



LUND UNIVERSITY
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Innovation and Spatial Dynamics**

**How can a cluster approach enhance innovation capacity in Russia?
A comparative study of innovation policies in the EU and Russia**

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Abstract

The aim of the paper is to compare the phenomenon of clustering in Russia, in terms of innovation policy to sustainable economic growth, with the positive experience of implementation of cluster approach to innovation in the EU as a part of the EU innovation strategy to competitiveness, within the theoretical framework of RIS. By aspiring to boost its global competitiveness Russia pursues innovation policy aiming to enhance its level of innovation capacity and to enable the shift from a natural resources – dependent model of economy to sustainable innovation-based economic growth. The ability of Russia to meet the challenge may be strengthened by implementation of clusters as a source for a higher level of innovation activity as well as higher competitiveness of firms in clusters. The study compares the examples of development of the pharmaceutical cluster in St-Petersburg, Russia and the bioscience cluster in the Øresund region, Scandinavia.

Key words: clusters, Russia, innovation policy, the EU, Øresund, bioscience, St-Petersburg

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1. INTRODUCTION

Being Russian I'm mostly driven by the interest to see how Russia has been developing in terms of innovation policy since the collapse of the Soviet Union in 1991. After some consideration I've decided to shorten the period to 1999-2010 and to make an analysis of innovation policy development in the post-crisis Russia - after the Russian default of 1998, which had a significant impact on the country's economy as well as the lives of many ordinary Russian people, having divided the era of modern economic reforms in Russia into two periods – before and after the default of 1998. Moreover, the following eleven years after the financial crisis of 1998 in Russia can be regarded as a rather successful period of time in terms of the economic growth and development in Russia. In spite of the fact that the ongoing global financial crisis may certainly impose some limitations on the country's ability to innovative development, I consider that even under the circumstances the challenge of competitive national innovation system is highly relevant to the country's advancement and the ability to shift to sustainable knowledge-based economic growth model in Russia.

1.1 RESEARCH QUESTION

Innovation system in Russia has undergone huge transformation after the collapse of the Soviet Union and is still in the transition period, combining both new and old elements of its structure. However, in spite of the new innovation policy, that is meant to strengthen the linkages among universities and enterprises and, thus, to stimulate the process of innovation and knowledge transfer in the private sector, as well as a growing amount of expenditures on R&D in the country (Dezhina, 2009), the innovation system of Russia is being estimated as not performing well. (Gianella et al., 2007) Given a strong scientific base for innovation to sustainable growth as well as rather positive experience of innovative development in the EU, the study aims to explore explicitly the implementation of cluster approach to innovation in the EU vs. Russia, making an impact on the level of innovation activity in Russia in terms of the regional development and institutional framework.

Accordingly, the research question is: **How cluster approach can enhance innovation capacity of Russia?**

Given the impact of innovation to sustainable economic growth, the research represents an attempt to explore the crucial role of cluster approach implementation to the possible enhancement of innovation activity in Russia, based on the examples of positive experience of regional innovative development within the EU. Thus, the research question has been formulated as to reflect the author's perception of the significance of cluster approach application to regional development for better innovation capacity as well as to sustainable economic growth and socio-economic development.

1.2 SCOPE AND LIMITATIONS

In my thesis I would like to explore how the innovation policy in Russia has been developing in 1999-2010 and to try to estimate possible factors and determinants of the inefficiency of Russian innovation system; to compare it with the development of innovation policy in the European Union during the same period of time, focusing on cluster approach and regional development; to evaluate the level of cluster development in Russia by year 2010 as well as perspectives of development and policy implications.

The research Objectives:

- to explore how the innovation policy in Russia has been developing over the period 1999-2010
- to compare with the development of innovation policy in the EU over the period
- to evaluate/to assess the impact of cluster approach application in Russia

1.3 CONTRIBUTION OF THE STUDY

The aim of the research is to compare clustering patterns at institutional and organizational framework to innovation, exploring the cases of regional innovation system in Russia and South Scandinavia. The major contribution of the research on innovation policy to sustainable economic growth, as well as to higher living standards and better rates of employment, concerns the phenomenon of different approach to clustering in Russia and the EU, based on the comparison of two case studies: implementation of the pharmaceutical cluster in St-Petersburg, Russia and the bioscience cluster in the Øresund region, Europe.

2. HISTORICAL BACKGROUND

Nowadays Russia emerges as one of the largest actors on the world economic arena. Having been the biggest and the core republic of the Soviet Union, collapsed in 1991, Russia inherited many features of the former Soviet Union's social structure as well as political and economic system, but also structural and macroeconomic problems. The country was considered to be an economy in transition for more than a decade, following the course of economic reforms and experiencing transformation of the whole economic system and institutional framework from the centrally planned to the market economy. (Almond et al., 2002, p.308)

Nowadays, along with other emerging fast growing economies Russia contributes to the global post crisis recovery, that became possible mostly due to its recent successful economic development and post crisis performance, enabled by stable higher oil and gas prices on the global market, but also by Russia's ability to succeed in implementing policies . (The World Bank in Russia, 2010, p.2) At the same time, Russia faces a challenge to make a shift to sustainable growth, moving from the natural resources- based economy to the one based on diversification and competitiveness. (The World Bank in Russia, 2009, p.12)

The history of Russia as a post-communism state is comparatively brief, covering the period of about twenty years after the collapse of the Soviet Union in 1991, though Russia existed as a state for a much longer period of time – for more than a thousand years. The nowadays Russia has undergone deep transformation in terms of all the political, economic and social institutions emphasizing structural change, with the new government facing the agenda of dealing with the legacy of the Soviet regime, when the high priority was given to the military defence, “leaving the rest of the economy to suffer from inefficient technologies and insufficient investment”. (Almond et al., 2002, p.308) The economic reform program was launched in Russia on January 2, 1992, when the government abolished most controls on wholesale and retail prices. Starting the economic transition from a state-control economy to a market one, in the early 1990s Russia pursued two major sets of reforms: macro-economic stabilization, as a structural adjustment program, and privatization program -creation of private property rights institution in Russia, followed by the mass privatization of the state assets. (Almond et al., 2002, p.338- 340)

According to Ahrend & Tompson, Russia pursued a set of such crucial reforms at the very time of the breakdown of the Soviet Union's planned economy, whereas the impact of external shocks of that time, including Chernobyl nuclear accident and its tremendous human cost, the fall of world oil prices in 1986 as well as the decline of US dollar in 1986-1987 having a negative impact on the volume of exports in the Soviet Union priced in dollars, whereas the largest share of imports was priced in European currencies, was burdened by the cumulative effect of the long-term secular decline in growth rates experienced by the Soviet Union since 1950s to the late 1980s.(Ahrend & Tompson, 2005, p.6) At the same time the growing political unrest in the country could also contributed to the fact that Russia's economy sank into depression by mid-1990s, which was further hit by the financial crisis of 1998.

According to Almond et al., given the fact that the effect of economic decline was more severe and far more protracted in Russia than in other catching up countries of Eastern Europe, Russia started to recover after the financial crisis of 1998 with surprising speed, mostly due to the rise of the world oil prices. (Almond et al., 2002, p.342) The following decade after the crisis of 1998 has become the period of the strongest economic growth, ever taken place in Russia, with almost doubled GDP and real appreciation of the rouble, meaning that the nominal GDP measured in the US dollars increased almost in 7 times over the period. There was also dramatic improvement in rates of such socio-economic indicators as real wages, total factor productivity and unemployment. Having defaulted on part of its debt in 1998, Russia managed to increase surpluses and to reduce significantly public debt, whereas also accumulating foreign assets reaching 13% of GDP in 2008. Over the decade 1998 -2008 there was a trend to decline in inflation, which was 85% in the year 1998 but reached single numbers by 2007. (OECD, 2009, p.3)

The major factor that may have had an impact on the improvement of economic performance in Russia may be attributed to stronger macroeconomic policies and structural reforms taken place in the country; however, another factor that have largely contributed to economic growth in Russia was higher oil prices at the world market, having reached its almost record level. Given the vulnerability of Russia's growing dependency on natural resources to continuous economic growth in the country, Russia aims to apply measures in order that to protect macroeconomic stability as well as to sustain long term economic growth.

3. THEORETICAL FRAMEWORK

3.1 REGIONAL INNOVATION SYSTEMS (RIS)

Innovation as the product or process development is carried out through various links between firms, competing companies and networks of production in the industry. A system approach to innovation is applied through an institutional framework, constituting a dynamic interactive network of innovative activity. Innovation for technology is able to boost the performance of national economy, to strengthen the excellence and competitiveness of companies, to advance the level of national society through the creation of new scientific knowledge for socio- economic upgrade and national enhancement.

The concept of Innovation System is an an important framework for national technological advancement. The System of National Innovation challenges the issue of socio- economic development and sustainable growth, establishing policies and institutions for commercial innovation and technological upgrade. A National Innovation System can be defined as “...the network of institutions in the public- and private- sectors whose activities and interactions initiate, import, modify and diffuse new technologies.” (Freeman, 1987, in Feinson, p.17) According to modern innovation theory, regional approach to innovation in terms of Regional Innovation Systems becomes more crucial to technological advancement, being able to provide a better institutional framework for technological upgrade and higher competitiveness as well as sustainable economic growth.*

This chapter introduces a theoretical framework for discussing the correlation phenomenon of clustering to innovation activity in terms of the regional development for sustainable economic growth, that will be applied in the empirical analysis of clustering practice in the EU vs. Russia, at the example of bioscience and pharmaceutical clusters, in part 6. The theory of Regional Innovation Systems provides good context for the tools being applied in order that to stimulate regional innovative cooperation as well as facilitate the long term knowledge-based economic growth in the country for further

* This and some other information has been taken from my own previous papers from EKHP02, EKHM04, EKHM11 courses of the ongoing Master Programme in «Economic Growth, Innovation and Spatial Dynamics”.

regional advancement, including higher living standards and better quality of life both at the federal and regional level, creation of the knowledge-based society and sustainable development in Russia.

The concept of innovation is meant to feature something new. The term innovation can be used rather broad to define any novelty, stemming from the noun of action from the Latin verb *innovare* – to make something new, to renew, to change. (Online Etymology Dictionary). Freeman emphasizes the duplex meaning of innovation: “the word is used both to indicate the date of the first introduction of a new product or process and to describe the whole process of taking an invention or set of inventions to the point of commercial introduction”. (Freeman in Newman, 1998) Innovation can be understood as “the first attempt” to implement the idea of a new product or process into practice. (Fagerberg, 2005, p.4) At the same time, innovation can be regarded as a process of creation of new products, new services, development of new methods of production, changes in management and organization. (Fasnacht, 2009, p.37) Whatever the perception of innovation is, the phenomenon of innovation as a continuous process makes a significant impact on long-term economic development.

According to the theory of regional development, the regional level can provide a better as well as a more efficient institutional framework for innovation process and knowledge transfer to take place. Playing a significant role in the process of regional innovative knowledge creation and knowledge circulation, the regional innovation system facilitates supportive coordination at the meso - , or regional, level. According to Asheim and Gertler, it is “the region's unique institutional endowment” that reinforces the local advantage in regional innovative development and knowledge transfer and, accordingly, supports regional innovation based economic growth. (Asheim, Gertler, 2005, p.291) At the meso – level the interaction between the players of the innovation process, such as local clusters, universities and firms, provide an efficient base for innovative knowledge creation and facilitate knowledge transfer; at the same time, facilitating knowledge transfer among the agents allows further enhancement of innovation activity in the cluster.

In a chronological sense, first being presented at the beginning of 1990s, the concept of regional innovation system may be regarded as a logical development of the national innovation system concept, however, with a greater emphasis on the territorial rationale.

A regional innovation system can be defined as “the institutional infrastructure supporting innovation within the production structure of a region”. (Asheim, Gertler, 2005, p.299) In a more narrow sense, the regional innovation system is primarily consisted of R&D centers, universities, research institutes and corporations. It can be claimed that Regional Innovation System is an important institutional framework addressing the issue of economic development, establishing policies and institutions for economic competitiveness as well as promoting commercial innovation.

