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The Role of Skolkovo as a Top Priority Initiative of the Russian Innovation Policy

Master's Thesis

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ABSTRACT

In the face of the ever growing global technological competition and increasing dependency on exports of natural resources, the government of the Russian Federation has recently declared knowledge-driven growth as its key policy objective. Under the Presidency of Dmitry Medvedev economic modernization and innovative development became top priorities of Russia's political agenda. Thanks to the enthusiasm and personal engagement of Medvedev, a number of strategic initiatives, mainly aimed at overcoming the technological inferiority of Russia, were implemented. The Skolkovo Innovation Centre is one of the most significant of them. It is a technology hub and a research complex being built outside Moscow, often referred to as Russian Silicon Valley.

The aim of this research is to analyse the complex of strategic objectives of the newly created Centre, its role in the Russian innovation policy and its current, as well as potential impact on Russia's overall innovative performance and global competitiveness. The analysis is based on the theoretical framework of national systems of innovation and is complemented by the innovation communication approach, underlining the key role of communication in success of an innovative ecosystem. The study shows that Skolkovo can be considered as one of the most successful innovation communication projects in modern Russia. Skolkovo has managed to draw attention to the numerous problems related to Russia's technological backwardness and initiated a public discussion about the imperative of the country's modernization through innovation-driven model of development. However, it is argued that the project has inherited structural disbalances and path dependencies of the Russian innovation system, which the country owes to the Soviet past and its leadership culture. Therefore, unless the Russian government improves the general investment climate, promotes the rule of law, eradicates corruption and fosters fare business competition, Skolkovo risks to be seen as a pure image promotion governmental endeavour rather than a powerful agent of change to boost Russia's modernization.

KEYWORDS: innovation policy, national innovation system, Russia, innovation communication, economic modernization, Skolkovo Innovation Centre

1 INTRODUCTION

> *"Innovation is no longer about money, it's about the climate: are individuals allowed to flourish and take risks?"*
> William Weldon, Chairman of Johnson & Johnson
> (The Economist 2007)

At present, innovations constitute the cornerstone of competitiveness and sustainable growth of world economies. As Michael Porter sagaciously asserted it more than twenty years ago: "National prosperity is created, not inherited… A nation's competitiveness depends on the capacity of its industry to innovate and upgrade." (Porter 1990: 73) The title of the 20th century leader in innovations can be rightfully attributed to the United States of America, which have managed to create a unique innovation ecosystem uniting academy, government and business initiatives in Silicon Valley. Currently, innovations have been raised to the highest level in national agendas of numerous countries across the globe. John Kao singles out four main tendencies characteristic of the current era of global innovation: "the rise of innovation as a currency of global competition, the global war for talent, innovation as a national agenda and the power of networks" (quoted in Luoma-aho, Uskali & Weinstein 2009: 3).

Countries differ from each other by their innovative performance not only in a quantitative manner (number of registered patents, new products and processes developed), but also in a qualitative one (sphere of innovation). The differences in innovation output used to be directly related to the input factors such as investment in research and development (R&D), venture capital, availability of skilled labour, and so on. This assumption has been put under question by the fact that while public R&D expenditures have been changing over time in various countries, their sectorial specializations have remained almost invariable. (Casper & van Waarden 2005; Porter 1990)

This contradiction has been discussed in the works of a number of researchers (Archibugi & Pianta 1994; Patel & Pavitt 1994; Casper & van Waarden 2005: 3–7), in

which they are trying to answer one main question: why are some countries more innovative than the others? It has been concluded that "nation-specific factors", and national institutions and organizations above all, have a great influence on a country's innovative performance. They are responsible for providing incentives and creating environment, which can stimulate, but also hamper innovativeness of firms and economy in total. This assumption has been further acknowledged in the works of Freeman (1987), Nelson (1993), Porter (1990), Lundvall (1992) and Edquist (1997), who have adopted the concept of a National Innovation System (NIS) to characterize such "an institutional environment". (Casper & van Waarden 2005: 8) At present, NIS has been recognised as the underlying principle, which enables analysis of the activities of particular agencies, companies and organisations that largely influence the way of national economic and innovative development. (Niosi 2002: 300)

As claimed by *The Global Competitiveness Report 2011–2012* (The World Economic Forum 2011: 8–10), which draws a comparison between the countries based on the indicators of their "micro- and macroeconomic foundations of national competitiveness", all countries as well as their economies can be classified by three phases of development. In the first phase, the economy is *factor-driven*, and countries compete with each other "based on their factor endowments", which are primarily unqualified work force and natural resources; low productivity of economy is mainly reflected in low salaries. After that, the countries advance to the *efficiency-driven phase* of development, where they are challenged to improve their "production processes" and "increase product quality". During this phase, competitiveness can be enhanced through improvement of educational standards, "efficient and developed goods", "labour and financial markets", taking benefits of the technological knowledge that is already available for use and increasing the country's economic activities in trade on the national and international level. Eventually, as the countries enter the *innovation-driven phase*, they start to procure higher salaries and higher living standards, which they manage to sustain only if their businesses succeed in competing through creation of unique products, sophisticating their production processes and innovating new ones. (The World Economic Forum 2011: 8–10)

The Global Competitiveness Report 2011–2012 defines Russia to be in a phase of transition from an efficiency-driven to an innovation-driven development stage. The country is ranked the 66th among 142 countries. Such a low rank (Finland 3rd, China 26th, Poland 41st, Brazil 53rd) indicates that the country's macroeconomic stability is outbalanced by the aggravating situation in such areas as "quality of institutions, labour market efficiency, business sophistication, and innovation". (The World Economic Forum 2011: 27) The Report reveals that the enforcement of the independence of the judiciary, the rule of law, fight against corruption, as well as development of an adequate system of protecting the intellectual property rights would considerably contribute to the boosting of Russia's economic activities and overall competiveness. In addition to the weak institutional framework, such factors as low efficiency of the goods market, unstable banking sector, over-regulation of domestic and foreign markets constitute the main obstacles that Russia needs to clear away from its way, if it wants to make use of its "high innovation potential" (38th place globaly), its "large and growing market size" (8th), and its "solid performance in higher education and training" (27th). (The World Economic Forum 2011: 27, 306)

When speaking about innovations, it is necessary to underline the role of national governments, which are "to encourage – or even push – companies to raise their aspirations and move to higher levels of competitive performance." (Porter 1990: 87) Concurrently, governments all over the world tend to protect particular markets or get involved in regulating the structure of an industry, disregarding the fact that "competitive time for companies and political time for governments are fundamentally at odds." (Porter 1990: 87) To gain a competitive edge and secure its positions internationally, an industry needs to invest more than a decade in its personnel development, in modernization of manufacturing flows, and in accessing foreign markets. Whereas in politics, "a decade is an eternity." (Porter 1990: 87) As a consequence, many governments pursue policies targeted at short-term foreseeable advantages (for instance, markets regulating, protecting industries from competition, granting subsidies), therefore, consciously or unconsciously, hampering innovation.

1.1 The Aim of the Study

The global economic crisis of 2008, which severely affected Russia, exposed a number of deficiencies of the country's economy, among them the aggravating dependency of national GDP on natural resources exports and deteriorating rate of the country's global competitiveness. That is why maintaining the country's technological competitiveness and keeping up with the leading global economies have become the main objectives of the current Russia's innovation policy. (OECD 2011: 180–181)

In the face of these geopolitical and economic challenges, technological modernization has been recognized as the key policy imperative, and innovation-based growth has been proclaimed as "the only possible development model". (Gokhberg 2010: 37; Gokhberg & Roud 2012: 121) With this respect, Russia faces a big challenge of elaborating such a policy that would foster an innovation-based economy and change the traditional focus of Russian R&D strategy from new knowledge creation to the practical implementation of new knowledge. The complexity of this challenge requires not only changes in the public conscience and common perceptions, it equally demands the engagement of various economical and political institutions in order to consolidate and facilitate close cooperation between government, education and business actors of the system. (Ivanov et al. 2006: 13)

At present, the Russian government is struggling to develop new and more effective initiatives to improve the outcome of its innovation policy. Recent years have witnessed a number of significant changes in innovation policy of Russia: Coordination Committees, headed by President and Prime Minister, were established; a network of development institutions (Technology Fund, Russian Venture Company, Development Bank) was initiated. Besides, several strategic programs, designed to increase financial support to science and technology, stimulate integration between science and universities, enforce innovative activities in state corporations, and to provide organizational, legal and economic incentives for innovative activities were adopted.

One of the most significant in terms of financial investment and legislative endorsement

initiatives of the Russian government is the creation of the Skolkovo Innovation Centre. The project was initiated in 2009 by then President Dmitry Medvedev with an aim to make the Centre a leading international innovation hub, oriented to promote the development and commercialization of new technologies and help transform Russian raw-material economy into innovation or knowledge-based one.

The country's societal and political developments mentioned above demonstrate the topicality of the thesis, which overall aim is to provide a complex analysis of the Skolkovo Project in the light of national innovation systems approach and within the context of constant structural transformations of the Russian innovation policy during the last 20 years. Specifically it aims to 1) analyse the structure of the Skolkovo innovative ecosystem to see how its elements are integrated and complement each other 2) examine the communication strategy of Skolkovo and the attitudes of the Russian population towards the project in contrast with the official rhetoric; 3) provide the SWOT analysis of the project, identifying its potential opportunities and the ways of further development. Pursuing these aims, the thesis is trying to estimate how Skolkovo responds to the challenges laying ahead of Russia's innovation system development. This requires a thorough examination of the main characteristics of the Russian innovation policy, its short and long-term goals as well as the key elements of the Russian national innovation system. Historical, political and economical preconditions that have led to the current stage of the system development also constitute an important part of the analysis.

The thesis is based upon two theoretical perspectives. The first perspective reflects on the concept of National Innovation Systems (NIS), because of its focus on nation specific factors and their influence in country's innovativeness (Freeman 1987, Nelson 1993, Porter 1990, Lundvall 1992 and Edquist 1997). The second perspective uses the innovation communication theory approach (Mast, Claudia, Simone Huck & Ansgar Zerfass 2005; Nordfors 2004, 2006; Luoma-aho and Halonen 2010), which defines communication as the key factor of an innovative ecosystem success.

