technological growth to date in Finland fully formed integral structure of the national innovation system, which is characterized by dynamic stability. This situation proves crucial institutional factor in the development of the knowledge economy.
3. Quality of human capital in the economy based on knowledge, is crucial. The level of development of human resources and depend on economic growth and sustainability indicators of national and regional economies.
4. Strong influence on innovation and technology potential of the area has industry specialization and market economy, as well as the dynamics of the external market environment sectors of specialization.
5. Socio - economic differences in the level of innovation and tech-nology in Finland are the result of the disproportionate placement of the main factors of innovation and technology activities.
6. The most effective forms of territorial organization of innovation and technology activities within the knowledge economy are regional innovation system, which are based on innovative technology clusters included in the network of global exchanges.

Sources and literature:

1. Braczyk, H-J., Regional Innovation Systems / Braczyk, H-J., Cooke, P., Heidenreich, M., / UCL Press, – London, 1998.
2. Hotz-Hart, B., 'Innovation Networks, Regions and Globalization' / B. Hotz-Hart, / The Oxford Book of Economic Geography, Oxford University Press, – Oxford, 2000.
3. A Study on the Factors of Regional Competitiveness. A draft final report for The European Commission Directorate-General Regional Policy [electronic resource]. Accessmode : http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/3cr/competitiveness.pdf
4. Finland must take a leap towards new innovations. Innovation Policy Guidelines up to 2015 – Summary [electronic resource]. – Access mode : http://www.ek.fi/ek/fi/tutkimukset_julkaisut/2010/10_loka/Innovation_Policy_Guidelines_final.pdf
5. Growth through expertise. Action plan for research and innovation policy [electronic resource]. – Access mode : http://www.minedu.fi/export/sites/default/OPM/Tiede/tutkimus-ja_innovaationeuvosto/erillisraportit/liitteet/TINTO_12.12.2012_eng.pdf
6. Information Society, Technology and Innovation in Finnish Development Cooperation [electronic resource]. – Access mode : <https://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&cad=rja&ved=0CE0QFjAE&url=http%3A%2F%2Fforin.finland.fi%2Fpublic%2Fdownload.aspx%3FID%3D68165%26GUID%3D%257B8A63E87D-960E-4911-BA466C873FE120B4%257D&ei=zX3hUuzKPOHAyQPJgYHYCg&usq=AFQjCNG5b1HIR2uyXicLTvJfLP6sR3ivng&vm=bv.59568121.d.bGQ>
7. Innovative Clusters drivers of national innovation systems [electronic resource]. – Access mode: [http://seamist.se/tks/ctup.nsf/\(WebFiles\)/12E95BEA3697F838C1256F4A00598ECF/\\$FILE/InnovativeCluster%20oecd.pdf](http://seamist.se/tks/ctup.nsf/(WebFiles)/12E95BEA3697F838C1256F4A00598ECF/$FILE/InnovativeCluster%20oecd.pdf)
8. Innovative Clusters. Identification of value-adding production chains and their network innovation, an international studies [electronic resource]. – Access mode : <http://www.oecd.org/sti/inno/2098804.pdf>
9. International Journal of Innovation and Regional Development [electronic resource]. – Access mode : <http://www.inderscience.com/jhome.php?jcode=ijird>
10. INVESTING IN GROWTH [electronic resource]. – Access mode : <http://www.hightech.fi/direct.aspx?area=htf&prm1=1078&prm2=article>
11. Regions and Innovation. Collaborating across Borders [electronic resource]. – Access mode : http://www.keepeek.com/Digital-Asset-Management/oecd/urban-rural-and-regional-development/regions-and-innovation-collaborating-across-borders_9789264205307-en#page1