Innovation, as a key driver for economic growth, is able to boost the economic performance of the country contributing to regional development and a significant upgrade in technology through discontinuities and, thus, accelerating economic growth. The approach to innovation as a driving engine for economic growth was first developed by Schumpeter (1934), who argued that innovation was a driving force of economic development and change, where new technologies, new products, new methods and new markets were the examples of such innovation. (Fagerberg, 2005, p.6) At the same time, given the conditions of globalization process and increased competition on the global market, innovation as well as the ability of firms to innovate allows them to challenge the advanced competitive position on the market and to provide the new growth of the venture.

According to Asheim and Gertler, geographic proximity and concentration plays a fundamental role to the knowledge and innovation process. Given the fact that innovation activity is not evenly spread in geographical terms across the regions, there is a theoretical approach that economic activity of more knowledge intensive character tends to clustering in geographical terms. (Asheim, Gertler, 2005, p.291) Moreover, being crucial for the effective creation and further sharing of innovative and tacit knowledge, the phenomenon of spatial proximity “reinforces the importance of innovative clusters, districts, and regions”. (Asheim, Gertler, 2005, p.294)

The theory claims that location and geographic proximity can make an impact on better innovative performance of clustered firms, thus, allowing to establish a challenging pattern of regional diversification. Given the fact that innovation as a prime cause lies at the basis of sustained economic growth, the enhanced process of advanced knowledge creation and increased knowledge transfer within the cluster provides the necessary foundation for regional innovative development and economic growth. Accordingly, it can be claimed that

innovation process and knowledge-enhancing structures at the regional level can be regarded as the driving force for sustainable economic growth.

According to the theory, the institutional environment as a factor of effective development is crucial for the success of innovation system. Depending on the institutional framework it's possible to distinguish three types of regional innovation systems. According to Asheim & Gertler, the first type of RIS can be determined as "*territorially embedded regional innovation system*", where firms (primarily those employing synthetic knowledge) base their innovation activity mainly on localized learning processes stimulated by geographical, social and cultural proximity, without much direct interaction with knowledge organizations". (Asheim & Gertler, 2005, p.300) The territorially embedded regional innovation systems reflect network-based, bottom- up support, representing a market-driven, non-systemic approach to innovation system. Second type of RIS is determined as "*regionally networked innovation system*", reflecting an approach where firms are still embedded in a region, but networks of interactive learning tend to be of a more structured, planned character due to the innovation policy and institutional infrastructure in the region, due to a higher level of involvement of R&D centers and universities to innovation process in the region and a more intensive degree of interaction among firms and universities. Finally, the third type of RIS, which can be reflected as "*regionalized national innovation system*", represents an approach to innovation system, where there is a higher level of strong functional integration into national innovation system and general coordination with actors outside the region. (Asheim & Gertler, 2005, p. 302)

Being fundamental to competition, geographical location and proximity may provide a comparative advantage in a global economy, where a cluster approach to innovation has become very popular in the EU. Porter defines clusters as "geographic concentration of interconnected companies, specialized suppliers and service providers, firms in related industries, and associated institutions (e.g. universities, standard agencies, and trade associations) in particular fields that compete but also cooperate. Such clusters are a striking feature of virtually every economy, especially those of more economically advanced areas". (Porter, 2000, p.253) However, given the fact that innovation occur as a result of multidimensional interaction among the various actors in the cluster, due to the existing technological trajectories and localized learning in the region, another rational is that promotion of "stronger systemic relationships between firms and the regions

knowledge infrastructure” facilitates the process of innovation and encourages competitiveness. (Asheim, Gertler, 2005, p.299)

According to Malmber and Power, the phenomenon of clustering may reflect three different perceptions. The first perception regards clustering as ”a functionally defined industrial system, composed by all the actors, resources and activities that come together to develop, produce and market various types of goods and services”, thus, reflecting its industry dimension. (Malberg & Power, 2003, p.5) At the same time, clustering may be considered as ”the spatial agglomeration of similar and related economic activity”, which constitutes the perception of phenomenon as a localized cluster. (2003, p.5) In addition, under the term clustering one may imply a rather relative understanding of its nature, more in terms of the cluster policy, which reflects the policy-driven character of the notion or even policy initiative. Accordingly, not just being a question of terminology, the phenomenon of clustering reflects at least the triple dimension of its understanding.

In a historical perspective, due to a set of initial conditions, including natural factors such as mild climate, fertile soil or richness in raw materials, energy and transportation endowment such as forests, rivers, natural ports, there has always been a tendency to cluster formation around cities or smaller regions in handicraft industries, services industries as well as science-intensive industries. However, clusters don't present just fixed flows of goods and arrangement of services in the region, but to a large extent appear as a dynamic layout of innovation and knowledge creation in proximity. (Sölvell et al., 2003 p.19) Nowadays, being crucial for the successful regional economic performance, clusters as “a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities” may include large companies and SMEs, universities and research institutes, regional government and financial institutions etc. (Porter, 2000, p.254) As a type of agglomeration activity in the region clusters can be characterized by dynamic competition, continuous upgrading and advancement of technological base, higher level of interconnection, intense cooperation, and knowledge spillovers. As a general phenomenon across nations in history clustering is particularly important in such knowledge intensive industries as pharmaceuticals, bioscience, IT and telecommunications.

Based on the theory, it's possible to claim that clusters perform as the engines of

knowledge creation. The cluster theory assumes that “clustered firms and industries will outperform others” (Malmberg & Power, 2003, p.1) in terms of the increasing firm competitiveness due to the ability to generate more of high-end sophisticated knowledge, thus, allowing the firms in cluster to function at the very edge of the technological progress. According to Sölvell et al., it is the “intense exchange of business information, know-how, and technological expertise, both in traded and un-traded forms” that constitutes the essence of cluster agglomeration and its sustainability. (Sölvell et al., 2003 p.19) Hereby knowledge transfer within the cluster network appears to be the principal rationale for the innovative development.

The theory on clustering suggests that it is the very multidimensional interaction among the agents of the cluster that enables the process of knowledge creation in the region. Given the fact that clusters are able to generate knowledge, clustering is a beneficial factor for the clustered firms, upgrading their competitiveness and enabling them to perform at the very edge of technological advancement, due to the the process of knowledge-transfer as a result of interaction of all the agents within the cluster. Being first introduced in the studies of innovation economy, the concept of the “Triple Helix” model was initially developed by its author Henri Etzkowitz, and then it got further elaboration in the works of Loet Leydesdorff. According to Etzkowitz, the interaction of “university, industry and government as relatively equal interdependent and interacting institutional spheres” constitute the foundation for a triple-helix society. (Etzkowitz et al., 2007, p.14) As a mode of linkages and interaction among University- Industry- Government triplex for stimulation of innovative development, the “Triple Helix” model “refers to a spiral (versus traditional linear) model of innovation that captures multiple reciprocal relationships among institutional settings (public, private and academic) at different stages in the capitalisation of knowledge”. (Viale, Ghiglione, 1998, p.3) The three spheres Research- Business- Government, interconnecting and converging, form a “Triple Helix” for innovation in a liberal society.

Based on the “Triple Helix” model, it's necessary to stress out the role of universities as a driving force of innovative development and growth in technology in the region. Being “increasingly central to discontinuous innovation in knowledge-based societies”, the university is considered to be the main source for future innovation- driven growth. (Etzkowitz et al, 2007, p.14) Moreover, Etzkowitz argues that it is the emergence of

entrepreneurial university within the “Triple Helix” framework is crucial for economic growth and social development in any knowledge-based society. (Etzkowitz et al, 2007, p.15) Accordingly, the “Triple Helix” model of Etzkowitz contributes to a better, outstanding role of universities for producing innovation as well knowledge transfer in the knowledge-based society.

Given the importance of successful cohesion of interconnected links, relationships as interaction among the agents of cluster for knowledge transfer to occur, the “Triple Helix” model as an efficient tool for innovation and transfer of knowledge within the cluster represents the concept of spatial organization, mutually connecting university, business and government dimension in any knowledge-based society within the framework of regional innovative development. The model is constructed on the idea that as equal agents of the knowledge-based society universities, businesses and regional authorities form a special mode of relationships among its academic, entrepreneurial and institutional settings in the region for innovation, social development and economic growth.

Given the fact that innovation in a knowledge-based society is a driving force for sustained economic growth, increasing the competitiveness of the economy, there are factors at the regional level that may influence this gaining of the competitive advantages. According to the School of the theory of competitiveness, in the knowledge-based society competitive advantages tend to be created and sustained mostly at the regional level; the interaction of economic entities within the region, including innovative firms, that implement innovative technologies and produce innovative goods, universities, that create innovative knowledge, state, that provide legal framework for innovation process and secure intellectual property rights, appear to be the driving force for the industry competitiveness as well as the factors providing economic growth. At the same time, the Scandinavian school of scientific thought emphasizes the principal role of universities and research centers in the innovation process, also providing support of continuous learning process for companies within clusters for better competitiveness. (Pilipenko, 2007, pp.170-171)

Regional innovation policy is meant to enhance innovation capacity in the region by providing the necessary framework for innovative knowledge creation, production of innovative products and advanced technologies, particularly by SMEs in the region, active interconnection of all the agents within the cluster as well as upgrading of regional competitiveness. Thus, regional level and regions are the main object of country's

innovation policy to sustainable economic growth.

3.2 PREVIOUS RESEARCH

The phenomenon of clustering in economics of Russia has been elaborated in a number of academic works of Russian scientists.

Cluster as a concept as well as cluster approach have been discussed in the work of K. Z. Adamova : “Clusters: concept, conditions of creation and functioning” (2008), in the works of U. G. Lavrikova: «Clusters as market institution of spatial development in the region's economy” (2008) and “Clusters: strategy of formation and development in the regional economy” (2008); in the work of F. M.-H. Bekbuzarova: “Boosting regional economic policy through cluster technologies” (2009); in the paper of A. A. Malafeev: “Cluster approach to organization of industry's innovative development and the possibilities of its modelling” (2009). The implementation of clustering in Russia as well as cluster development in the regional economy of Russia got elaborated in the works of I. G. Pilipenko: «Competitiveness of the country and development of spatial forms of production organization in the regions of Russia” (2007) and «Implementation of cluster policy in Russia” (2008);in the scientific study of U. G. Lavrikova: “The conceptual framework and practice of implementation of cluster approach in the regions of Russia” (2008); in the work of K. Z. Adamova: “Cluster policy as a tool for enhancing the competitiveness of the national economy” (2009). Clustering and clusters at the territory of Russia as well as perspectives of its development have been discussed in the work of N. I. Teterin: “Analysis of existing and evaluation of potential/ emerging clusters in the regional economy: the case study of Saratovskaya region” (2009); in the work of I. M. Guliy: “Cluster approach to the machinery complex in Vologodskaya region” (2009); in paper of N. E. Egorov: “The Industrial innovative mega- cluster in South Yakutia” (2008).

Some of the works will be used as empirical data for textual analysis in the case study of Russia in Chapter 6.

4. METHODOLOGICAL FRAMEWORK, EMPIRICAL DATA AND SOURCE CRITICISM

4.1 TEXTUAL ANALYSIS

The project will be conducted in terms of implementing a qualitative approach to research. Here I consider a qualitative approach as defined by John W. Creswell in his book "Qualitative inquiry and research design. Choosing among five traditions"(1998, Sage Publication, Inc., USA): "Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting." (Creswell, 1998, p.15) When choosing an approach for the research, I have considered such criteria as the research problem "How cluster approach can enhance innovation capacity of Russia?", which is highly relevant, from this point, to be engaged in a qualitative study, and to some extent the personal experience of the researcher.