1.2 The Materials and Method

The thesis is based on the documentary research method of materials qualitative analysis, which uses a case study of Skolkovo Innovation Centre to illustrate and evaluate the transformations of the Russian innovation policy. It has been argued that the documentary research constitutes one of the three primary types of social research, along with surveys and ethnography. Although it has been often overlooked in comparison with other social science methods, the researches agree that the documentary research method is reliable and precise, and even more "cost effective than social surveys, in-depth interviews or participant observation". (Mogalakwe 2006: 221)

The method implies the analysis of the documents relevant to the research topic. Within the documentary research method a special attention is paid to the quality of the documentary sources, in particular to the authenticity, credibility, meaning and representativeness of the documents. (Scott 1990) The range of document types is wide and comprises all forms (paper, electronic) of materials such as newspaper articles, consultancy reports, governmental decrees, ministerial reports, interviews, presentations, official speeches, including video and image analysis. (Mogalakwe 2006: 223)

The research materials used in the thesis include the analytical report on Russia's innovation policy produced by the Organisation for Economic Cooperation and Development (*OECD Reviews of Innovation Policy: Russian Federation* 2011), which is one of the most notable proponents of the NIS concept, and has adopted it as a leading analytical tool. Besides, the OECD was the first organization to acknowledge "the importance of technology for economic change" on international level and to draw attention of policy-makers to the responsibility of government and private sector for stimulating development of new technologies. (Lundvall 2010: 5)

Another source of the research materials is the World Economic Forum, which reports *The Global Competitiveness Report 2011–2012* and *The Global Information Technology Report 2012* have also been used for the analysis. Moreover, *The Global*

Innovation Index 2013, produced in collaboration of Cornell University, INSEAD Business School and World Intellectual Property Organisation, as well as the databases on innovative performance of the European benchmarking tools (INNO Policy TrendChart, ERAWATCH) have been chose as sources of reliable data as well. The research materials also include the surveys of the Russian national statistics agencies, the academic articles written by the Russian and foreign researches on innovative policy developments, presentations and newsarticles retrieved from the official webpage of the Skolkovo Foundation, as well as of the elements of Skolkovo ecosystem, and the official webpage of the President of Russia.

1.3 The Structure of the Study

The thesis is organised in 5 chapters, including the first introductory one. Chapter two on theoretical background gives a literature overview on the basic concepts related to innovations and various approaches to their classification and analysis. The chapter also examines in depth the theory of National Innovation System, its actors and their functions. It analyses how much government should be involved in promoting innovations, which is reflected in the structure of innovations governance and control system. Further on, the chapter examines the concept of innovation communication and the role that communication plays in building trust, reputation and in enabling knowledge exchange and effective interaction among the actors of the innovation ecosystem.

Chapter three focuses on the distinctive features of the Russian innovation policy and discusses the implications of historical preconditions and path dependencies inherited from Soviet times on the current structure of the national innovation system. An in-depth analysis of core strategic policy documents, including the analysis of three possible development scenarios, provides a forward looking approach and helps understanding future patterns of the policy measures and the country's potential growth.

Chapter four is dedicated to the analysis of the Skolkovo Innovation Centre ecosystem

based on content analysis of the articles from the official Skolkovo Foundation webpage official governmental addresses, news articles covering Skolkovo activities and speeches and interviews of political leasers. Skolkovo's image of a main initiative of innovative development and a long awaited agent of change reflected in its communication narratives is discussed as well. The chapter concludes with a SWOT analysis of the project, examining its strong and weak sides and presenting opportunities for a bigger impact on Russian innovativeness and the culture of innovative entrepreneurship.

The summary of research findings is presented in the chapter five which reviews the key elements of the theoretical approaches applied and presents the results of Skolkovo case study.

2. INNOVATION AS CONCEPT AND SYSTEM

This chapter provides a clarification on the theoretical foundations and the main concepts of the thesis. Thus, it defines what is the innovation, its nature and categories, as well as how its notion has been changing during the last century. Further on it elaborates on the theoretical arguments about the national innovation system approach and its interpretation in the works of various scholars. The theory of innovation communication, which focuses on the role of communication and importance of social connections for a success of the innovation ecosystem, also constitutes a part of the analysis.

2.1 The Concept of Innovation

For a long time, invention, creativity and imagination were associated with the notions of evolution and progress, and the features of a true human genius. Gradually with the growing role of organizations in the twentieth century those values were modified. (Farr 1989: 25 as quoted in Godin 2008: 45) "If there was to be increasing economic efficiency, there had to be innovation – through organizations and the mobilization of their employees' creative abilities" (Godin 2008: 45).

The concept of innovation has never been referred to one single discipline, but is currently being studied in the fields ranging from economics to anthropology. Innovation enjoys a strong positive conceptual connotation. It is traditionally associated with efficiency, progress and growth, and even when perceived as purely technological change it is predominantly aligned with improvement. Innovation has become the central concept of the modern times, a part of the popular imaginary; it is present in the media and in public policy where it is often seen as a panacea against global economic and social problems. (Godin 2008: 5)

Traditionally Joseph Schumpeter, Austrian-American economist, is the main author to be referred to when speaking about innovation. During the great economic recession in

1930s, Schumpeter focused on the effects that market changes have on the capitalist system. In his book *Capitalism, Socialism and Democracy* first published in 1943, he portrayed a process of "creative destruction" where:

> "The opening up of new markets, foreign or domestic, and the organizational development <…> illustrate the same process of industrial mutation, that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one" (Schumpeter 1939: 83).

"In Schumpeter's view, "radical" innovations create major disruptive changes, whereas "incremental" innovations continuously advance the process of change". (OECD 2005: 29) Seen as the main propelling force of economic change, innovation as argued by Schumpeter can emerge as new products, new methods of production, new sources of supply for raw materials, new forms of organization and new markets. (Lundvall 2007: 101; OECD 2005: 29)

It can also be summarized that Schumpeter in his reasoning makes innovation equal to "New Combinations":

> "Recalling that production in the economic sense is nothing but combining productive services, we may express the same thing by saying that innovation combines factors in a new way, or that it consists in carrying out New Combinations" (Schumpeter 1939: 87–88).

Besides, Schumpeter was among the first theorists to distinguish innovation from invention. To Schumpeter, invention is a simple act of intellectual creativity, which "is without importance to economic analysis" (Schumpeter 1939: 85). Whereas innovation, on the contrary, is regarded as "an economic decision", when a company decides to apply or adopt an invention. (Schumpeter 1939: 85)

Although Schumpeter pioneered with the concept of innovation, it had taken long time until the term became widely accepted. In the early 1960s the category was still not generally recognized. As Machlup pointed out, "we shall do better without the word

innovation" (Machlup 1962: 179, quoted in Godin 2008: 35). To others, the category appeared to be too general, as it "has come to mean all things to all men" (Ames 1961: 371, quoted in Godin 2008: 35). For a long period of time, innovations had been referred to as "invention, technological change and its variants: technical advance and technical progress". (Godin 2008: 36) Over time economists developed conceptual frameworks of technological innovations, defined as a dynamic process from invention to diffusion with the final goal of commercialization. Since mid-1950s, these frameworks were further elaborated by researchers Carter and Williams (1957, 1958, 1959, quoted in Godin 2008: 37) and later by "evolutionary" economists such as Freeman (1971), as well as Nelson and Winter (1982). (Godin 2008: 32–35, 37)

There is a large number of various definitions of innovations, which vary considerably depending on the type of scientific approach applied. The *evolutionary approach*, for instance, considers innovation as "a path-dependent process whereby knowledge and technology are developed through interaction between various actors and other factors". The efficiency of these interactions has a considerable influence on the future of economic development. (OECD 2005: 32)

Closely connected to the evolutionary approach is the concept, which regards innovation as a system. The *systems of innovation approach* (Lundvall 1992, Nelson 1993, quoted in OECD 2005: 33) focus on the impact of institutions on the innovative performance of firms and other actors. Special emphasis is placed on the role of the transfer, diffusion and application of ideas, skills, knowledge and information. The networks, which facilitate the exchange of information, are integrated within the social, political and cultural context, which in its turn determines and limits the innovative performance of economy. The systemic approach pays special attention to conditions and policies, in which the markets function and to the role of governments in monitoring and regulating this overall structure. Innovation is hence perceived as "a dynamic process in which knowledge is accumulated through learning and interaction". Depending on the focus of the systems of innovation approach, it can be equally applied at regional, national and international levels. (OECD 2005: 32–33)

Additionally, Lundvall (2005: 9) distinguishes two modes of innovation: 1) *science-based innovations*, which are mainly focused on promotion of R&D, exploiting and accessing the explicit codified knowledge (databases, documents etc.); this knowledge is easily stored and retrieved, and is sometimes referred to as know-what; 2) *experience-based innovations* are referred to learning by doing, using and interacting. Experience-based innovations are attribute to organizational frameworks and relationships among staff members, who share implicit or tacit knowledge (which is mainly intuitive and hard to be defined), thus promoting interactive learning.

2.1.1 Nature of Innovation

Innovations as such are often associated with the notions of newness and the unknown which include several characteristics (Zerfass 2004, Zerfass & Mast 2005, quoted in Maisch et al. 2011: 4):

- Innovations are novel and represent previously unknown combinations. Due to this, innovations can potentially provoke anxiety and resentment towards their adoption.
- Innovations are complex. The more advanced innovation is, the more abstract the new product is found by the target groups. Competitive advantages of an abstract product are not very distinctive to potential customers and are therefore hard to communicate.
- Innovations are unprecedented. As innovations have little connectivity and are new by nature, the target groups are unable to rely on their previous experience or existing evidence.
- Innovations are characterized by high level of uncertainty. All previously mentioned aspects of innovations add up to giving rise to disbelief and doubts among the target audience. Uncertainty about the potential of an innovation and anxiety about its possible failures risk leading to dislike and refusal.

Lundvall (2010: 9) refers to innovation as a “ubiquitous” and “cumulative” phenomenon, which emerges not as a single shot, but rather as a process. He suggests that future innovation is determined by the past and can be called as “a new use of pre-

existing possibilities and components". Lundvall's idea of continuity confronts Schumpeter's assumption of "creative destruction" when the results of an innovation process appear to devalue the previous knowledge. However, both Schumpeter and Lundvall agree that collective entrepreneurship and interactive learning constitute the essential activities of innovation.

Alongside, Lundvall (2005: 9) points at the fact that innovation cannot be predicted. He claims that an innovation process is fundamentally uncertain and disruptive. Moreover, it is sometimes "not possible to distinguish innovation as an event from its diffusion and use". (2005: 9) On this basis, Lundvall attributes to the concept of innovation the following characteristics: 1) "discontinuity in the technical characteristics or in the use of a new product or process", and 2) "introduction, diffusion and adaptation of the new artefact".