Given the fact that the aim the study is to explore the development of cluster policy in Russia vs. the EU, also based on official texts and outlines of state programs as well as other researcher's scientific works on the phenomenon, the method of Textual Analysis will be applied in the research as "an effective method for understanding and evaluating" of different types of texts. (Hartin Lorio, 2003, p.165) It can be also argued that due to a rather limited scope of time intended for the research the chosen method is a good alternative for conducting a qualitative study.

4.2 EMPIRICAL DATA

In my research I'm going to use and to analyse data from secondary sources, including official papers and public documents as well as other researcher's academic studies.

Documents may include both official papers and public documents of the EU and Russia's state. In particular, among the official papers within the case of Russia I'm going to include into analysis texts of the state federal and regional programs of socio-economic development in Russia: the "Concepts of long-term socio-economic development of

Russian Federation for the period up to 2020”, approved by the Prime Minister of Russian Federation V. Putin in 2008, and the “Strategies of development for science and innovation in Russian Federation for the period up to 2015”, approved by the Ministry of Science and Education of the Russian Federation in 2006, both focused on the enhancement of economic growth in Russia. Among the official documents included into the comparative analysis research to the EU case there are also the guidelines from the EU government websites, including the Lisbon strategy as a plan for the development of innovation policy in the EU as well as the outline of the European cluster policy, taken from the European Commission website for textual analysis.

I will also analyse the text of the regional “Concepts of pharmaceutical cluster development in St-Petersburg” (2010), which is an official document, prepared for the governor of St-Petersburg Valentina Matvienko and approved within “ The strategy of pharmaceutical industry development in the Russian Federation for the period up to the year 2020”, for the comparative analysis of implementation experience with the Øresund bioscience cluster in Scandinavia.

In the empirical analysis I will also use such secondary sources as academic researches and studies, conducted by other researchers on the issue. For example, to the case of clustering in Russia I will apply the studies of such known Russian scientists as Tatarkin A.I. & Lavrikova U. G. and their “Cluster policy in the region” (2008) as well as Lavrikova's study “Clusters as market institution of spatial development in the region's economy” (2008), works of Pilipenko I. V. - “Implementation of cluster policy in Russia” (2008) and «Competitiveness of the country and development of spatial forms of production organization in the regions of Russia” (2007), the research of Golovanova S. V., Avdasheva S. B., Kadochnikov S. M - “Innovative clusters and structural change in the economy of Russia” (2010) as well as the study of Lenchuk E. & Vlaskin G. - “The cluster approach in the strategy of Russia's innovative development” (2010), that discussed in their works the phenomenon of clustering in Russia within the framework of its regional development for innovation.

Among limitations of this type of empirical data – documents -that will be used in the research can be the following: 1) documents may be protected or unavailable to public access information 2) materials may turn out to be incomplete 3) it may be time-consuming

to search information in hard to find places 4) the documents may not be authentic or accurate. (Creswell, 2003, p.186) Along with another possible limitation, when working with texts – language, which is still not the issue of the present research but more of an advantage due to the fact that all the sources required for the study are either in Russian or English language, it is the validity of data that might be a concern. However, application of the 20 criteria to verification and assessment of standards of quality in qualitative research, suggested by Creswell, can be regarded as important as description, interpretation, and evaluation. (Creswell, 1998, p.194)

5. EMPIRICAL ANALYSIS

5. THE CLUSTER APPROACH AND REGIONAL INNOVATION SYSTEM: THE CASE STUDY OF THE EU

5.1. INNOVATION POLICY AND INNOVATIVE CLUSTERS

The concept of Innovation Policy is one of the most important criteria to consider in the national innovation system. Emerged in the mid-1990s as an attempt to boost European competitiveness, Innovation Policy is a paradigm focusing on technology and innovation. It's generally agreed that innovation can be regarded as a driving force for economic growth and competitiveness, being able to challenge the issues of economic performance and development; the new paradigm is known as “insisting on a wider and more “systemic” vision of innovation as opposed to the previous linear expectations of technology”. (Borras, 2003, p.15)

In the European Union there is a high focus on innovation paradigm among the countries. It enables the member states to achieve higher competitiveness as well as to create new job opportunities on national and regional markets, at the same time facilitating access of new innovative products and services to the European market. Aiming to boost the economy as well as to increase the maximum competitive of the European Union market by 2010, the Lisbon strategy, launched in March 2000, became an action plan for

all member states in terms of the development of innovation policy in the EU. (Europa: http://europa.eu/legislation_summaries/research_innovation/research_in_support_of_other_policies/n26021_en.htm)

In order that to make the EU the most successful competitive economy in the world there is a great emphasis in the Lisbon strategy on innovation and innovation process, particularly on rather ambitious innovation policy, with a special focus on SMEs ; at the EU policy level there is a challenge to put the European SMEs companies at the very edge of innovative decision-making unlocking its growth potential as well as enhancing its innovation capacity. To assist SMEs in question the European Commission started a support program in 2008 called Enterprise Europe Network, which is meant to promote international cooperation as well as international trade and investments, aiming to attract additional FDI to the region, to facilitate establishment of technology-based partnerships among SMEs, to assist SMEs experiencing technical issues as well as to stimulate innovation etc. (Schmiemann, 2008, p.3) Aiming to support and to provide better opportunities for the SMEs from all sectors of the EU market, the Enterprise Europe Network program became a part of the EU policy for promoting economic growth and entrepreneurship.

In addition, the innovation policy of the EU aims to enhance the performance of companies, also contributing to such social and economic objectives as better job opportunities for experts and specialists in the European countries, creation of new jobs at the market, effective regional economic development, achievement of knowledge-based sustainable growth etc. In order that to meet the goals there is a wide range of policy tools being applied in the EU: establishing of supportive environment, strengthening the Intellectual Property Rights (IPR) system, investing into the human capital, upgrading skills and competences of the workers as well as improving training and education; standardizing and effective implementation of norms in the EU in order that to create interoperability and to provide future technological innovation, to ensure legal security for innovative firms and to build confidence among customers; boosting the development and innovation capacity of the regions, emphasizing the role of networks linking businesses and companies with research institutions and universities and forming cluster initiatives at the regional level. (<http://ec.europa.eu/enterprise/policies/innovation/policy>)

At the same time, in the EU there is a great emphasis on cluster policy in terms of the innovation framework. Clustering is one of the tools within the innovation paradigm of the EU able to boost its innovation capacity as well as to strengthen the competitiveness of the European Union and the member states. Providing supportive business conditions and friendly environment for all companies in the region, including SMEs, clusters facilitate collaboration as well as a knowledge-transfer among research institutions, universities, customers and businesses. One can't underestimate the role of SMEs in terms of the cluster policy: according to Eurostat Statistics 2009, SMEs can be regarded as the main drivers of economic growth in Europe between 2004 and 2006, showing faster growth than large firms. (Schmiemann, 2009, p.1) Given the strategic importance of clustering for economic development of the region, the European Commission has outlined a cluster policy framework for better assistance to the EU country members in supporting clusters, also aimed to enhance the level of regional excellence, to stimulate transnational cooperation as well as to encourage the integration of SMEs into clusters and to foster its innovativeness. (<http://ec.europa.eu/enterprise/policies/innovation/policy/clusters>) In the thesis I will consider the cluster policy as a way to organize the microeconomic politics towards the innovative clusters in the country within the innovation paradigm to be efficiently applied in Russia as well as in the European Union and other advanced countries.

5.2 REGIONAL INNOVATION POLICY. CLUSTER STRATEGY IN DENMARK

There is a strong relationship between innovation and regional economic growth, where innovation activity and knowledge flows appear to foster and to boost the growth. Given the fact that knowledge- and innovation-intensive activity tends to be clustered in geographical terms, it's necessary to emphasize the positive impact of regional policy implementation on socio-economic development and innovation-based economic growth in the country, enabling it to perform at the very edge of technological advancement and competitiveness. (http://europa.eu/pol/reg/index_en.htm) Moreover, cluster promotion innovation policy as a policy of regional development is considered to be particularly beneficial for the regional growth in the EU, also giving an opportunity for lagged and peripheral regions to catch up as well as to strengthen its socio-economic potential and also to enhance the level of employment.

(http://ec.europa.eu/enterprise/magazine/articles/innovation/article_10770_en.htm)

Given a growing level of European competitiveness, Denmark as one of the most-advanced economies in Europe is still in the top of the best EU performing countries with one of the highest levels of innovation capacity in Europe. It can be claimed that there is a strong relationship between innovation activity and regional development in Denmark. At the national level there is also a focus on the importance of regional innovation policy for economic growth. The Danish Globalization Strategy as well as cluster innovation policy, promoting core competences of the region, on the one hand, but also facilitating connection of smaller regions to the knowledge system, on the other hand, aim to make Denmark the most innovative and the most competitive country in the world.

It's generally agreed that the core competences of Denmark are high-tech, pharmaceuticals and agro- production. Given its beneficial institutional environment, there is a few innovative regional clusters of firms embedded into regional innovation framework in Denmark. To give an example of innovation clusters in Denmark one may consider such high technology sectors as pharmaceuticals and bio-tech that are geographically concentrated in Medicon Valley, the Øresund Region. Given a growing role of clusters in the innovation policy, the new innovation strategy is intended to intensify the strengths and advantages of the region, but at the same time to adjust cluster policies to the specific conditions of the target region. (Christensen et al., 2005) Moreover, the Danish Mega Clusters (DMC) approach is going to play a central role in the innovation strategy, allowing to apply specific policy implications on each cluster in order that to provide better conditions for its growth and development. (Dahl, 2000)

Adopted by the government in 2006, the Danish Globalization strategy as an innovation program includes the increase of the amount of money allocated to innovation and research. One of the main objectives of the innovation plan is even further enhancement of institutional framework in order that to strengthen interaction, coordination and collaboration between universities, companies and other stakeholders within the national innovation system. Another objective of the new innovation policy is a stronger focus on SME's sector development as well as enhancement of interaction among research institutions and SME's in the region. (<http://www.proinno-europe.eu/page/innovation-and-innovation-policy-denmark>)

5.3 THE CASE STUDY OF THE BIOSCIENCE CLUSTER IN SCANDINAVIA

The bioscience cluster in the Øresund region of Scandinavia, first introduced in 1994, provides a good environment as well as opportunities for many innovative bio-tech and pharmaceutical companies. Connected over the ocean by the Øresund bridge in 2000, the cluster became known as the Medicon valley, situated in the two European countries, including the part of the greater Copenhagen in Eastern Denmark and Skåne region in the Southern- Western Sweden, also contributing to trans- border regional integration within Europe. The bioscience and biotechnology industry in the region has long historical roots, tracing back to almost a century ago as long as the 1880s, when the first research laboratory of Carlsberg Breweries was founded in Copenhagen. Given an extensive bioscience and medical research in the region as well as a larger university network and collaboration in the area, providing beneficial conditions for a number of pharmaceutical companies to start up, the Øresund bioscience cluster has also a significant impact on the regional socio-economic development, strengthening its competitiveness and enhancing knowledge-based economic growth. (<http://www.mediconvalley.com/>)

The bioscience cluster in the Øresund region can be regarded as one of the leading innovative life science clusters in the world. Having estimated the “Bio-Innovation Quotient” for each country, the Biotechnology Industry Organization in “Scientific American's Worldview 2010” has put the Øresund region within the world top five innovative bioscience clusters, along with the other most advanced innovative countries as the US, Canada and Singapore. (<http://biotech-now.org/section/events/2011/05/06/podcast-scientific-american-s-worldview-2011-preview>)