The Organization for Economic Cooperation and Development (OECD), which for several decades has been providing comprehensive reports on national innovation strategies, proposes the following features of innovation:

a) Innovation entails uncertainty over the result of innovation endeavours.

b) Innovation requires investment.

c) Innovation is subject to spillovers, when externalities of economic activities affect the parties not directly involved in them. An inventing company seldom fully enjoys profits of its creative innovation, as the companies, which acquire the innovation also gain from "knowledge spillovers or from the use of the original innovation".

d) Innovation comprises the exploit of "new knowledge or a new combination of existing knowledge". New knowledge can be both generated internally through the series of extended R&D activities or obtained from external bodies through acquisition of new equipment and technologies.

e) Innovation objective is to increase a firm's performance by attaining a competitive advantage or simply preserving its competitiveness on the market. (OECD 2005: 34–35)

It might be worth mentioning that for the professionals, directly involved in innovative activities and who contributed to the report *Fostering Innovation-led Clusters: A Review*

of Leading Global Practices (The Economist 2011), innovation is mainly associated with change and tolerance for different views and opinions. "If everybody agrees, there's no innovation. It's when somebody says, 'I disagree with the status quo and I want to change it'". However, if in a country, due to some political reasons or cultural grounds, change is not tolerated, innovations have very few chances to succeed. (The Economist 2011: 11)

2.1.2 Taxonomy of Innovations

Charles Edquist (2001) underlines that innovations differ from each other with respect to their determinants. According to these determinants, innovations can be classified into two categories. Primarily, Edquist distinguishes *product innovations*, which can be both goods and services, and *process innovations*, which include technological and organizational innovations (see Figure 1 below).

In this taxonomy, technological and goods innovations have mainly material value, while organizational and services innovations are of intangible character. All categories of innovation are equally important for economic growth and development. That is why only a sound balance of tangible and intangible innovations, without any type of them prevailing over another, can guarantee the well functioning of the system. (Edquist 2001: 7-8)

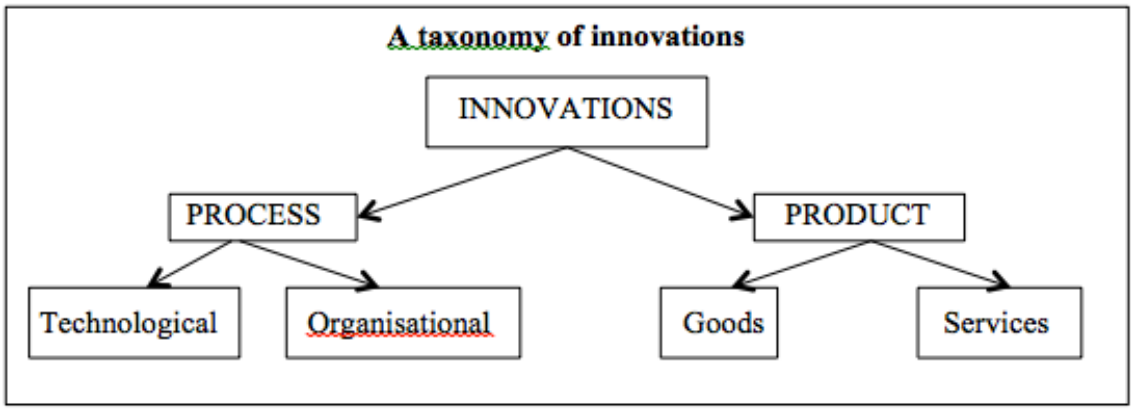


Figure 1. Categories of innovations (Edquist 2001: 7)

Edquist's taxonomy was developed further on by the OECD researches, who enlarged it to differentiate four categories of innovations: "product innovations, process innovations, marketing innovations and organizational innovations". (OECD 2005: 47) Thus, a *product innovation* is "the introduction of goods or service that is new or significantly improved with respect to its characteristics or intended uses" (OECD 2005: 48). The notion comprises major improvements in primarily functional characteristics, technical provisions, machineries, resources, computer programmes, and easiness of usage. *Process innovations* entail the usage of a new or considerably upgraded manufacturing or distribution scheme that comprises considerable modifications in technological processes, machinery or software. (OECD 2005: 49)

Marketing innovations encompass the introduction of a new marketing approach engaging substantial transformations in "product design or packaging, product placement, product promotion or pricing". The main objective of marketing innovations includes general increase in sales, increase of clients' satisfaction of the services or "accessing new markets". (OECD 2005: 49)

Through *organizational innovations* companies implement "a new organizational method" in their operating procedures, "workplace organization or external relations". Organizational innovations mainly aim at improvement of a company's efficiency by decreasing the expenses on the staff members, operating expenditures, improving the wellbeing of the employees and increasing their work output, getting admission to external information etc. (OECD 2005: 51)

2.1.3 Incremental vs. Radical Innovations

Companies can be divided into two big categories in terms of the way they innovate, incrementally or radically (Dewar & Dutton 1986, Gersick 1991, Pennings 1988, Tushman & Romanelli 1985, quoted in Orlikowski 1991: 5). *Incremental innovations* are linear, cumulative modifications of a process or a product, which result in a low scale upgrading or modifications in order to adapt to the up-to-date technology. They entail improvements within a given frame of solutions (i.e., "doing better what we

already do"). (Norman & Verganti 2014: 82) Through incremental innovations organisations improve and elaborate on the already established processes or products without significant changes in their basic activity patterns. Whereas *radical innovations* undermine existing assumptions and imply "nonlinear, paradigmatic changes representing significant departures from existing practice or knowledge" (Orlikowski 1991: 5). Norman and Verganti (2014: 82) define them as a change of frame (i.e., "doing what we did not do before"). Both categories are meant "as ends of a continuum" to characterize the new knowledge, which innovation embodies. Yet, as Dewar and Dutton (1986: 1423, quoted in Orlikowski 1991: 5) argue: "the middle values of this continuum are difficult to interpret".

Norman and Verganti (2014: 82) see the major distinction between the two categories in the perception of innovation, whether it is recognized "as a continuous modification of previously accepted practices" or whether it is "new, unique, and discontinuous". Radical innovations entail many more risks and complications as compared to incremental ones, as they request to diverge from the established norms, rules and methods. The main obstacle on the way of radical innovations is not the risks, and uncertainty that they entail, but the fact that most companies and institutions are prone to stability and unwilling to change their status quo (Starbuck 1983, quoted in Orlikowski 1991: 6).

Despite the fact that radical innovations are highly valued thanks to their substantial capacity to differentiate, they are notably rare. Most radical innovations take considerable time to become accepted. Apart from that it is quite challenging to create anything completely new at present time: "all new ideas have predecessors", they are often generated on the basis of a new combination of already existent ideas. Norman and Verganti (2014: 82–84) argue that the majority of successful products are subjected to constant incremental innovations, aimed at reducing their operational expenses and maximizing their efficiency. Complexity, limitations in aptitude and usual high costs of radical innovations make them difficult to "live up to their potential when they are first introduced".

Both types of innovation are equally necessary. Radical innovations are the source of major changes; they introduce breakthrough fields and crucially new frameworks. While incremental innovations transform them into an adequate form suitable for the consumers. “Without radical innovation, incremental innovation reaches a limit. Without incremental innovation, the potential enabled by radical change is not captured.” (Norman & Verganti 2014: 82–84)

2.2 Theory of National Innovation Systems (NIS)

The end of the XX century saw the emergence of numerous innovation system approaches, which despite their similarities emphasize conceptual differences and are focused on different actors. Based on the analysis of literature on innovation systems several concepts can be enumerated such as “regional innovation systems (Asheim & Isaksen 1997; Cooke et al. 1997), sectoral systems of innovation and production (Bresci & Malerba 1997), technological systems (Carlsson & Stankiewicz 1991)” (Bergek et al 2008: 4). The list can be continued by the concept of national systems of innovation described in the works of Freeman (1987), Lundvall (1992, 2005), Nelson & Rosenberg (1993). Some ideas of the innovation system approach can be found in Michael Porter’s concept of national competitive advantage and Etzkowitz-Leydesdorff’s Triple Helix concept. (Lundvall 2004: 3; Edquist 1997)

2.2.1 The Concept of NIS: Its Definition and Development

The National Innovation System (NIS) concept emerged in the mid-1980s as a result of the discussions initiated by the European governments with regard to the future of their industrial policies. As Naubahar Sharif (2006: 749, 761) points it out, the emergence of the NIS concept was determined by a number of specific socio-political circumstances. One of the most significant among them was the accelerating economic globalization and increasing international competition among both companies and countries. After the World War II the predominant approach among the scientific circles, including government advisers on science, was a linear model of development (research –

technology transfer – implementation) and "technology push". Christopher Freeman (1995: 9 as quoted in Feinson 2003:14) describes this as a "chain reaction" approach on the example of the nuclear bombe development: "basic physics => large-scale development in big labs => applications and innovations (whether military or civil)". However, in 1950s and 1960s it became apparent that regardless of considerable investments in R&D "technological change and economic growth depend more on efficient diffusion than on being first in the world with radical innovations" (Freeman 1995: 10, quoted in Feinson 2003: 14).

This awakening was reinforced by the two geopolitical events: skyrocketing technological and economic success of first Japan and then South Korea, in contrast to the downfall of the USSR and the socialist economies. Thus, linear model development approach coupled with the macroeconomic theory, dominating the policy making in the US and most of industrialized countries, failed to provide explanations to the factors of international competitiveness and the growing differences in pace of technological and economical advance among the countries. (Feinson 2003: 14)

An accelerating economic growth of Japan interested Christopher Freeman, who in 1987 published an entire book dedicated to the Japanese competition culture. Freeman explains that Japan's economic achievements are mainly due to "long-term policies, pursued over many decades, rather than to any short-term manipulation of currency exchange rates, or exploitation of relative factor-cost advantages" (Freeman 1982: 21, quoted in Sharif 2006: 761).

In the face of the growing necessity to compete with Japan to retain global economic positions, European countries and particularly Scandinavia were much more vigorous in adoption of the NIS concept in comparison with the United States. This can be explained by the fact that "smaller, highly international and globally connected economies", such as Scandinavia and Northern Europe, are more susceptible to similar threats. Thus, the first country, where the NIS approach was applied as a fundamental basis of its science and technology policy, was Finland. Hit by a severe economic recession of 1993, Finland adopted NIS approach as a development and recovery

strategy, which allowed the country to eventually increase its competitiveness through focus on knowledge-intensive areas, along with a heavy investment in education and research and development. (Sharif 2006: 745–752)

It has not yet been finally defined whether the concept of NIS originated in academia or in policymaking institutions, namely in the OECD's Directorate for Science, Technology and Industry, which used to be responsible for providing recommendations to the countries concerning their technology and innovation strategies. As argued by Sharif, the concept was developed simultaneously, since many of the founders and supporters of the NIS approach worked both for academia and policymaking institutions. One of the proponents of the concept, Bengt-Åke Lundvall, argues that it appeared owing to the two major contributions, the book "Technical Change and Economic Theory" edited by Giovanni Dosi, Christopher Freeman, Richard Nelson, Gerald Silverberg and Luc Soete, and published in 1988 and a report "Technology and The Economy: The Key Relationships" issued by the OECD in 1992. (Sharif 2006: 750)

Although the concept of NIS has been there for more than 30 years by now, even today it features an astonishing variety of interpretations. The definitions range from narrow (focusing mainly on research organizations) to broad (including basically all institutions that affect learning). (Johnson 1998: 4) "Academics and practitioners embrace varying conceptions of the approach's domain of reference". (Sharif 2006: 756)

According to Richard Nelson (1993: 4), a national innovation system is "a set of institutions, whose interactions determine the innovative performance of national firms". One of the earliest authors elaborating on NIS, Christopher Freeman (1987: 1), describes it as "the network of institutions in the public- and private-sectors whose activities and interactions initiate, import, modify and diffuse new technologies". Stan Metcalfe (1995, quoted in Sharif 2006: 745) broadens the definition by putting an additional focus on the role of institutions and their frameworks, within which "governments form and implement policies to influence the innovation process". He also underlines that the system of interconnected institutions is responsible for the creation, storage and further transfer of the skills and knowledge, indispensable for new

technologies.

Bengt-Åke Lundvall has extended the boundaries of the concept, which he claims should include "the elements and relationships which interact in the production, diffusion and use of new, and economically useful knowledge and are either located within or rooted inside the borders of a nation state" (Lundvall 2010: 2). By the interacting elements he understands companies, R&D institutions, educational sector, financial organizations and governmental regulatory bodies. Often these elements either reinforce each other or appear to be the main reason impeding the processes of learning and innovation.

According to Lundvall (2010: 1–2), the NIS approach is based on two underlying principles. The first one defines knowledge as "the most fundamental resource in modern economy" and learning as "the most important process" in contemporary society, being the key element responsible for the system's dynamic and connectivity of all its elements. The second principle relies on the idea of learning as an "interactive" and "socially embedded process", which can be understood only within the institutional, sociocultural and historical conditions particular to every nation state. Meanwhile a nation state is recognized as the main propulsion source of learning process and industrialization surge:

> "National systems play an important role in supporting and directing processes of innovation and learning. The uncertainties involved in innovation and the importance of learning imply <…> a complex communication between the parties involved. When the parties involved originate in the same national environment – sharing its norms and culturally based system of interpretation – interactive learning and innovation will be easier to develop." (Lundvall 2010: 4)

This recognition also implies "national-cultural" aspects, which are different in every country, because of variable levels of "cultural homogeneity" and "political centralization". Beyond that, Lundvall proposes to acknowledge NIS as an evolutionary concept with strategic mission to create and reproduce knowledge through processes of learning and innovation. From this perspective, historical transformations of national innovation systems can be understood only through an analysis of co-evolution of

production structure, technology and institutions. (Lundvall 2005: 3, 10–11)

However, innovations seldom stay within the borders of a country. Faced with increasing internationalization and modernization of national production systems, development of foreign trade between the countries, employment of foreign specialists and import of foreign technologies, national systems of innovation remain open and heterogeneous. Considering the above-mentioned factors, Lundvall also distinguishes national, regional and global levels of values attributed to NIS. The national level goals are dominated by the two top priorities, commonly dominating public discourse, such as "international competitiveness" and "national economic growth". On the level of international organizations, like OECD and European Community, the goals tend to focus on regional prosperity and preventing potential conflicts inside the community territory. On the global level, represented by United Nations organisations and global environmental organisations, it has finally become obvious that only through "ecological sustainability" and "reduction of social inequality" it is possible to maintain the global economy and human wellbeing. The potential danger lies in the situation when national short-term economic growth goals disregard the long-term global objectives aimed at sustainability and equality. (Lundvall 2010: 5–7)

In summary it can be concluded that most of the approaches defining the concept of NIS acknowledge the following common tendencies (Ivanov 2006: 29):

1) traditional linear model of development is replaced by a nonlinear one, which implies a close cooperation among all elements of the innovation process and its market orientation;
2) every NIS is particular and nation specific; there is no unique or "the best" model of a NIS, since evolutionary factors affect the economic, social and political development of a country;
3) NIS concept is an analytical tool, which should be applied by national governments while elaborating innovation policies, but should not be used as a "ready-made solution" in organising of the national innovation process.

The growing number of academic articles dedicated to NIS demonstrates the increasing impact of the concept (Freeman 1987, Nelson 1993, Lundvall 1992, Edquist 1997,

Malerba 2004 etc.). The concept is widely accepted as an academic and policymaking tool. At present, the NIS approach is used by various supra-national organizations such as the European Union (EU), the United Nations Conference on Trade and Development (UNCTAD), in a less degree the World Bank and the International Monetary Fund. (Sharif 2006: 745)

2.2.2 Main Actors of NIS and Their Functions

The NIS concept indicates that national economies differ in their production systems and institutional set up, which is generally conditioned by various historical trajectories of development, language and cultural heritage. This disparity is reflected in the functional patterns of the NIS elements, represented by business and public sector institutions, responsible for research, education and training. (Lundvall 2010: 14)

Regardless of the considerable differences between national economies and intricacies within the concept of NIS itself, OECD has proposed to divide the key innovation actors into five main categories (institutions and policies directly involved in scientific and technological innovation):

- *Governments* (local, regional, national with different weights by country) that play the key role in setting broad policy directions;
- *Bridging institutions*, such as research councils and research associations, which act as intermediaries between governments and the performance of research;
- *Private enterprises* and the research institutes of finance;
- *Universities* and related institutions that provide key knowledge and skills;
- *Other public and private organizations* that play a role in the national innovation system (public laboratories, technology transfer organizations, joint research institutes, patent offices, training organizations and so on). (Feinson 2003: 26)

The broader perspective of the system includes all elements of the social, cultural and political environment of a country. To these elements belong institutions, affecting learning and exploring activities, financial institutions and their money policies, labor

market and pre-university education system. The NIS interconnections, which can be regarded as an indicator of an absorptive capacity of the system, give evidence of effectiveness of the transfer of knowledge and resources between all the elements of a system. (Feinson 2003: 26)

The predominant function of NIS and its actors can be formulated as production, diffusion and usage of innovations. In line with this assumption, Xielin Liu and Steven White (2000: 6–7, quoted in Edquist 2001: 9) propose to distinguish the following five fundamental areas, which are at the core of any NIS:

1. research (basic, developmental, engineering)
2. implementation (manufacturing)
3. end-use (customers of the product or process outputs)
4. linkage (bringing together complementary knowledge), and
5. education

Charles Edquist (1997) proposes to make a distinction between organizations' and system activities, which affect innovations. Instead of defining the system as constituted by organisations, he argues that system should be defined by its primary activities: research and development; competence building; formation of new product markets; articulation of user needs; creation and change of organisations; networking around knowledge; creating and changing institutions; incubating activities; financing innovation; consultancy services.

2.2.3 The Role of Government in Promoting Innovations

The main motivation of governments to pursue their innovation policies is not technological progress itself, but "the assumption that innovation is a key element in national economic growth" (Lundvall 2010: 6). The idea that technological change and innovation process constitute the main determinants of national economy's prosperity has been globally recognized. Some national governments acknowledged it earlier; some countries recognized it later. As Freeman and Perez point out, not all countries equally succeed in the technological race. (Lundvall 2010: 5)

The power of influence that the governments have on the efficiency and competitiveness of their national innovation systems is often underestimated. Apart from the maintenance of R&D system, a large number of public policies need to be implemented, comprising such diversified fields as “education and training, competition and trade, and industrial and regional development”. (OECD 2011: 179) The main sectors of governmental responsibility comprise procuring the availability of well-educated working force; adjusting state scientific organizations to the requirements of the national business and current global technological standards; stimulating investment of the private sector in R&D activities; supporting and encouraging the creation of “competitive innovation-oriented industries”; ensuring infrastructural assistance to start-up companies; establishing “global opportunities through international cooperation”; and strengthening and promoting “regional innovation potential”. The efficiency and consistency of these complex measures matter the most for policy makers. (OECD 2011: 179)

The above-mentioned mix of actions composes the innovation policy, through which the state regulates the performance of its NIS. Edquist (2001: 19–20) argues that an imitation mechanism has become an integral part of policy-making in many countries. The imitation produces a copycat effect, which is visible for instance in numerous national technological development programmes, especially in the fields of “IT, new materials or biotechnology”. As a result of blind copying, the nation specific NIS features are often disregarded. (Edquist 1997: 38)

The concept of national system of innovation emphasizes the importance of such aspects as institutional efficiency and performance for the national economic growth and sustainability in a long perspective. (Niosi 2002: 300) Proper understanding of how other systems of innovation operate could help promote a cross border “institutional learning” and prevent blind copying of foreign strategies. A weakness of Eastern European economies in comparison with the Western ones lies in the problem of “understanding of the workings of the ‘real market economies’ in relation to innovation”. (Lundvall 2010: 5)

2.2.4 Assessment and Measurement of NIS

National systems of innovation are often subjects to measurements and comparisons. Initially the analysis of efficiency of policies and technology performance across OECD member countries was based on measuring inputs (such as R&D expenditure and the number of researches) and outputs (as patents, for instance). Apart from OECD, such organizations as Eurostat and the National Science Board also applied the number of population and the amount of GDP (Gross domestic product) to calculate the national wealth, correlation of GDP to GERD (Gross Expenditure on Research and Development) to find out the country's R&D intensity, and the quantity of scientific articles and citations to measure the scientific impact. Through measuring inputs, outputs and processes, common for the system, performance indicators were constructed. They are often used to rank actors of an innovation system and to inform decision makers. (Katz 2006: 893–894)

After a while the weaknesses of such an approach became obvious. Although these tangible criteria offer useful information about the content and direction of technological development, they cannot be applied to evaluate how efficiently "economically useful knowledge" is produced, diffused and exploited within a national system of innovation. Moreover, these quantitative indicators tend to overlook the fundamental determinants of NIS, to which belongs a seamless transfer of knowledge and information among the actors of a system, as well as their constant interaction at various stages of an innovation process. (Lundvall 2010: 6, OECD 1997: 9)

Eventually, as a result of transformations in the character and environment of innovations, it became obvious that new indicators were needed to reflect these transformations and place the appropriate "tools of analysis" at policy makers' disposal. (OECD 2005: 3) A significant amount of research was performed between the 1980s and 1990s to create models and establish analytical frameworks for the study of innovation. Following various surveys and attempts to interpret their outcomes, and driven by the need for a coherent set of analytic tools and concepts, OECD (1992) issued the first edition of *Oslo Manual* (full title "The Measurement of Scientific and

Technological Activities, Proposed Guidelines for Collecting and Interpreting Technological Innovation Data"), built around the concept of technological product and process (TPP) innovation in manufacturing.