It's possible to claim that bioscience innovative clusters make a positive impact on the socio-economic development. The bioscience cluster may include companies and university centers within such scientific fields as biotechnology - an area of bio- molecular and cellular processes research, pharmaceuticals and R&D in Life Sciences. It can be claimed that bioscience clusters are able to solve the global issues as well as to enhance the quality of life of many people, but also to meet this challenging problem of the advanced society - to heal and to feed the lagged regions of the underdeveloped world, among others by researching breakthrough products and technologies. Innovation and advances in bioscience may provide the basis for better quality of life as well as higher

standards of living by better prevention, detection and cure of diseases, including previously untreatable ones, production of newest drugs and medicines that can treat oncological and serious infectious illness; advances in bioscience may have an impact on the rates of pollution as well as to enhance global environment, to refine technologies as well as to provide better, cleaner and more cost-efficient types of energy, to increase agricultural yields and to save millions of children's life. In addition, the bioscience cluster for innovation in Europe may enhance performance and competitiveness of the agricultural industry in the EU: to enhance crops tolerance to insects and herbicides in order that to have higher crop yields, to low the volume of used chemicals in agriculture in order that to reduce the product leftovers into the environment, to provide enhanced and cheaper nutrition for crop in order that to avoid feed deficiency and to get a better quality product at a less cost, to use bio-tech crops in order that to reduce the time of "tilling farmland" etc. (http://bio.org/about_biotech/)

The phenomenon of the Øresund bioscience cluster evolution is discussed in the paper of B. Asheim and J. Moodysson "The Øresund region: A dynamic region in Europe due to inter-regional collaboration?" (2008). The authors argue that regional integration and collaboration off all stakeholders within the Øresund cluster enhanced socio-economic development of the region. Given the fact that 60% of pharmaceutical companies in Scandinavia are located in the Øresund region due to its beneficial bio- scientific research environment, incorporating 11 host universities and 26 clinical hospitals, formation of the cluster of bioscience industrial specialization, enhanced the competitiveness and rates of employment in the region. (Asheim & Moodysson, 2008, p.5)

Along with universities in the Øresund bioscience cluster as the main drivers for innovation and advances in technology, larger pharmaceutical companies and SME's in the area are another important actors of innovative process and successful economic development in the region. Within the integrated Øresund bioscience cluster there are about 130 biotech enterprises, 130 medtech firms and 70 pharma companies located in the region. The largest companies include "Novo Nordisk A/S" with 9000 of employees, "H. Lundbeck A/S" (Denmark) with 2100 employees, "Coloplast A/S" (Denmark) with 1990 workers, "Novozymes A/S" (Denmark) with 1669 workers, "AstraZeneca R/D Lund" (Sweden) with 957 workers and "Pfizer Health AB" (Sweden) with 850 workers. (Asheim & Moodysson, 2008, p.7) The total amount of employees occupied in the Øresund

bioscience cluster is about 40 000 of people.

(<http://www.mediconvalley.com/content/us3/workforce>)

As the main actors of the Øresund bioscience cluster in Scandinavia, universities as a source of innovation play an important role in the Øresund cluster, providing necessary scientific basis for successful innovation process in bio -science and pharmaceuticals within the three dimensions. The first role of universities is to provide education of the world level in order that to build and to sustain the pool of highly -skilled specialists and researchers in the field of bio-science. The highly-educated workforce in the Øresund region is provided by 150 000 university students, whereas 45 000 students study life science. (Highly Educated Workforce: <http://www.mediconvalley.com/>) Another dimension of the university's impact is scientific and clinical research. In the Øresund region the most important universities are the University of Copenhagen in Denmark, founded in 1479, with 37 000 students and about 7000 employees, and the University of Lund in Sweden, founded in 1666, with 40 000 students, 6000 employees and about 3000 postgraduates, both having a larger scope of scientific research, particularly in the fields of medicine, chemistry and biology. The third dimension of universities is collaboration and integration between universities and enterprises, among others in order that to contract research as well as to commercialize scientific research and to start-up SME's as innovative, knowledge-intensive firms by university researchers.(Asheim & Moodysson, 2008, pp.7-9)

In conclusion, it can be claimed that it is the more intensive level of collaboration among universities and enterprises in the Øresund region in terms of the bioscience research and its commercialization as well as particular institutional environment within the innovation framework at the regional level in the two European countries Denmark and Sweden contributed to the regional competitiveness and facilitated the world success of the Øresund bio-science cluster in the Northern Europe.

6. CLUSTER APPROACH AND REGIONAL INNOVATION SYSTEM: THE CASE STUDY OF RUSSIA

6.1 CLUSTER POLICY, COMPETITIVENESS OF RUSSIAN ECONOMY AND THE LEGACY OF THE SOVIET PLANNED SYSTEM

6.1.1 CLUSTER POLICY IN THE REGIONAL DEVELOPMENT OF MODERN RUSSIA

Cluster approach as a tool of the innovation policy to socio-economic and regional innovative development has received much of attention in Russia nowadays. Given the positive experience of clustering in advanced European economies to competitiveness and innovation-based growth, cluster policy in Russia is widely considered to be an effective way to enhance regional competitiveness and regional innovative development, also meeting the goals of socio-economic development in Russia, including higher salary and higher living standards in the region - as well as facilitating sustainable economic growth in Russia. Clustering in Russia for innovation and upgrade in technologies can become the driving force for economic growth, enabling this challenging shift from the source-based economy to the new model of innovation-based sustainable economic growth.

Clustering as an effective way to enhance regional competitiveness, facilitating the interaction of all the agents of the innovation process in cluster – businesses, universities and state - and providing the framework for knowledge transfer can be regarded as an universal means to regional advancement. According to Tatarkin and Lavrikova, cluster as a tool of regional development makes an integrating impact on the goals of regional strategies of Russia, aimed to increase competitiveness of the regional economy as well as to enhance regional social infrastructure and educational level in the region; the objectives of industrial policy, meant to create competitive industry complex in the region; the challenge of the national innovation policy of Russia to make a shift to the innovation-based model of regional development as well as to advance the role of SMEs in the innovation process within the region etc. (Tatarkin & Lavrikova, 2008, p.2)

Given the crucial role of SMEs to regional development in the advanced European countries, it can be argued that clustering to regional development can reduce the issue of

under-performance of small and medium sized companies in Russia, that are assumed to play a strategically significant role in the process of innovative knowledge creation within the cluster in a strong cooperation with universities and research centres in the region, better contributing to the innovation process and economic growth.

6.1.2 TPCs -TERRITORIAL PRODUCTION COMPLEXES AS A MODEL OF REGIONAL DEVELOPMENT IN RUSSIA: HISTORICAL PERSPECTIVE

According to the theory, regional framework can provide a better support for the upgrade of Russia's innovation capacity. At the same time, the modern organization of regional development in Russia bears the traits of the Soviet system of socio-economical and geographical planning with a strong focus on larger enterprises in terms of the so-called territorial-production complexes (TPCs). Having been created at the time of the Soviet central planned economy and then implemented that time within its geographical economy framework, the structure of Russia's regional economy is formed at the base of territorial-production complexes (TPCs) model, which tended to be the main regional policy tools in the federal districts of the Soviet Union. It can be claimed that the model of territorial-production complexes can be regarded, to some extent, as the Soviet model of cluster.

From the market perspective, territorial-production complex as a Soviet model of cluster can be characterized by a strong focus on large companies production, with a minimum stimulus of competitiveness among the players as well as its weak market orientation. Being concentrated on a certain compact, limited territory and having a single productive and social infrastructure, any territorial - production complex as a planned set of stable interrelated and interdependent, equally developing objects of various branches of industry was created for a joint economic performance within the region. (Golovanova et al., 2010, p.40)

From the historical perspective, territorial-production complex as a model of regional organization was largely implemented in the Soviet Union. For the first time being determined in 1920s by a Russian scientist Kolosovskiy N. N. , the founder of the science of economic geography in the Soviet Union, the notion of territorial-production complex can be regarded as the principal element within the science of theoretical economic geography in the Soviet economy. A territorial-production complex can be defined as an

interrelated and interdependent combination of production industries in a certain geographic location or area, which is at the same time a part of the whole economic complex of the country or some economic region. (Encyclopedia of Economic Geography: http://dic.academic.ru/dic.nsf/enc_geo/280)

In 1970s the Soviet government clearly outlined a strategy of the country's regional industry development. Within the new paradigm of regional development, became known as "The shift of production forces to the East" program, the greatest emphasis was put on the development of the Eastern regions of the Soviet Union, particularly the regions of Western and Eastern Siberia as well as the Far East region. Due to the challenge imposed by the decision, the question of territorial-production complexes' creation and development became strategically important. Since that time the model of territorial-production complexes was considered as a primary cell of any economic region. At the same time, this type of territorial-production organization was actively applied to the newly- developing regions. For example, in 1971 there was just five Eastern territorial-production complexes that the government planned to develop: Sayanskiy, Middle-Obskiy, Krasnoyarsko-Achinskiy, Bratsko-Ust-Ilimskiy and Irkutsko-Cheremkhovskiy industrial districts. (Pilipenko, 2008, p.19)

At the same time it was also evident that due to the severe climate conditions as well as the large size of Russian Eastern territories it would be very difficult to create an extensively urbanized area in Siberia and the Far East region, similar to the European part of the Soviet Union, as well as to build a considerable amount of plants necessary for its advancement. However, it was generally accepted that the new model of territorial-production complexes as a form of regional development, that had been elaborated the way as to meet the challenge of Eastern Russia regional development, would be a success. According to Bogachev V. N., from the practice of economical development of Russia it was strategically necessary to create industrial nodes in Siberia as well as to establish territorial-production complexes of clear specialization in the region, with a minimum amount of workers necessary for its performance and maintenance, but at the same time extracting the resources, particularly oil and gas, which were of special importance to the national economy. (Bogachev in Pilipenko, 2008, p.20) Being a successful model of regional development, the TPC- approach kept being actively applied also in the post-Soviet Russia.

Accordingly, when planning the structure of spatial organization and territorial-production complexes in the Soviet Union, the main goals that had to be taken into consideration were: 1) process optimization of raw material extraction; 2) optimization of spatial disposition of industrial enterprises as well as the factories of agricultural sector; 3) optimization of social accommodation facilities and social infrastructure in the region, including schools, universities, research centres, libraries etc. (Pilipenko, 2008, pp. 20-21) At the same the model of territorial-production complexes assumed creation of links and connections among the neighbour territorial-production complexes as well as the development of regional complementarities. The model of territorial-production complex is primarily applicable in the regions with low density population and poor development of the manufacturing industry, which are specialized within the raw material sector. (Golovanova et al., 2010, p.41)

Clustering is not quite new phenomenon in Russia. Due to the fact that there was a special focus on the creation of larger industrial enterprises in Siberia, specialized on the natural resources extraction and heavy manufacturing production, these regional industrial complexes determined the territorial organization and contributed to the regional development of Russian economy.

6.2 OVERVIEW OF CLUSTER DEVELOPMENT IN RUSSIA IN 1999-2010

6.2.1 CLASSIFICATION OF CLUSTERS

Due to the fact that clustering as a paradigm is a rather new phenomenon in Russia, having received much of academic attention among the Russian scholars only during the last twelve years, whereas nowadays being in the process of active implementation at the federal and regional levels, there is no single classification of clusters in the literature being elaborated for the practical use and cluster policy implications. Taking into consideration that the contours of a cluster model seem to be rather vague, it's even more important to be aware of its general trend of development, so that to be able to form the approach to be applied later as well as to create a legal framework for its support.

Based on the practice of its formation, it's generally agreed that there could be several types of clusters in Russia. According to the Russian scholars E. Lenchuk and G. Vlaskin,

a very general classification of clusters in terms of its formation and development, which has been presented in Table 1, may include such criteria as industry orientation, the type of policy and its goals, spatial and geographic location. (Lenchuk E., Vlaskin, G., 2010, p.49)

Table 1

Classification of cluster types in Russia

Model	Geography	Orientation	Clusters
Innovative	Siberia	Bioscience, Medicine, Nanotechnology	Altaic Biopharmaceutical cluster “Altai-Bio”, Novosibisky Bio-cluster
Industrial	Volga region	Automotive, Engineering/Machinery, Aviation	Volga Automobile production cluster (Samara), Ulyanovsky Aviation cluster
Dynamic	Central Federal District	Textile industry, some other industries lost its share of the market	Ivanovsky Textile cluster
Restructuring	South Russia	Agricultural and Food industries	Krasnodarsky Agricultural cluster

Source: Lenchuk E., Vlaskin G., “Кластерный подход в стратегии инновационного развития России»// «The cluster approach in the strategy of Russia's innovative development”, p.49

However, classification, developed by Lenchuk and Vlaskin, may not be regarded as a complete one, since, for example, it doesn't reflect such an important industry in the Russian economy as oil industry but also gas industry or energetics. In spite of the fact that the thesis doesn't aim to establish a new classification of clusters, in this chapter I will try to provide a general framework of cluster formation principles in Russia nowadays.

6.2.2 CLUSTERS VS. TPCs IN MODERN RUSSIA

As it has been already outlined in part 7.2.1.2, TPCs as territorial production complexes represent the legacy of economico- territorial organization of the Soviet planned economy. According to Russian scientists Pilipenko I. V. (2007) and Golovanova S. V. (2010), clusters and territorial-production complexes (TPCs), both representing a model of territorial organization of economic activity, correspond to different socio- economic systems and levels of country's development. Reciprocally, territorial-production complexes as an element of economico- territorial organization that, to some extent, can be regarded as “the Soviet model of cluster” represents industrial and post-industrial stage of economic development, in the past inherent for the socialist system's countries; whereas clusters as a model of economico- geographical organization correspond to the spatial dynamics in the market economy of the knowledge-based societies.

Along with different theoretical concepts of geographical organization of economic activity, developed in fundamentally different socio-economic systems, another factor of cluster and territorial-production complex unlikeness is its different production structure. Territorial-production complex can be regarded as a multi -branch setting with a group of few principal industries of specialization, which also assumes development of other related productions. In addition, territorial-production complexes and the way of its development were controlled centrally by Gosplan and central committees. Cluster as a network of independent firms and productions, located in geographical proximity and working in a single industrial sector or sub-sectors, also includes universities and research sectors, educational organizations and administrative control bodies.

At the same time, territorial-production complexes and clusters differ in terms of its specialization. Territorial-production complexes tend to be concentrated in such industries as chemical, metallurgical, mining, heavy engineering and other manufacturer oriented industries, whereas clusters are likely to develop in new high- tech sectors of economy, particularly IT and bioscience, which, in comparison to heavy engineering, are more consumer oriented. (Pilipenko, 2007, p. 25)

Furthermore, territorial-production complexes and clusters as models of socio -

economic development appear to be different in terms of its geographical location. Thereby, the model of territorial- production complexes was actively used for the strategical development of new regions in Russia, which were mostly situated in Siberia and the Far East and were characterized by severe climate conditions as well as low density of population. Under the circumstances this territorial-production complex model was a success, meeting the challenge of production shift to the undeveloped regions. In contrast to this model of territorial-production organization , clusters tend to be formed in well-developed, populous regions, with a well-established educational chain and infrastructure, including universities, scientific centres and research universities.

Finally, another discrepancy between the concepts of territorial -production complexes and clusters lies in the formation of its spatial organization and knowledge flows. Within the framework of territorial-production complex there is a few large vertically integrated mills, with little, if any, information flows among the enterprises and research centres. At the same time, cluster is not a simple aggregation of firms situated within any geographical proximity or representing related industries - the idea of cluster assumes that there is a positive interaction as well as knowledge-transfer among all agents of cluster, including universities and SME's, which constitute the principal foundation of the cluster.

Representing the advanced model of economico - geographical organization clusters in Russia can be divided in accordance with the type of its formation.

6.2.3 EFFECTIVE AND POTENTIAL CLUSTERS

Due to its successful development and nowadays performance as well as its positive impact on socio -economical advancement of the region, there are a few clusters in Russia that can be regarded as a type of effective cluster. An example of such an effective cluster in Russia can be a petrochemical cluster in Tatarstan republic. The republic of Tatarstan is generally known for its well-established structure of oil-production, petrochemistry and automotive industries. In Tatarstan there is produced 8% of oil in Russia, 64% of styrene, about 40% of ethylene and polyethylene. Moreover, Tatarstan manufactures about 30% of car tyres and about 50 % of diesel trucks in Russia Formed at the base of an industrial-production complex, the petrochemical cluster in Tatarstan incorporates such major industry enterprises as “Tatneft”, “Nizhnekamskneftehim”, “Kazanorgsynthes” and

“KamAz”. (Kasymova, 2008, <http://www.tisbi.org/science/vestnik/2008/issue1/eq6.html>)

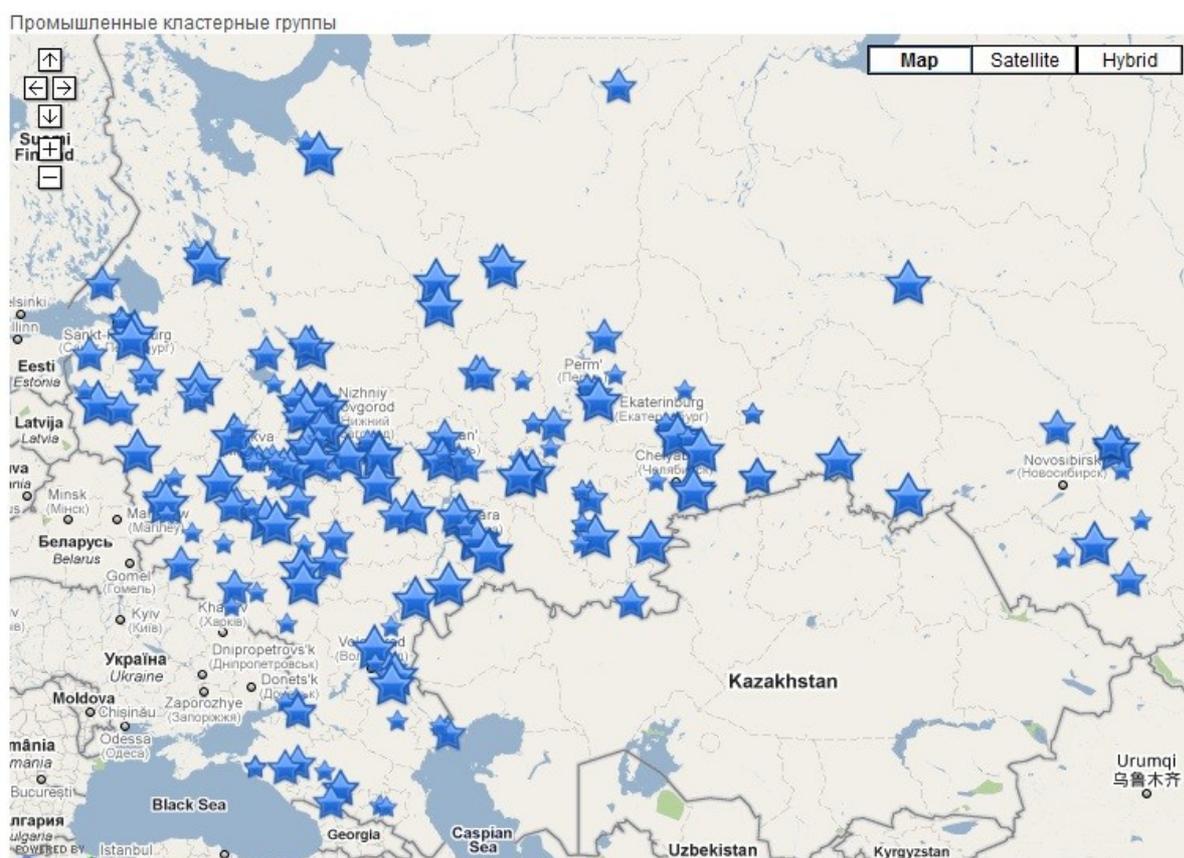
The region challenges to solve the main economic objective - that is to make a shift from a resource model of the economy to the innovation-based model. Accordingly, established as a single interrelated complex of several industry branches, this huge petrochemical cluster in Tatarstan facilitates creation of aggregated product innovation and an increase of the cluster competitiveness.

The potential clusters as an area, industry or territorial aggregation that appear to have all initial factors and elements for the establishment of a successful cluster can be developed in accordance with the regional or federal cluster programs. For example, regional program of Sverdlovskaya area development assumes creation of Uralsky automobile cluster, focusing on the competitive production of cars and trucks, but also automotive components as well as military machinery. Given the large potential of Sverdlovskaya region automobile performance, the Headboard of the principal enterprise in the cluster ZAO “Automobiles and motors of Ural”, Novouralsk, that have a series of long termed agreements with foreign companies in China, including FAW, Geely, ZX, FOTON, contemplates to produce about 60 000 of Geely Otaka cars, 7000 of Land Mark SUVs, and about 12,500 trucks annually. The challenge of Uralsky automobile cluster is to increase the level of cooperation and interaction and to stimulate innovation activity among the enterprises producing cars in the region , to upgrade quality control systems of automobile mills to ISO/TU 16949 standards and to advance the technologies of car production, thus, increasing competitiveness and economic performance of all enterprises in Uralsky cluster and the Sverdlovskaya region. (Tatarkin & Lavrikova, 2008, p.12)

6.2.4 INDUSTRY AND REGIONAL CLUSTERS

Incorporating enterprises within a single industry or industry branch, the industry type of cluster is largely represented in Russia. To give an example, there is a high technology titanium industry cluster “Titanium Valley” created in Sverdlovskaya oblast'. Aiming to attract foreign investments and to create new enterprises within the branch as well as new working places in the region, the “Titanium Valley” cluster is formed at the base of OAO “Corporation VSMPO-AVISMA” in a city Verkhnya Salda, making 27% of titanium of the world production. (Lavrikova, 2008, p.39) The research intensity within the cluster is

provided by close interaction among universities, enterprises and regional government in Sverdlovskaya oblast'. When establishing a titanium cluster in Sverdlovskaya oblast', one of the challenges that the region is aiming to reach – is first of all further strengthening of Russia's competitiveness at the world titanium market, but at the same time it's also challenging to provide a new form for sustainable economic growth in Sverdlovskaya oblast' and to facilitate the higher competitiveness of the region.