In the second edition in 1996, *Oslo Manual* updated the scope of concepts, definitions and methodology to improve the understanding of innovation process and to cover a wider range of industries. Besides a new conceptual framework to collect data on NIS performance was elaborated. It identified four categories of factors primarily related to innovations. These four categories can be pictured as a map (see Figure 2 below) that indicates the areas with the greater advantage for the business sector, but also problematic areas, which are to be considered by governments when shaping policy initiatives. (OECD 1996: 18–19)

The biggest category of factors influencing innovation forms a part of framework conditions. The higher the quality of framework conditions is, the stronger is innovation performance that a country displays. These conditions comprise macroeconomic stability, basic educational system for the general population, some aspects of the legislation such as taxation, intellectual property rights, patent law, access to venture markets, communications infrastructure, openness to international trade and foreign direct investment. It is these framework conditions that encourage the private sector actors to take risks engaging into innovative activities, which have a potential to result in considerable profits and benefit society at large. (OECD 1996: 19; OECD 2011: 24)

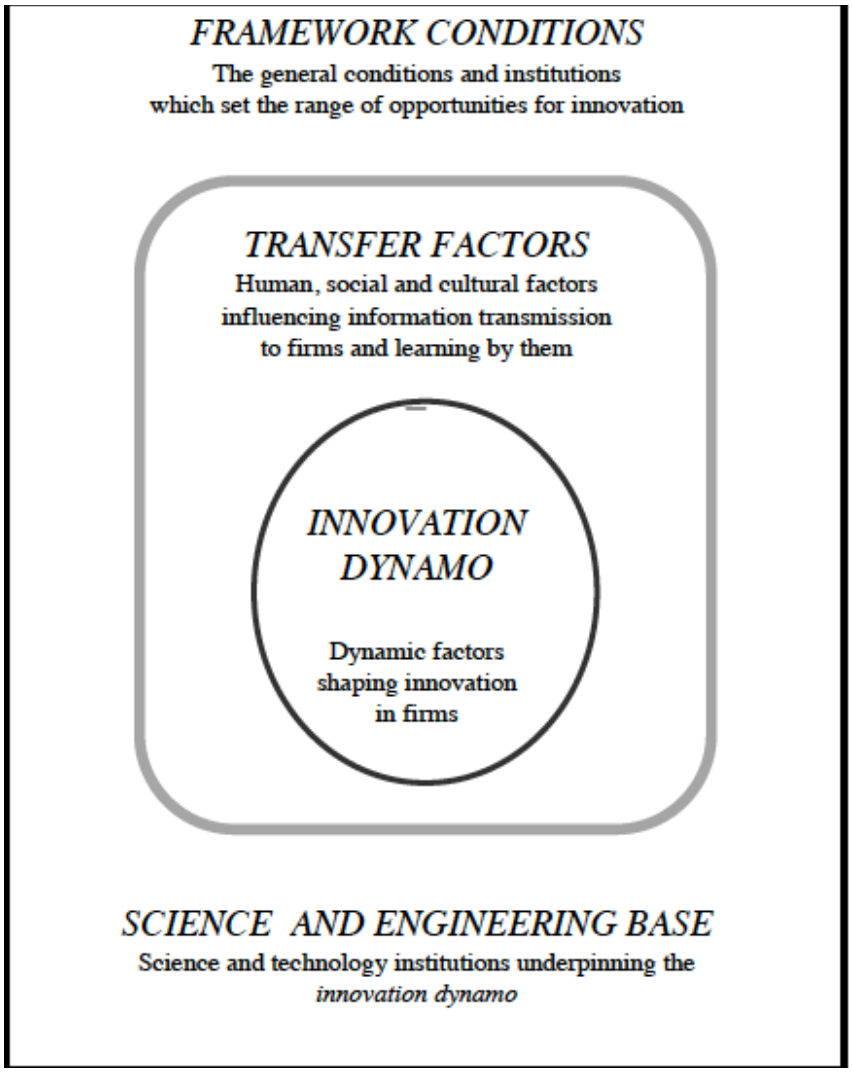


Figure 2. Four categories of factors influencing NIS (OECD 1996: 19)

The category of science and engineering base represents the accumulated knowledge and S&T institutions that sustain private sector's innovative activities by providing technological training and scientific knowledge. It covers specialized technical training and university systems, support system for basic research, public R&D activities, R&D in generic technologies. (OECD 1996: 20–21)

The transfer factors are responsible for the quality of formal and informal linkages between enterprises, regulatory bodies and institutions; personal networks which facilitate the flows of information, cooperation with international experts; personnel

mobility; ethics, trust and openness that have impact on the way networks, linkages and other channels of communication function; knowledge and skills transmission between and within organizations. These factors are highly dependent on the social and cultural values of the population. (OECD 1996: 21–22)

The innovation dynamo can be determined as a multi component structure of elements, which shape innovation activities at the company level. It includes "dynamic factors within or immediately external to the firm and very directly impinging on its innovativeness". (OECD 1996: 22) To these belongs the quality of labour force as a key asset for an innovative firm, as well as its specific structural characteristics (How active are firm's competitors on the market? How does a firm manage its finances? Does it cooperate with other companies or firms or educational institutions? What internal organisational structure does it have?). (OECD 1996: 22)

Defects in any of these categories may hamper policy incentives and produce a retroactive effect of the policy instruments. Therefore, in case a country suffers from widespread corrupt practices, it can be a very demotivating factor, which makes governments unwilling to give direct subsidies to private enterprises. Cumulatively, "flawed framework conditions can lead to distorted policy responses". (OECD 2011: 24)

Several years later, in 2005, OECD issued the third edition of *Oslo Manual*. It introduced the expanded framework of innovation measurement: greater emphasis was placed on "the role of linkages" between companies and organisations, which constitute a part of the innovation system. Moreover, it highlighted that innovative activities should be fostered not only in high-tech sectors, but also in services and low-technology manufacturing. At present the OECD *Oslo Manual* has been worldwide accepted as the key guideline for assessing country's innovative development. (OECD 2005: 10–11)

2.3 Innovation Communication and Its Role in Innovation Systems

To date innovation has been universally recognized as the key factor for economic growth, organizational reforms, societal progress and the main source of competitiveness. (Ackermann 2013, Nordfors 2009, Porter 2002, Mast, Huck & Zerfass 2005). Innovations are often referred to as "ecosystems of dynamic multichannel networks" of different stakeholders, representatives of academia, business and government "where the dynamic process of innovation creation and experimentation takes place". (Luoma-aho & Halonen 2010: 4) The term "ecosystem" builds upon the notion of "interconnectedness" between all the players of a system, which enables exchange, interaction and crosspollinations of ideas. Innovation does not exist without social connections, seamless circulation of information and communication. Without these intangible assets innovation ecosystem cannot thrive and flourish. (Jansen et al. 2006, Ruppel & Harington 200, quoted in Luoma-aho & Halonen 2010: 4)

Numerous studies on innovation cover its various attributes and classifications; provide analysis of best practices and framework conditions. However, such important aspect of innovation as communication of innovative products and services has until recently been disregarded. Innovation communication as a field of academic research first drew the attention of the German scientific community. (Zerfass & Huck 2007, Brem et al. 2010, Eberl 2009, Vetter 2007, quoted in Ackermann 2013: 3) Alongside German scientists, the importance of innovation communication has been acknowledged and analysed in the articles of David Nordfors and his colleagues from VINNOVA Stanford Research Center of Innovation Journalism, including several Finnish researches such as Vilma Luoma-aho and Saara Halonen from the University of Jyväskylä. (Luoma-aho & Halonen 2010)

In the articles of the above mentioned researches, innovation communication is defined as "systemically planned, executed and evaluated communication of innovations" with an objective to promote a better understanding of the complex issues of innovations, build trust towards them and organizations from where innovations originate. (Mast, Huck & Zerfass 2005: 3) Being a "bridging activity" among the various actors of an

innovation ecosystem, communication "co-creates social meanings and facilitates cooperation". (Grunig 2006, Health 2006, quoted in Luoma-aho & Halonen 2010: 10) Apart from being an instrument of sharing and spreading of new information, innovation communication has been proven to be responsible for creating the image of the innovation as well. (Mast, Huck & Zerfass 2005: 5)

On a company level innovation communication fulfils different functions. For internal stakeholders it is the main instrument to raise general awareness of innovation and promote an innovation culture (Zerfass & Huck 2007, Benner & Tushman 2003, quoted in Ackermann 2013: 4), enhance personnel motivation, loyalty and retention (Greg 2012, Scott 2001 as quoted in Ackermann 2013: 4), as well as "cross-pollinates ideas" throughout different stages of innovation process. (Estrin 2009 as quoted in Ackermann 2013: 4) External innovation communication is focused on creation of a favourable and innovative image of an organization (Zboralski & Gemünden 2009, quoted in Ackermann 2013: 4) and building confidence among all the actors involved on individual and organizational level to scale down anxiety and gain confidence of the external parties (Luoma-aho & Halonen 2010; Zerfass & Huck 2007, quoted in Ackermann 2013: 4).

Given the complex nature of innovations (novel, complex and have low degree of connectivity), their introduction often entails high level of uncertainty and lack of trust. As negative emotions tend to overcome the feelings of curiosity and interest about the novelty, the overarching goal of innovation communication is to "build trust in the innovation" and to dispel doubts of potential risks and negative effects. (Zerfass et al., 2004, quoted in Maisch et al. 2011: 3, 21) Communication facilitates establishing trust-based relations on both levels: between individual actors of the system and between institutions and industries. (Luoma-aho & Halonen 2010: 10) The earlier building of a trusting relationship with target groups and stakeholders is established, the higher are chances of innovation communication to be effective and the innovation to succeed. At the same time a successful communication strategy should transcend the product and relationship levels, and develop an active approach of building trust on a bigger scale, in relation to both the company as a trusted innovator and the innovation sector in general.