Picture 1. Map of Industrial cluster groups in the Russian Federation

Source: Subcommittee of the Russian Chamber of Commerce for development of subcontracting and cluster technologies, 2010, <http://promcluster.ru/>

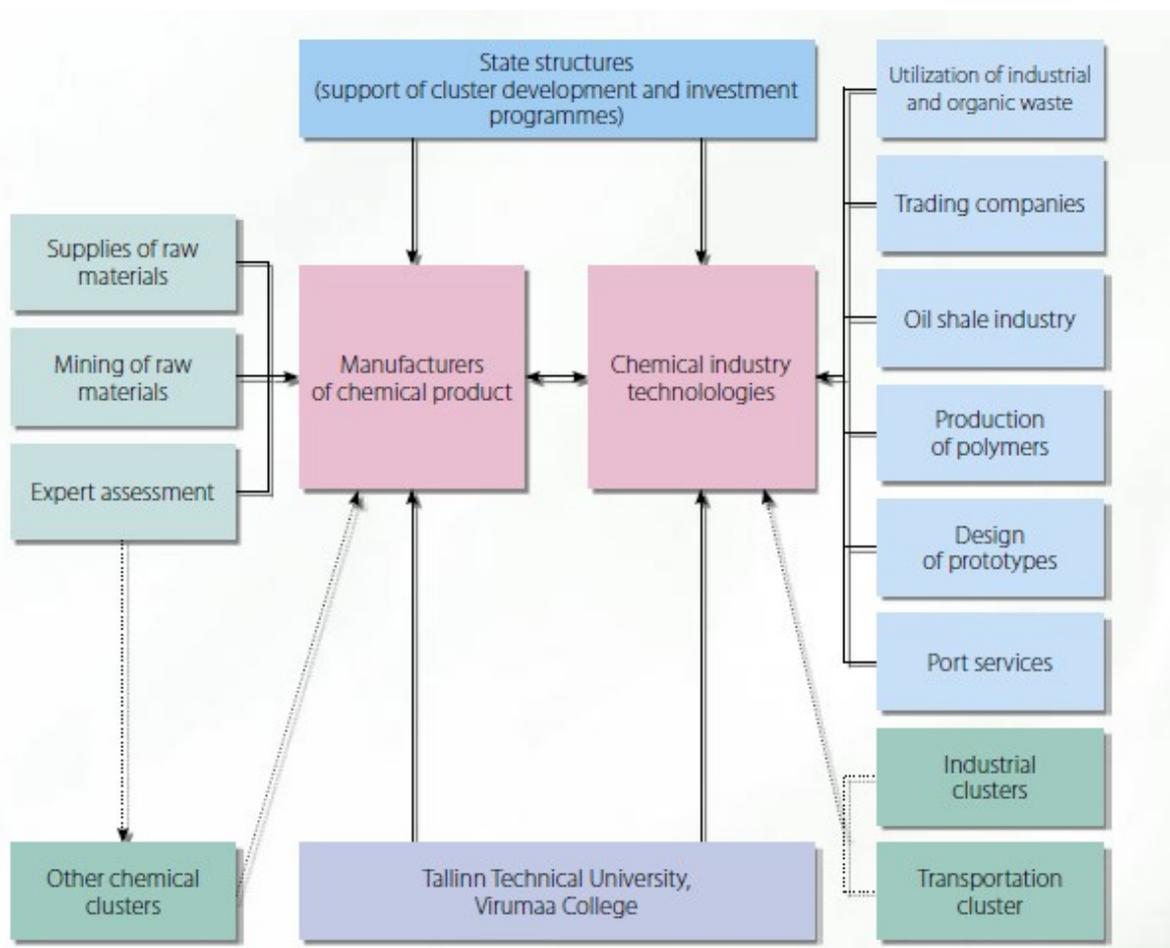
In contrast, regional clusters tend to reflect a single territory - the geographical scope of cluster dimension. Either localized within a certain geographic area or city, or dispersed over a larger district or region, regional type clusters have been actively formed in Russia. One of the regions, where the cluster approach has been actively implemented, is Samarskaya oblast', which is one of the most advanced industrial regions in Russia. Nowadays the industrial complex of Samarskaya oblast' includes 400 large and middle size enterprises as well as over 4 000 of small businesses. Moreover, the region facilitates

creation of special infrastructure in Samarskaya oblast' cluster for innovation, enabling generation of knowledge and knowledge transfer in the region. Aiming to boost innovation activity and to stimulate development of potentially effective, knowledge intensive technologies in Samarskaya oblast', there is a regional program, called "Innovation-Production – Market", which provides the state support for innovation and high technology projects in such industry sectors as automotive, air and space industry, petrochemical etc. (Lenchuk, Vlaskin, 2010, p.54)

6.2.5 TRANS - BORDER CLUSTERS: ST- PETERSBURG + ESTONIA CLUSTER

Trans-border clusters reflect the economic agglomeration in the border regions of neighbouring countries. At the same time, it has to be preliminary stated that, in general, nowadays trans-border clusters in Russia tend to be of potential character, unless there exist initial necessary conditions and international cooperation within the sector in question for the cluster formation, but the cluster has not been formalized as regional. The chemical cluster in St-Petersburg region, Russia and the North-East part of Estonia can be regarded as one of the most representative examples of that type of clusters in Russia. Particularly, it's estimated that negotiations on commercialization of innovations will include utilization of oil shale waste materials as well as production of fertilizers in Russia and further certification of products in Estonia under the EU regulations. There are about fifteen Estonian companies that are likely to participate in the Russian – Estonian chemical cluster, including "Baltford Technology Engineering OU" in Narva, specialized in design and production of prototypes, running-in and taking technologies and equipment, utilizing hydrocarbon waste to industrial design levels, "VKG AS" in Kohtla-Järve, an oil shale processing company, "SilSteve AS" company in Sillamäe, specialized in cargo transfer, packaging arrangements, sorting and labelling; initially there are eighteen Russian companies that may be incorporated into the cluster, including OAO "Slantsy" plant in Slantsy, with a specialization in petroleum coke tempering, industrial production based on petrochemical raw materials, chemical-recovery production and electricity production; ZA "Asphaltic cement plant" in St-Petersburg; OOO "EKSIM" in Ivangorod, specialized in export and import customs clearance; St-Petersburg Chamber of Commerce and Industry -support St-Petersburg economic development and international economic cooperation, etc. (EstRu Cluster Development, 2009) The organization of potential trans- border chemical cluster in St.Petersburg region and North-East of Estonia as well as the

interaction of the main actors in the cluster – Tallinn Technical university and Virumaa College , plants and companies as well as state structures, - constitute the basis to innovative development in the region. (Picture 2)



Picture 2. The structure of interaction within the trans-border chemical cluster

Source: “Trans-border clusters of Russian Nort-West and Estonian Nort-East”, 2009, EstRu Cluster

Due to the fact that international innovation cooperation and regional development are the two strategies being actively applied in Russia, it can be estimated that creation of trans-border clusters as a way of international cooperation, integration and interaction may have a positive impact on the regional innovative development in Russia.

6.3 CLUSTER POLICY IN RUSSIA AS A STATE PROGRAM: REGIONAL INNOVATION POLICY, APPLICATION STRATEGIES AND A TOP DOWN APPROACH TO CLUSTER POLICY IN RUSSIA

In order that to increase national economic competitiveness of Russia, the government of Russian Federation puts a lot of emphasis on innovation policy as one of the main strategies of economic development in Russia. Given the recent macro-economic stability and successful performance of the economy, Russia challenges to make a shift from the current model of its macro-economic development, that is based on country's export of natural resources, to the innovation-based model of economic growth. According to German Gref (Gref, 2006), the minister of economic development and trade in Russian Federation, in order that to succeed the government aims to regional economic diversification, that is also meant to change innovation development in the country by stimulating innovation activity in the regions, with a special focus on SME's, where the cluster policy as a state program is designed to facilitate the transition from the sluggish innovation activity to its sharp revival – and to provide the shift to sustainable economic growth.

Accordingly, clustering has become one of the key elements of both federal and regional programs of socio-economic development in Russia. In the program “Strategies of development for science and innovation in Russian Federation for the period up to 2015”, approved by the Ministry of Science and Education of Russia on February, 15, 2006, there is a special focus on the crucial role of innovation and technologies to advanced economic development in Russia, as well as the importance of strengthening of cooperation and interaction among universities and private companies, but also creation of innovative technical zones and clusters in Russia. (http://www.st-gaterus.eu/_media/str_2015.pdf) At the same time, it is also clear that the success of the innovation -based scenario of country's development will also depend on the ability of regional authorities to provide necessary institutional framework for the creation of knowledge-based society and innovation-based economic growth. In the “Concepts of long-term socio-economic development of Russian Federation for the period up to 2020”, approved by the Prime Minister of Russian Federation V. Putin on November, 17, 2008, (<http://government.ru/gov/results/1181>), it's claimed that cluster initiatives as well as positive cooperation among enterprises, universities and state within the territorial-

production clusters in Russia shall find a stronger support at the regional level. ("The Concepts to 2020": <http://www.ifap.ru/ofdocs/rus/rus006.pdf>)

Moreover, regional innovative development is considered to be the main source for economic growth in Russia. The Ministry of Regional Development of Russia has elaborated the "Concepts of regional policy enhancement in Russian Federation", accepted by the government of Russia in 2009 (<http://archive.minregion.ru/WorkItems/ListNews.aspx?PageID=536>), where clusters as zones of advanced technological development have to become the driving force for innovation and regional competitiveness. (Lenchuk & Vlaskin, 2010, p.46) Accordingly, the regional perspective of Russia's economic development to innovation shall gradually reduce the country's economic dependence on the export of natural resources, providing the new model of innovation based sustainable economic growth in Russia.

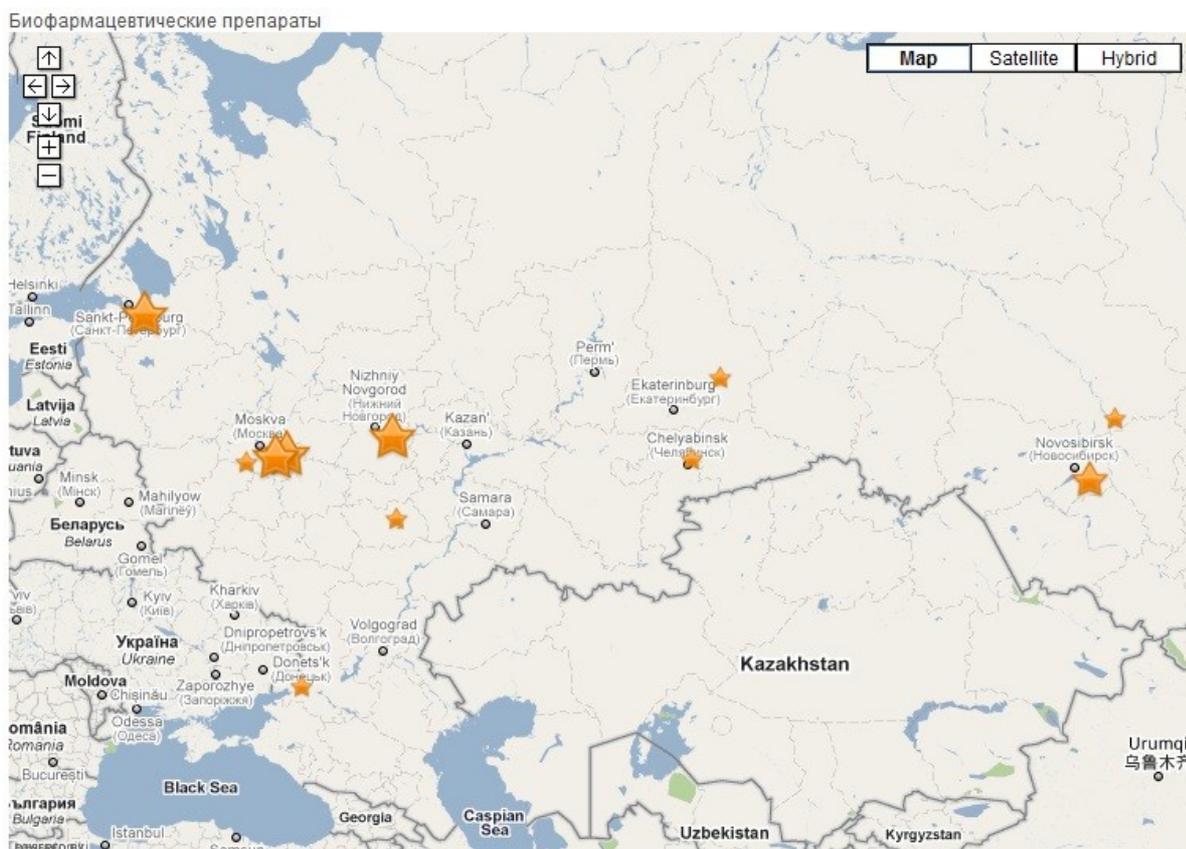
At the same time, within the framework of regional innovative development in Russia there is a special focus on the enhancement of cluster developing within IT, bioscience and pharmaceutical sectors that are going to be supported by the government at both regional and national levels to make them the most technology- advanced and innovation-intensive, putting them at the very edge of technological development.

6.4 THE CASE STUDY OF THE PHARMACEUTICAL CLUSTER IN ST-PETERSBURG, RUSSIA

Production of the Russian pharmaceutical industry is almost not represented at international markets. In 2007 exports of drugs and pharmaceutical substances from Russia amounted to only about 6 billion of rubles, which is less than 0,04% of the world total market sales of pharmaceuticals. Given the fact that the pharmaceutical market of Russia is one of the largest in Europe, the situation seems to be unjust. However, the situation may be changed in the forthcoming decade.