(Maisch et al. 2011: 21)

Flawless interaction and shared knowledge between all members of an innovation ecosystem ensure its overall success. This can be achieved only if information on innovations is spread not only among the specialist community, but also within broader social groups. (Mast, Huck & Zerfass 2005: 3) Outreach activities to inform on innovations are impossible outside the media channels. Since media is a major source and producer of information within all spheres of modern life, it has significantly gained on influence in setting the "public agenda" and defining the major topics of the day. "The media cannot tell you what to think, but they can affect what you think". (Sandred 2005: 7) Therefore it is the media that set "a standard for public discussion" and create shared knowledge between different sectors and organizations within the innovation system. (Nordfors 2004: 3)

Considering the challenges that innovations per se present, the way they should be communicated differs significantly from general topics coverage. There is a consensus opinion among journalists and communication experts about several criteria of successful presentation of innovations. Above all, innovations should be put into a context of current situation, which can be applied as a frame of reference to it. Technical aspects of innovations are interesting only for a narrow circle of specialists and hardly for a wide audience that is why innovations should be illustrated by means of "easy-to-grasp" concrete examples, which help to reduce innovation complexity. These examples can include specific impacts and benefits that an innovation brings to its target audiences. Apart from connecting innovations to the context and illustrating their applications and advantages, innovations should also be „packaged" into a story, which highlights their human or emotional links. The goal here is to personalise and visualise an innovation through connecting it to a certain image, sharing an interesting story about innovation's inventor, its origin, or a way the adoption of a concrete innovation influenced company development. When summarized, "the keys to successful innovation communication are topicality, reduction of complexity, and presentation of benefits". (Mast, Huck & Zerfass 2005: 9, 10–11)

It has been argued that due to digitalization of the mass media and the increasing influence of Internet on socio-political tendencies across the world, our societies have undergone major transformations and have entered the era of "attention economy" where attention becomes the object of consumption replacing traditional products and services, and "understanding and managing attention is now the single most important determinant of business success" (Davenport & Beck 2001, quoted in Luoma-aho, Uskali & Weinstein 2009: 4). Attention economy is particularly difficult for innovators "as the survival and success of their innovations is influenced ever more by what publics and stakeholders perceive it to be". (Troshani & Doolin 2007, quoted in Luoma-aho & Halonen 2010: 7)

As attention becomes a limited and treasured asset, the role of "attention workers" (journalists, PR and marketing managers, advertisers, lobbyists) and their influence increase. Attention workers, who generate and broker information on a professional basis, are primarily responsible for creating ties between different actors of the innovation system, "cultivating an innovation-friendly culture" along with setting the agenda for innovations. (Nordfors 2006, quoted in Luoma-aho & Halonen 2010: 5) Since reputation in innovation systems is often a decisive benchmark, which determines social relations and transactions, it is within responsibilities of attention workers to create and sustain their good reputation and the reputation of an innovation they represent. (Luoma-aho & Halonen 2010: 5)

Innovation communication is fundamentally to pave the way for an unhindered research, development and implementation of innovative processes, services and products. As any other object of communication, innovations are to be introduced "as concrete, comprehensible and oriented towards the stakeholders as possible". Due to the particular nature of innovations, their complexity, novelty and therefore inability to present proven impacts and applications, they require a different communicative approach. This approach through mechanisms of personalization and visualisation displays particular advantages of innovations for potential users and presents them in "a way that they can be experienced and felt". (Mast, Huck & Zerfass 2005: 10–11)

3. INNOVATION POLICY OF RUSSIA

This chapter is dedicated to the particularities of the innovation policy of Russia, which are analysed from the point of view of NIS approach. Thus, the stages of the system development and its current trends are examined from the perspective of its national distinctive features and the historical preconditions, which are also reflected in the policy governance structure and the Russian population attitudes towards the innovations per se. A particular focus is put on the strategic policy documents, both long and short term oriented, which proposes various scenarios of the country's innovation-driven development up to 2020 (*Strategy-2020*) as well as concrete innovative projects, which have already been launched (*Go Russia!*).

3.1 The Russian National Innovation System: Current Trends and Path-Dependencies

Innovation policy is a relatively new instrument of governmental "interventions in favour of R&D, new technologies, and the diffusion of new products and processes" (Rammer 2006: 265). The role of innovation policy cannot be underestimated as, if designed properly, it is the primary and determinant resource of a sustainable technological performance of a country. It is also responsible for attracting and detaining international investments in the country's R&D sector. A successful innovation policy is characterized by its capacity to respond duly to the changes in the political, institutional and business environment within the country as well as to the outside global challenges. Thus it includes "all governmental activities aiming at promoting and accelerating technical progress, creating and disseminating new findings, technologies and skills […] and effectively using them in economy and society". (Jaffe et al. 2002, Laredo & Mustar 2001, quoted in Rammer 2006: 266)

In the age of continuous aggravation of globalized competition and struggle for markets, Russian government is pursuing a vision that the primary objective of the Russian innovation policy is to provide efficient instruments to foster technological modernization of all branches of industry and services sector. (Innovative development:

National Report 2008: 59–60) In a more comprehensive sense, Russian innovation policy represents a cross-sectoral mergence, uniting several sectorial policies such as science, technology and innovation policies (see Table 1.).

Table 1. Interconnection between science, technology and innovation policies (Innovative Development: National Report 2008: 61)

Interconnection between science, technology and innovation policies
Science Policy Objective: generation of scientific knowledge Instruments: competitive grants, state institutes, tax incentives for companies, intellectual property rights (IPR) protection
Technology Policy Objective: development of industrial technology trends Instruments: public procurement, subsidies, cooperation, standards, foresight, HR
Innovation Policy Objective: upgrading the level and results of innovative activity Instruments: competition policy, corporate legislation, regional and sectoral clusters, consumer protection, environmental regulation, foresight

Only a well-balanced comprehensive set of measures within these "three policies", determined by the present-day socio-economical objectives, can guarantee perceptible improvement of the situation and successful outcome. In view of the current challenges the focus of government regulation measures is shifted towards the technology (or industrial) policy. (Innovative Development: National Report 2008: 61)

In terms of instruments the present Russian innovation policy incorporates "competent actors" (small and big companies, research universities, public research institutes) and "supporting institutions and measures", among which some are "insufficiently co-ordinated", "some are still experimental, and others lack critical mass". (OECD 2011: 14) Recent institutional changes in the policy governance may play a role of a

development trigger, especially, if those changes are endorsed by "efforts to break with the top-down tradition in policy implementation and to build more distributed, co-ordinated and adaptive governance structures at lower policy levels". (OECD 2011: 14)

Despite the new instruments of innovation policy (market incentives, the modern technical and financial innovation infrastructure, progress in legal environment) the current Russian innovation system still comprises the elements of the Soviet centrally planned system. This includes large government sector of science, predominant federal support for R&D, top-down decision-making and governance. (Dezhina 2011: 92)

According to statistics, in 2008 governmental R&D agencies and institutions carried out 74% of all R&D activities in Russia, while only 14% of R&D was performed by private sector. As to be compared with the data of the EU countries: the same year public R&D organizations conducted only 8% of R&D in the United Kingdom, 11% in the United States, and 16% in France. (Dezhina 2011: 92)

In 2008, Russia's gross domestic expenditure on R&D (GERD) accounted for 1,03% of the country's GDP, as compared to 2%, during the late Soviet period and 1,28%, during the prosperous year 2003 (see Appendix 1). Today Russia ranks on the 29th place for its GERD/GPD ratio in the Global Innovation Index 2013 (where Israel ranks the 1st, Finland the 2^{nd,} China the 25th and Brazil the 34th). This can be explained by two facts. First of all, Russian economy is still in an emerging stage of development as compared to the knowledge-based economies, which have a tendency to spend more on R&D to keep pace with technological progress. Secondly, Russian economy is characterized by its industrial structure with dominating extracting industries, which have traditionally low R&D incentives. (OECD 2011: 101–102)

Another important aspect to be mentioned is a low innovative activity of the Russian business sector. In 2009 only 8% of the companies were involved in technological innovation, while in Germany the respective share was 64%, in Finland 47%, and in the Czech Republic 39%. (Dezhina 2011: 92) Russian enterprises show little interest and motivation to invest in innovations. They mainly focused on the local market, which is

characterized by lower risks of competition, easier entry barriers in comparison with the international markets, which attract only 2–3% of Russian industry. Such business model fails to stimulate long-term investments in science and technology. Subsequently, innovation activities of the majority of Russian enterprises (66,7%) are limited to purchasing of machinery and equipment, which provides access to adoption of new technologies (see Figure 3 below). (Dezhina 2011: 92)

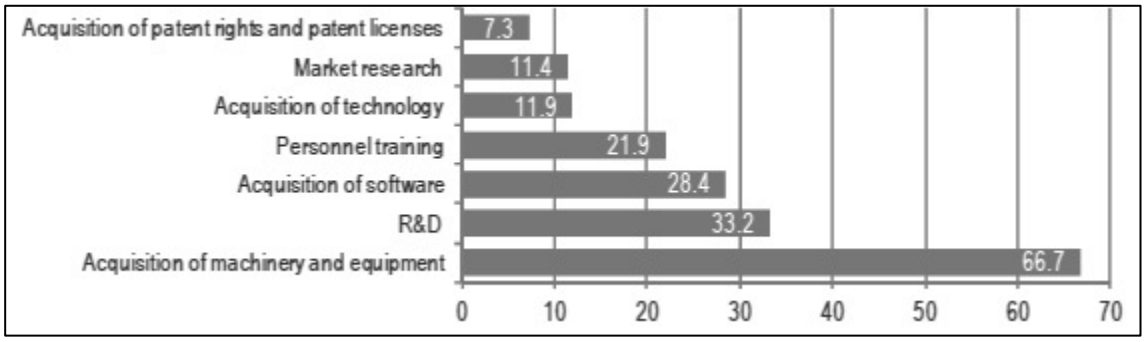


Figure 3. Percentage of innovative industrial enterprises engaged in selected types of innovation supporting activity in 2008 in Russia (OECD 2011: 134)

Moreover, the innovation intensity in percentage of total sales, as well as financial results of investments in innovations in Russia remains on a very low level (1,9% in Russia as compared with 5,5% in Sweden and 4,6% in Germany). During the period 1995–2009 innovation products constitute only 5–6% of total sales. (Gokhberg & Roud 2012: 122)

At the same time, a low level of investments in technological innovations of Russian companies can also be explained by the inability of Russian R&D organizations to offer to business the required technological solutions at the necessary standards of quality, novelty and competitiveness. All these factors have led to a decrease of business share in Russian GERD from 33% to 27% during the last decade, while for the OECD countries these indicators remain on average at 65%. Finally, the follow-up model of technological development has resulted in deterioration of the linkages among the actors of Russia NIS, leading to the scarce number of “new-to-market innovative products”

(0,8% of the total industry sales compared to 6,3% in Finland). (Gokhberg & Roud 2012: 122)

The efficiency of an innovation policy can be evaluated by the diversity of the system regulation measures and correlation of direct regulation instruments (such as public subsidies, for instance) with indirect incentives for private businesses, involved in high-risk innovation projects. As it is shown in the Appendix 2, the types of regulation instruments, implemented by the Russian government, cover a wide spectrum of policy aspects and fully correspond to the best world practices and recommendations. However, the closer analysis shows that these instruments are considerably outweighed by the direct state financial support instead of indirect incentives, which are considered to be more effective for fostering business innovation activity. (Innovative development: National Report 2008: 81–82)

Structural disbalance and technological underdevelopment of the economy, low innovation capacities of companies, and insufficient output of the R&D sector threaten to undermine Russia's global positions. The current problems and bottlenecks of the national innovation system are of systemic nature and require a comprehensive program of reforms. (Innovative development: National Report 2008: 83–84)

Lots of innovation strategies have been elaborated to change the situation. The government has already made available a number of modern policy instruments, including tax allowances, new schemes of financing innovations through development institutions, and infrastructural projects, technoparks, special economic zones. Despite the high number, their output is insignificant. This is mainly due to the continuing inconsistent policy of the Russian government, which seldom supports its numerous initiatives for a long time. The initiative to create centres of transfer at regional universities, for instance, has kept federal financing and attention only for three years. Similar situation happened to technoparks and IT-parks initiatives. (OECD 2011: 180)

In 2009 Federal Target Programmes (FTPs), viewed as the main financial instrument of public funds allocation and state regulation in the field of science and innovation, were

initiated. However, it turned out that FTP performance indicators were inconsistent with the desired goals. Among the major reasons for this were unsteady public funding, low rates of return on investments, excessive bureaucratization of the decision-making process, and as a result marginal participation of private companies in co-financing and usage of FTP's findings. In 2010–2011 the Government shifted its attention to a new initiative of Technological Platforms; one year later than the investments were sharply redirected to the project of Innovative Clusters. (Innovative development: National Report 2008: 71–75)

According to the national analysts, the low output of the most of governmental initiatives in the field of innovation and economic development has been largely due to the lack of coordination among the governmental ministries and agencies as commissioners of the programs. The complicated interministerial structure of the majority of the programs is the main factor, which impedes the success of their implementation.

Besides that, the priorities of the Russian innovation policy change almost every second year. Meanwhile, innovation projects usually take up to 5–7 years to bring the first results. As a result of short-term initiatives, many projects remain uncompleted and investments lost. (Innovative development: National Report 2008: 70–77, OECD 2011: 180–181)

3.1.1 Societal Aspects of Innovations in Russia

The progressive word "modernization" has taken hold of the Russian political discourse since September 2009, when then President Dmitry Medvedev entered the office and asked rhetorically: "Should we drag a primitive economy based on raw materials and endemic corruption into the future?" The definite answer "No!" as well as his views on the future development of Russia followed in the program article "Go, Russia!" and later in November 2009 in his Address to the Federal Assembly. (Krawatzek 2011: 26)

The growing impact of this innovative political discourse becomes evident through the contextual analysis of the Russian press. According to Jukka Pietiläinen (2011: 27), who is researching on the nature of the Russian modernisation process, "modernization was mentioned over 300 000 times in 2010 as compared to 200 000 times in 2009 or 2008, or to merely 150 000 times in 2005". In his article Pietiläinen draws parallels between a sudden popularity of the word *modernisation* with the revolutionary role that the words *perestrojka* (transformation) and *glasnost* (transparency) played in the Russia media the middle 1990s.

The researcher Katri Pynnöniemi (2011: 25) compares the current innovation zeal with the "campaign for industrialization" in 1920s and modernisation processes, imposed by Peter the Great in the early XVIII century and the ardent debates of "Westernizers" and "Slavophiles" about a pro-European or unique Russian path of development for the country. Every period of Russian history has its particularities, and what unites them all when it comes to reforms is not the wellbeing of its citizens, but "first and foremost Russia's prestige as a great power". Despite substantial reserves of natural resources, the country's leadership has realized that if Russia does not diversify its economy in the nearest future, it will find itself in "a weaker position that it may accept". (Pynnöniemi 2011: 25)

While political elites are enthusiastically speaking about technological breakthroughs and industrial efficiency, Russian people understand modernization quite differently. In March 2008 the Russian Public Opinion Research Centre (further WCIOM) held an opinion poll addressed to the views of the Russians on innovations, their influence on the general well-being of the country and future prospects for Russia. Every second respondent (53 %) could not provide any answer. For the 27% of respondents innovations meant any kind of novelty, while 15% associated the introduction of modern technologies with them in the first place. Fewer were those who believed that innovations represent the usage of scientific achievements (3 %) or the investment in promising sectors of economy, or social changes and specific developments (each criterion by 1%). (WCIOM 2008)

However, more than a half of the respondents (55%) assumed that innovations could help to enhance economic development and improve social life in the country. Such an optimistic point of view was more characteristic of the young people than of the older generation (65% among 18–24 year-olds, 56–59% among 25–59 year-olds and 41% in the group of "60+"). There are also 16% of the pessimists in whose opinion innovations would not fundamentally improve their lives. 62% agreed that innovations are an essential prerequisite for the future prosperity of the country, with which 14% of the respondents cannot agree. There is a consensus of opinion of 60% of Russians that innovations require maximum investment at present, the gains will offset the investments, while 14% call it “a waste of money”. 56% of respondents believe that the role of innovations will increase, as they will be implemented in all sectors of economy (according to 16%, this tendency will not become a frequent practice). Innovations should be introduced in all sectors simultaneously, confirm 28% of respondents. Among the sectors, which are in need of innovations, the respondents named manufacturing industry (19%), agriculture (16%), medicine (14 %), science and education (10%). Such branches as social sector (4%), construction of housing and roads (3%), business (2%), energy, electronics and environmental protection (each 1%) require the least of innovations in the view of the Russians. (WCIOM 2008)

Other surveys indicate that the Russians tend to associate modernization more with social and political reforms rather than with technological developments. Thus, modernization for the Russians is “equality before the law and observation of human rights” (41%), “fight against corruption” (38%), “social fairness and justice” (31%), “effective innovative economy” (24%), but also “renewal of Russian values and traditions” (14%) and “creating opportunities for free enterprise and market competitions (12%). (Pietiläinen 2011: 27) Medvedev’s campaign for modernization was subjected to a criticism on behalf of the scientific community, opposition members and Russian population, all united by the argument that the main prerequisite for innovation-driven economic development of Russia is drastic reforms of the current political and administrative regime of the country. (Pynnöniemi 2011: 25) That is why the elimination of corrupt bureaucratic practices, reinforcement of the democratic practices and policies as well as the instruments of free market economy are paramount

objectives to be attained in the first instance. Nonfulfillment of these requirements may lead to a failure of any attempt to modernize Russian economy. (Pynnöniemi 2011: 25)

The divergent interpretation of modernization by Russian authorities and common people demonstrates that modernization from above, focused on financial support of specific industry sectors or "vertical modernization", as Igor Yurgens defines it, is hardly able to "renew" Russian economy and ensure its sustainable development. Only through "horizontal modernization", which implies systemic modernization of all public and state institutions, together with deep transformation of political culture, the government can achieve long-term objectives of economic and social welfare in Russia. (Yurgens 2011: 24)

3.1.2 Historical Preconditions and Stages of Development

Despite the similarity of core principles and objectives, every country demonstrates its own distinctive approaches in elaborating its innovation policy. These distinctions are essentially conditioned by particular historical inheritance and its influence on country's economic, social and political systems. In case of Russia, with its specific geopolitical position, distinctive cultural character and strong allegiance to the Soviet system, this pattern is especially relevant. (OECD 2011: 180)

After the collapse of the USSR in 1991, where science and technology policy was mainly built around military industry, the country has undergone radical transformations of its constitutive systems. At present Russia is struggling to overcome the legacy of a central planned economy and to adjust to the standards of an innovation-oriented market economy. This transition is particularly challenging, given the fact that during the 1990s Russian authorities, preoccupied with the harsh socio-economic difficulties, failed to include innovation policy and economic modernization to the list of the national priorities. Due to the increased oil prices and economic upturn in early 2000s, the government could finally switch its S&T policy "from a survival to a consolidation/renewal mode, with an effort to concentrate new resources on selected institutions, sectors, technologies and sites." (OECD 2011: 180)

The first attempts to formulate Russian innovation policy were made in 1997–1998, although at that time the State Duma (Russian Parliament) did not accept the draft concept and declined it a status of an official document. Nevertheless, some steps to support the innovative potential of the country were made much earlier in response to the considerable political and economic changes of Perestroika and a drastic decrease of the public funding for scientific research. (Ivanov et al. 2006: 126, 130)

According to the recent OECD *Review of Innovation Policy of the Russian Federation* (2011: 182–184), Russian science, technology and innovation policies have undergone three fundamental stages of development (for more details see Appendix 3):

1. "Turbulent restructuring, with early experimentation of new innovation policy approaches" (1991–1998). The period of rescuing the scientific heritage of the Soviet system under the conditions of sharp economic recession and countrywide brain drain of S&T specialists. The most successful initiatives included the creation of competitive funding organisations: the Russian Foundation for Basic Research (RFBR) and the Foundation for the Assistance to Small Innovative Enterprises (FASIE). Regional authorities took first steps to develop technology centers and business incubators.

2. "Stabilisation, with significant additions to the innovation policy framework" (1999–2003). Improvement of economic situation with a growth of R&D budget by 7% (in 1999) contributed considerably to the development of new legal frameworks, stimulating innovative activities and to the implementation of a large-scale programme "Mega Projects". This programme was aimed at mobilizing Russian scientific community to cooperate together with the business sector and to carry out joint projects in developing and manufacturing breakthrough technologies.

3. "Consolidation and expansion of the innovation policy framework" (2004 – present day). This phase is characterized by adoption of a number of long-term development strategies and legislative documents such as the updated Patent Law, part of the Civil Code on Intellectual Property Rights. It also includes the implementation of a number of Federal Target Programmes (FTPs), administrative restructuring within the Ministries

responsible for development and implementation of the innovation policy, measures to promote innovative activities among high education institutions, creation of a series of large state-owned technology-oriented corporations (ROSNANO, ROSCOSMOS) to support Russian new technologies on the global markets. In order to stimulate participation of universities in research and innovation, the government has established a network of Federal Universities. Since 2009, innovation has become a new "buzzword" in the political rhetoric of Russian leadership. Every Ministry involved in implementation of the innovation policy has elaborated its own strategy of modernization. A considerable financial support was allocated to create new centres of excellence, technoparks, Special Economic Zones and Technological Platforms.

However, considering the amount of financial investments and administrative support from the government, Skolkovo Innovation Centre, which will be discussed in more details in Chapter 4, has become the flagship project of the modern Russian innovation policy.