It is generally agreed that pharmaceutical market in Russia has a good potential to

growth. Being one of the most fast growing sectors of the Russian economy, pharmaceutical market in Russia is estimated to grow to at least 10 -12% annually, taking into consideration the implications of the financial crisis of 2008. According to the “Concepts of long-term socio-economic development of Russian Federation for the period up to the year 2020”, it is generally accepted that the volume of pharmaceutical production in Russia will reach on average the European level per capita in 2020, hereby estimating to increase to 1-1,5 trillions of roubles in 2020, given the number of population in Russia at that time 142-145 millions. (“Strategy of pharmaceutical industry development in the Russian Federation for the period up to the year 2020”, 2009, p.14)



Picture 3. Map of Biopharmaceutical cluster groups in the Russian Federation

Source: Subcommittee of the Russian Chamber of Commerce for development of subcontracting and cluster technologies, 2010, <http://promcluster.ru/>

The aim of the program “ The strategy of pharmaceutical industry development in the Russian Federation for the period up to the year 2020”, developed by the Ministry of Industry and Trade of the Russian Federation in 2009, is the transition to innovation model

of socio-economic development of the pharmaceutical industry in Russia. The program is designed to be implemented into three stages during the period 2009-2020:

- the first stage, covering the period of years 2009 -2012, is “Localization of production and drug development at the territory of Russia” that includes creation of modern industrial base in Russia, with a special focus to high- tech production, clusters and research centres at the territory of Russia;
- the second stage, that is for the period 2013 -2017, is ”Development of the pharmaceutical industry in the Russian market” that also aims to establish a well-functioning system of national generics drugs production and marketing as well as to challenge the own licensed production of highly innovative medicines that do not have counterparts abroad, so that to ensure independence of the Russian Federation in terms of the drugs production;
- the third stage is named the "Development of the pharmaceutical industry on foreign markets" , which is going to be implemented through the years 2018- 2020. This stage includes implementation of measures aimed to enhance competitive advantages of national pharmaceutical industry and to achieve the shift to innovative model of development. The main objective to be accomplished at the finals stage is national production of newly, patented, innovative drugs to import abroad, for the foreign markets. (“Strategy of pharmaceutical industry development in the Russian Federation for the period up to the year 2020”, 2009, pp.34-45)

Accordingly, the main measures of “The Strategy of pharmaceutical industry development in the Russian Federation for the period up to the year 2020” include:

- stimulation of high value-added innovative drugs production at the territory of Russia;
- promotion of high technology chemical and biochemical substances production in Russia;
- enabling the transition of Russian enterprises to GMP standard no later than 2011;
- protection of the domestic market from unfair competition;
- encouraging development and production of national analogues of now imported generics and innovative drugs;
- creation of new educational programmes as well as modification of existing ones in order to provide the pharmaceutical industry in Russia with new specialists.

(“Strategy of pharmaceutical industry development in the Russian Federation for the period up to the year 2020”, 2009, pp.5-6)

The challenge of cluster policy in St-Petersburg is to increase the level of economic development in the region as well as to enhance competitiveness of the city at the national and European markets. Creation of pharmaceutical innovative cluster in the region is meant to facilitate advanced technologies and know-how in the sector as well as to establish production of high value-added drugs. It's generally agreed that St-Petersburg region has a necessary framework for the pharmaceutical cluster formation: the region can provide an excellent scientific environment, which is represented by 111 universities and institutes in the region, 11 bioscience research centres, as well as an extensive clinical and preclinical database. The pharmaceutical cluster in St-Petersburg also include 7 larger pharmaceutical enterprises at the territory of St-Petersburg, occupied in the production of innovative medicines and import substitution drugs.

http://www.clusterprojects.spb.ru/sites/default/files/document/2010/26/koncepciya_farmklaster.pdf

Creation of pharmaceutical cluster in St-Petersburg was officially signed in June, 2010 during the time of XIV International Economic Forum in St-Petersburg in accordance with the regional “Concepts of pharmaceutical cluster development in St-Petersburg” (2010). According to Valentina Matvienko, the governor of St-Petersburg, given the Federal Program “Pharma 2020” in Russia as well as a number of clusters already existing in the region, including such innovative and efficient clusters as ICT and automobile, the challenge of pharmaceutical cluster will be given a high priority at the municipal level in terms of support and legal framework.

At the initial level of pharmaceutical cluster's formation in St-Petersburg Russian firms are given preference, however, with further possible attraction of foreign capital and international cooperation in the sector; the first four companies that constitute the core of the pharmaceutical cluster in the region are Russian enterprises: OOO “Geropharm” - creation of pharmaceutical production's complex with an amount of investments 1,3 billion of rubles; ZAO “Biokad” specialized in production of pharmaceuticals and medicines with investments 1,07 billion of rubles; OOO “NEON” - a new chemical-pharmaceutical production mill with an amount of investments 910 millions of rubles; OOO “Samson-Med”

- medicines and drugs production with total investments 1,5 billion of rubles. Administration of St-Petersburg have provided the territory of 14 hectares for the new enterprises to be arranged within the industrial zone "Pushkinskaya" in St-Petersburg region.

(<http://gov.spb.ru/news6662.html>)

It is also agreed that pharmaceutical cluster in St-Petersburg will be developed in two phases. The first phase of the cluster development includes investments projects and implementation of pharmaceutical production facilities at universities and research centres in St-Petersburg in order that to reduce the existing gap in technologies and management control but also to replace imported drugs and medicines in the state orders with the products made in the cluster. The objective is going to be accomplished until the year 2015, when the second phase of the cluster development begins. During the second phase, which is assumed to be over by the year 2020, it's planned to increase the number of small and medium- sized innovative enterprises (SME's) in the cluster as well as to ensure further development of research centres at the base of the largest universities in St-Petersburg. It is also assumed that the growing amount of export products, manufactured in the cluster, as well as the higher integration and participation in the international research projects will allow to attract new investments into the region for the development of extensive fundamental base and applied research centres, which are rather limited in financing nowadays. ("Concepts of pharmaceutical cluster development in St-Petersburg": <http://www.labclinpharm.ru/1265.html>)

According to the "Concepts of pharmaceutical cluster development in St-Petersburg" (2010), during the implementation of both phases of pharmaceutical cluster development in St-Petersburg the fundamental priority is given to the challenge to enable an effective interaction and collaboration of universities and medical research centres with pharmaceutical companies in the cluster to provide innovation process in the region; it's also important to attract high-skilled specialists as well as to work out schemes of public-private partnership in the framework of federal and joint target programs.

7. DISCUSSION

It can be claimed that clustering to innovation has been applied in Russia within the framework of innovation policy to enhancement of competitiveness and boosting of sustainable economic growth. At the same time, based on the positive experience of the EU, there is a few barriers that may limit or prevent productive implementation of clustering in Russia. In addition, the degree of importance of clustering to national development as well as methods of clustering implementation in the Russian context are still discussed in the academic world and mass media in Russia.

First, it's generally agreed that clustering in Russia, particularly clustering within the sector of national pharmaceutical industry, appears to be the best solution to industry's advancement, innovative development as well as upgrade in biotechnology. Implementation of clustering, within the state program of the national "Strategy of pharmaceutical industry development in the Russian Federation for the period up to the year 2020", has also received much of response from business circles in mass media in Russia. In one of the interviews about implementation of pharmaceutical clusters in Russia Nikolay Demidov, the CEO of "PharmExpert", the market research center with headquarters in Moscow, acknowledges the importance of cluster implementation to innovation in Russia's pharmaceutical industry, estimating possible returns to investments within the five years. Another director Maxim Uvarov, the CEO of "Binnopharm" company, the biggest biological and pharmaceutical complex situated in Moscow region, in the interview to N. Bykova, expresses some moderate optimism regarding the implementation of cluster policy in Russia as he considers that it may provide a good stimulus to the focus on innovative development and create healthy competitiveness to Western companies. (Bykova: http://www.strf.ru/material.aspx?CatalogId=223&d_no=33988) However, according to Maxim Uvarov, implementation of clustering in Russia might become a rather challenging matter due to the fact that there is no productive institutional environment created, in comparison to the EU, for the effective application and development of clustering in Russia within the framework of national innovation system.

Second, in his interview Nikolay Demidov, while evaluating possible ways of cluster

development in Russia, shows particular concern regarding the level of potential innovativeness and the ability of continuous innovative capacity of pharmaceutical firms in Russia. At the state level in Russia there are two possible scenarios of national innovative development in pharmaceuticals: 1) the Russian approach that assumes a stronger focus on the making of brand-name generic drugs – pharmaceuticals originally created and patented abroad - by larger national manufacturers, better supported by the state, with smaller incremental degree of innovativeness but larger cooperation with European programs; 2) the Western approach that is based on the continuous growth of competitiveness of national pharmaceutical companies, given the enabling environment, that also includes the dislocation of foreign pharmaceutical manufacturers to the territory of Russia for local performance and exchange in excellence. Due to the fact that production of generics doesn't assume larger own extensive innovation research, it can be argued that the Western approach to innovation policy as a process of clustering for intensive-knowledge creation and knowledge transfer to another innovativeness level can be considered as a more advantageous way of innovative development to be implemented in Russia, taking into consideration the more advanced level of innovation in clusters as a radical breakthrough in technology and science, that can then facilitate the innovation-based growth of pharmaceutical industry in Russia, allowing to increase global competitiveness of Russian pharmaceutical companies, performing at the very edge of technological advancement in the world.

Third, based on the theory, clusters as a local setting of innovative and high-technology-oriented larger companies and SME's, as well as regional cluster initiatives for support of innovative clusters in the regions, can facilitate better productive environment for innovation and advances in technology, increasing the level of regional innovation capacity and, thus, contributing to its own higher competitiveness. Given the important role of SME's in the regional development within the EU, implementation of clustering in Russia poses the challenge to the government for necessary upgrade of institutional framework for SME's. The lower level of development of Russian economy in terms of the share of small and medium-sized enterprises (Rosstat, 2006) as well as rather limited participation of SME's in the regional development can be considered as one of the larger obstacles to cluster development in Russia. Accordingly, taking into consideration the positive experience of the EU countries in terms of SME's policy, the main focus of the regional policy in Russia should be also further advancement of SME's as well as enhancement of

legal framework necessary for SME's successful performance.

Fourth, the major difference in the development of two clusters in question: the bioscience cluster in the Øresund region, Europe, as a regional type of cluster, and the pharmaceutical cluster in St-Petersburg, Russia, as an industry type of cluster, is the different approach to cluster coordination. Stretching across the two advanced highly-technological Scandinavian countries, the Øresund cluster might be unique in comparison to other clusters in Europe, differing in its scope and size, and potentially benefiting from such a close cross-border proximity in terms of advantageous institutional environment to cluster development as well as promotion of regional innovation system at the government level in Sweden and Denmark and support of SME's . However, due to the fact that innovation policy as well as regulatory framework is created within the national innovation system of each country concerned it can be regarded, to some extent, as a factor, limiting the cluster potential. At the same time, according to the case of implementation of the pharmaceutical cluster in St-Petersburg, the regulatory paradigm of innovative development is not yet available in Russia at the regional level. In addition, given the support to a number of SME's, embedded in the Øresund bioscience cluster, the pharmaceutical cluster in St-Petersburg incorporates a few larger pharmaceutical enterprises, mostly supported by the state, with a very little, if any, share of SME's in the cluster, which may be regarded as a deficit of regulatory framework in Russia.

Fifth, given a significant role of productive institutional framework in the EU, enhancement of legal framework in Russia is crucial for the successful performance of clusters to innovation as the first step to creation of productive environment. According to Lenchuk & Vlaskin, there is no single matrix structure to clustering at the regional level in Russia. In contrast to Europe, where clustering is framed within a clear system of organization of innovative development, clustering in Russia lacks the systemic approach at the regulatory level, both consolidating opportunities and cluster support initiatives. It's necessary to enhance legal regulation of innovation activity at the regional level.

8. CONCLUSION AND FURTHER RESEARCH

In the thesis I have tried to explore how national innovation system has been developing in Russia over the period 1999 – 2010 as well as to evaluate the productive impact of clustering on innovation capacity in Russia within the framework of regional innovation system. Based on the comparison with innovation policy in the EU over the same period of time, my assumption was that implementation of clustering as a paradigm of regional development in Russia can enhance national competitiveness and provide the fundamental basis for sustainable economic growth in Russia, enabling the shift scenario from a natural resources-dependent economy to the innovation-based model of economy, with a predominant role of SME's as an innovative production factor for competitiveness.

The empirical analysis allows to conclude that given the comparison with the EU the economy of Russia is characterized by a higher degree of regional market monopolization, lower degree of innovative commercialization and lower rates of SME's, with industrial enterprises largely supported by the state as the main stakeholder in the national innovative development, that can be regarded as one of the factors reducing innovative capacity in the country as well as competitiveness of Russian economy comparing to the European level. According to the conducted research it's possible to claim that clustering within the framework of regional innovation systems in the EU countries, for example, based on the case study of innovation policy and institutional environment to innovation in Denmark, as an example of "*regionally networked innovation system*", can be regarded as a source to national competitiveness, making an enhancing impact on the level of innovation capacity and advancement in technology in the EU countries, increasing regional competitiveness and also contributing to regional socio- economic development, including higher rates of employment and a higher level of salary in clusters, given the productive setting of institutional environment.

Cluster policy in Russia is one of the tools of innovative governance at the regional level to institutional framework within the region. First, based on the comparison with the EU, clustering and regional framework to innovation appear to have a better productive impact on enhancing innovation capacity in Russia. Second, within the paradigm of regional innovation system, clustering as an effective element of innovation policy can enhance

regional economic performance and regional competitiveness, also contributing to the issue of socio- economic development of the lagged and peripheral regions in Russia.

The conducted analysis enables to conclude that given the challenge of the economy's mode shift to sustainable innovation-based economic growth in Russia as an objective of the national innovation program for competitiveness, implementation of clustering turns out to be the exactly comprehensive solution that can meet the posed challenge. Given the crucial role of theoretical foundation, the comparative analysis of the two regional case studies: implementation of the bioscience cluster in the Øresund region, Europe, as a regional type of cluster, and implementation of the pharmaceutical cluster in St-Petersburg, Russia, as an industry type of cluster, based on the positive experience of the EU, allows to conclude that clustering to competitiveness within the framework of regional innovation system can enhance innovation activity in Russia, increase regional competitiveness, improve rates of employment, increase innovative capacity of SME's on the market, thus, strengthening the competitiveness of Russia's economy in general. Accordingly, the systemic approach to innovation needed at the regional level in Russia as the driving force to sustainable economic growth.

9. BIBLIOGRAPHY

Ahrend, R. & Tompson, W., (2005), "Fifteen years of economic reform in Russia: What has been achieved? What remains to be done?", OECD, Economic Department Working Papers #430

Almond, G., Dalton, R., Powell, B., Jr, (2002), "European Politics Today", 2nd edition, Longman

Asheim, B., Gertler, M., (2005), "Regional Innovation Systems", Ch.11 in Fagerberg *et al.* "The Oxford Handbook of Innovation", New York: Oxford University Press, pp. 291-311

Aseim, B., Moodysson, J., (2008), "The Øresund region: A dynamic region in Europe due to inter-regional collaboration?", *Working Papers On Line (WPOL)*, Institut Universitari d'Estudis Europeus, pp. 1-17

Vogachev, V. N., "Динамические аспекты формирования ТПК в регионах пионерного освоения"// "Dynamic aspects of TPC's formation in the regions of pioneering development", Russian, Novosibirsk, 1977

Borras, S., (2003), "The Innovation Policy of the European Union: from Government to Governance", Edward Elgar Publishing

Christensen, J.L. et al., (2005), "The Danish Innovation System", Aalborg University, Denmark

Creswell, J. W. , (1998), "Qualitative inquiry and research design. Choosing among five traditions", Sage Publication, Inc., USA

Creswell, J. W., (2003), "Research Design. Qualitative, quantitative, and mixed methods approaches", Sage Publication, Inc., USA

Dahl, M. (2000), "Synopsis for the Danish Clusters Studies", DRUID/IKE-Group, version 05-05-00

Dezhina, I., “Innovation Policy in Russia during the Economic Crisis”, Expert Article 414, Baltic Rim Economies, 30.10.2009

Etzkowitz, H., et al., “The triple helix model of innovation: university – industry – government interaction”, *Tech Monitor*, January -February 2007, pp. 14- 23

Fagerberg, J., Mowery, D.C. And Nelson, R.R. (eds) (2005), “*The Oxford Handbook of Innovation*”, New York: Oxford University Press

Fasnacht, D. (2009), “Open Innovation in the Financial Services”, Springer-Verlag Berlin Heidelberg

Feinson, S., (2003), “National Innovation Systems Overview and Country Cases”, Rockefeller Foundation, pp.13-38

Freeman, C., (1998), “Innovation”, in Newman, P., “The New Palgrave Dictionary of Economics and Law”, 1998, Macmillian, London

Gianella, C., Tompson, W., (2007), “Stimulating Innovation in Russia: the Role of Institutions and Policies”, *Economic Department, Working Paper 539, ECO/WKP(2006)67, Organisation for Economic Co-Operation and Development*

Golovanova, S. V., Avdasheva, S. B., Kadochnikov, S. M., (2010), “Иновационные кластеры и структурные изменение в российской экономике”// “Innovative clusters and structural change in the economy of Russia”, project 09-08-0006, Moscow State University, Russian text, pp. 1-128

Gref, G. O., (2006), “От макроэкономической стабильности к инвестиционному росту»// «From macroeconomic stability to investment growth”, *Economic Policy*, #4, Moscow, Russian text, pp. 5-18

Hartin Lorio, S., (2003), “Qualitative Research in Journalism: Taking It to the Streets”, Routledge

Kasymova, G. F., (2008), “Совершенствование процесса формирования кластеров в экономике Республики Татарстан»// «Enhancing the process of cluster formation in the economy of the Republic of Tatarstan”, Russian text, journal “*Vestnik of TISBI University*”, #1, <http://www.tisbi.org/science/vestnik/2008/issue1/eq6.html>

Lavrikova, Y. G., (2008), “Кластеры как рыночный институт пространственного развития экономики региона»// «Clusters as market institution of spatial development in the region's economy”, Russian text, Ekaterinburg

Lenchuk, E., Vlaskin, G., “Кластерный подход в стратегии инновационного развития России»// «The cluster approach in the strategy of Russia's innovative development”, Russian text, 2010, pp.45-57

Malmberg, A., Power, D., (2003), “(How) do (firms in) clusters create knowledge?”, Copenhagen, pp. 1-15

OECD, (2009), Policy Brief: “Economic Survey of the Russian Federation, 2009”
<http://www.oecd.org/dataoecd/50/18/43225190.pdf>

Porter, M., (2000), “Locations, Clusters, and Company Strategy”, Ch.13 in “*The Oxford Handbook of Economic Geography*», Clark, G., Feldman, M. & Gertler, M., Oxford University Press, pp. 253-274

Pilipenko, I. V., (2007), “Конкурентноспособность страны и развитие пространственных форм организации производства в регионах России»// «Competitiveness of the country and development of spatial forms of production organization in the regions of Russia”, in “*VII Socratic readings*”, ed. Shuper, V. A. , Moscow, Russian text, pp. 160 -199

Pilipenko, I. V., (2008), “Проведение кластерной политики в России»// «Implementation of cluster policy in Russia”, Russian text, pp.1-34

Rosstat, (2006), “Small businesses in Russia”

Schmiemann, M., (2008), "Enterprises by size-class – overview of SMEs in the EU", Eurostat: Statistics in focus, #31

Schmiemann, M., (2009), "SMEs were the main drivers of economic growth in the EU between 2004 and 2006", Eurostat: Statistics in focus, #71

Schumpeter, J., (1934), "The Theory of Economic Development", Harvard University Press

Sölvell, Ö., Lindqvist, G., Ketels, Ch., (2003), "The cluster Initiative Greenbook. The Competitiveness Institute/ VINNOVA, Gothenburg

"Strategy of pharmaceutical industry development in the Russian Federation for the period up to the year 2020", (2009), the Ministry of Industry and Trade of the Russian Federation, Russian text, pp.1-70

Tatarkin, A. I., Lavrikova, U. G., (2008), "Кластерная политика региона"// "Cluster policy in the region", *"Industrial Policy in the Russian Federation"*, № 8, Russian text

The World Bank, 2009, *Russian Economic Report #20*, <http://www.worldbank.org.ru>

The World Bank, 2010, *Russian Economic Report #21*, <http://www.worldbank.org.ru>

Viale, R., Ghiglione, B., (1998), "The Triple Helix Model: a tool for the study of European regional socio-economic system", *The IPTS Report*, 29

Web references:

"Biotechnology Industry Organization" (2011):

<http://biotech-now.org/section/events/2011/05/06/podcast-scientific-american-s-worldview-2011-preview>

"BIO" organization. "Biotechnology: Healing, Fueling, and feeding the World"

http://bio.org/about_biotech/

Bykova, N., "Playing in clusters" at "Innovation: Pharmaceuticals and Medicine", in the online magazine "Science and Technologies in the Russian Federation" from October, 04, 2010

http://www.strf.ru/material.aspx?CatalogId=223&d_no=33988

"Concepts of long-term socio-economic development of the Russian Federation for the period up to 2020", (2008):

<http://www.ifap.ru/ofdocs/rus/rus006.pdf>

"Concepts of regional policy enhancement in the Russian Federation", (2009):

<http://archive.minregion.ru/WorkItems/ListNews.aspx?PageID=536>

"Concepts of pharmaceutical cluster development in St-Petersburg", (2010):

<http://www.labclinpharm.ru/1265.html>

Encyclopedia of Economic Geography:

http://dic.academic.ru/dic.nsf/enc_geo

EstRu Cluster Development, "Trans-border clusters of Russian North-West and Estonian North-East", (2009):

<http://www.kohtla-jarve.ee/uploads/documents/valissuhted/projektid/2/cd/en/eternal.pdf>

Europa: Regional Policy

http://europa.eu/pol/reg/index_en.htm

Europa: summaries of the EU legislation: Research and innovation:

http://europa.eu/legislation_summaries/research_innovation/research_in_support_of_other_policies/n26021_en.htm

European Commission: Innovation Policy:

<http://ec.europa.eu/enterprise/policies/innovation/policy>

Innovation and Innovation Policy in Denmark, PRO INNO Europe, 2010

<http://www.proinno-europe.eu/page/innovation-and-innovation-policy-denmark>

Innovation: Promoting Cluster Excellence in Europe, 29/10/10

http://ec.europa.eu/enterprise/magazine/articles/innovation/article_10770_en.htm

Medicon Valley:

<http://www.mediconvalley.com/>

Online Etymology Dictionary. Retrieved April 26, 2011, from Dictionary.com website:

<http://dictionary.reference.com/browse/innovation>

St-Petersburg Administration official site: the pharmaceutical cluster

<http://gov.spb.ru/news6662.html>

St-Petersburg Committee for Economic Development, Industrial Policy and Trade:

http://www.clusterprojects.spb.ru/sites/default/files/document/2010/26/koncepciya_farmklaster.pdf

“Strategies of development for science and innovation in the Russian Federation for the period up to the year 2015”, (2006):

http://www.st-gaterus.eu/_media/str_2015.pdf

Subcommittee of the Russian Chamber of Commerce for development of subcontracting and cluster technologies:

<http://promcluster.ru/>