3.1.3 Legal Aspects of Policy Regulation

During the Soviet times all relations in the field of science were managed by the special regulatory acts and normative regulatory acts within the general legislation. The first cornerstone of the basis of the Russian scientific legislation was laid in 1996 with the enactment of the Federal Law N 127-FZ "On Science and State Scientific and Technical Policy". At that time innovations were not considered as the priority area of the national interests that is why the Law was focused on regulation of the relations between the subjects of scientific and technological activities, leaving out such aspects as practical application of the scientific findings as well as their commercialization. In 1999 the Federation Council prepared and approved a draft of the Federal Law "On Innovative Activities and State Innovation Policy", which was rejected by the President in January 2000. Until recently, the Russian system of laws and regulations disposed no general law regulating innovative activities on the federal level. However, many regions and municipal entities have adopted their own laws, for instance the Law "On Innovation Activities in Tomsk Region" adopted in 2008, the Law "On Innovative Activities in

Lipetsk Region" adopted in 2011. Yet these laws have no common methodological basis and differ from each other conceptually, which leads to terminological confusion and inconsistency with the international standards. (Ivanov & Ivanova 2011: 55, 85)

Since the famous speech of Dmitry Medvedev during his budget message in June 2010, in which he announced the development of innovations in Russia as one of the main objectives of its fiscal policy, support for innovations has become a priority in determining the vector of the state policy. This emphasis contributed significantly to the improvement of the legal instruments of the regulation in the sector of R&D and innovations. (Kuzmina 2011:68)

Thus, the Federal Law N 254-FZ "On Amending the Federal Law "On Science and State Scientific and Technical Policy"" dated 21.07.2011 has finally formalized in legislation the conceptual framework of the innovation activities. According to the amendments, the Federal Law N 127-FZ dated 23.08.1996 "On Science and State Scientific and Technical Policy" has been revised to include the Chapter IV on the state measures of support for the innovative activities and to introduce in the Article 2 such key categories as:

> "Commercialization of scientific and (or) R&D findings - activity to involve scientific and (or) R&D findings into economic turnover.
>
> Innovation is a new or a significantly improved product (goods, services) or a process, a new sales method or a new organizational method introduced in business practice, workplace organization or external relations.
>
> Innovative project is complex of activities aimed to achieve an economic profit through implementation of innovations, including the commercialization of scientific and (or) R&D findings.
>
> Innovative infrastructure is a complex of organizations that contribute to the implementation of innovative projects, including the provision of administrative, material, technical, financial, informative, HR and organizational consulting services.
>
> Innovative activities are the activities (including scientific, technological, organizational, financial and commercial activities)

> aimed at implementation of innovative projects, as well as at creation of an innovative infrastructure and its operating." (Federal Law of the Russian Federation dated 21 July 2011 N 254-FZ "On Amending the Federal Law "On Science and State Scientific and Technical Policy"" 2011: 3)

The definitions have drawn certain criticism on behalf of the researchers and policy-makers. For instance, Elena Kuzmina (2011) claims that it is inaccurate to include the activities "aimed at creation of an innovative infrastructure" in the term of "innovative activities", since the activities to develop innovations are carried out under totally different legal basis and by different parties, than the activities to support innovations. In case the activities to support innovations are considered as innovative activities, it may facilitate financial misapplications and encourage corrupt practices. Moreover, the researcher criticizes the concept of "innovation project" as unnecessary, as it duplicates the meaning of "innovative activities", which are aimed at developing innovations and receiving profit from their commercialization. The term innovative project should be understood not as activities, but rather as a program of their implementation, a set of project documents to be submitted for governmental support. Another weak point of the amendments is a definition of innovation itself, given that it acknowledges only one of its characteristics, which is the novelty. (Kuzmina 2011: 68–70) As to be compared with the definition given in Finland's National Innovation Strategy, which is much more precise and reflects in a more comprehensive way the intangible nature of innovations and innovative activities:

> "Innovation refers to a utilised competence-based competitive advantage. A competence-based competitive advantage can emerge from scientific research, technology, business models, service solutions, design, brands or methods of organising work and production. <…> Capitalised as innovations, competence based competitive advantages promote the advancement of businesses, society and wellbeing." (Government's Communication on Finland's National Innovation Strategy to the Parliament 2009: 4)

While European Commission glossary provides a definition, which is quite similar to the Russian variant:

> "An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing

> method, or a new organisational method in business practices, workplace organisation or external relation. The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new (or significantly improved) to the firm." (Glossary of the European Commission).

Although the amended federal law "On Science and State Scientific and Technical Policy" regulates all relations in the sector of innovations and public support measures, it strangely omits such important terms as "innovation policy" and "innovation system". One of the most important amendments of the Law is the Chapter IV. It provides the definition of the term "Government support for innovation" and enlists possible support measures, which conform to the legislation of the Russian Federation. (Federal Law of the Russian Federation dated 21 July 2011 N 254-FZ "On Amending the Federal Law 'On Science and State Scientific and Technical Policy'" 2011: 5–6)

Despite a number of terminological inconsistencies, the amended Federal Law "On Science and State Scientific and Technical Policy" has contributed to the legislative consolidation of the main terms related to innovative activities, which is an important step that Russian government made to fulfil its commitment to improve innovative environment in the country. (Kuzmina 2011: 70).

3.2 The System of Innovation Policy Governance

Based on the results of the analysis conducted by OECD experts, an efficient system of innovation policy governance should exhibit the following characteristics: "legitimacy, coherence, stability, adaptability, and ability to steer and give direction" (OECD 2011: 195). Since late 2000s, when innovation became a top-level priority of the national political agenda, the legitimacy of innovation policy has been associated with the direct interference of the "highest" governmental authorities, specifically of the president or prime minister. Such "a top-down approach" is logically expected to provide a better coherence and "ability to steer and give direction" to the policy. However, due to the inconsistency of the activities of the relevant ministries and agencies, it has resulted in

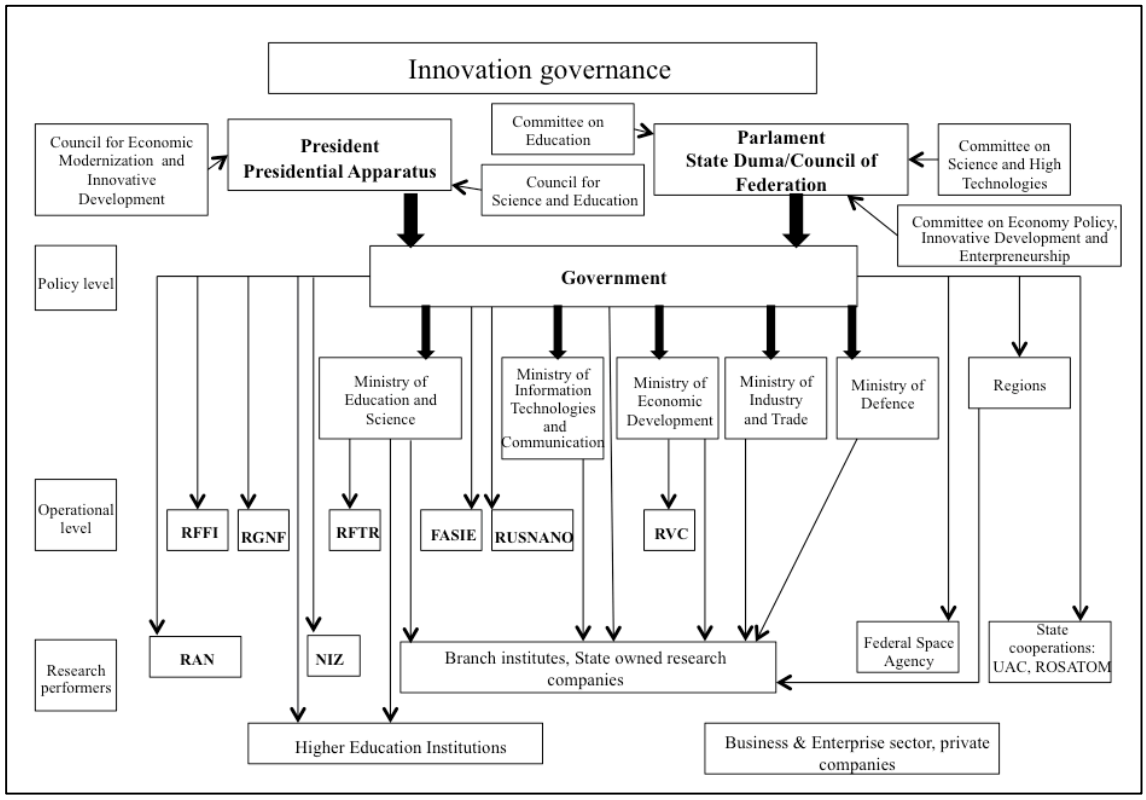
"multiple and partly competing strategic visions" and "overlapping initiatives". (OECD 2011: 195).

The state system of management of scientific and innovative activities evolved during 2002–2010 and it is still the subject to regular transformations. The system comprises (see Figure 4) policy, operational and research levels. On the policy level: the President and Prime Minister of the Russian Federation, on the executive side, legislative authorities of the Russian Parliament (the State Duma and the Council of Federation), which are responsible for the "overall policy guidance and supervision", and executive bodies (federal ministries, agencies and services, regional authorities) that are in charge of "detailed policy formulation and implementation". (OECD 2011: 185) The corresponding departments of the Presidential Administration and the Executive Office of the Government supervise and coordinate the work of legislative and executive bodies. (Ivanov & Ivanova 2011: 53)

The key Ministries responsible for the elaboration of the state innovation policies and control over their implementation are the Ministry of Economic Development, the Ministry of Education and Science and the Ministry of Industry and Trade. The Ministry of Defence, the Ministry of Health and the Ministry of Energy also play an active role in R&D and innovation policy-making. As a result of a number of re-centralisation reforms within the system in 2010, the state agencies responsible for policy implementation were dissolved and reorganized: the functions of the Federal Agency for Science and Innovation (in charge of top priority Federal Targeted Programs and federal scientific facilities) as well as the Federal Agency for Education were delegated to the Ministry of Education and Science; the functions of the Agency for Information Technologies were assumed by the Ministry of Communications and Mass Media, and the Federal Agency for the Administration of Special Economic Zones adjoined the Ministry of Economic Development. (Mini Country Report/ Russian Federation 2011: 2).

The operational level (as indicated in the Figure 4) of the system is composed of several funding organizations, the most relevant of which are the Russian Fund of

Technological Development (RFTR), the Foundation for Assistance to Small Innovative Enterprises (FASIE), the State Corporation for Nanotechnologies (RUSNANO) and the Russian Venture Company (RVC). An important input in innovation policy analysis and evaluation is attributed to the think-tanks (for instance, the State University – Higher School of Economics) and innovation stimulation organizations (like ROSNANO – Russian Corporation for Nanotechnologies). (Ivanov & Ivanova 2011: 53–55)



Abbreviations:

RFFI – Russian Foundation for Basic Research
RGNF – Russian Foundation for Humanities
RFTR – Russian Fund for Technological Development
FASIE – Foundation to Assistance to Small Innovative Enterprises
RUSNANO – Russian Corporation of Nanotechnologies
RVC – Russian Venture Company
RAN – Russian Academy of Science (RAS)
NIZ – National Research Centres
ROSATOM – State Corporation of Nuclear Energy
UAC – United Aircraft Corporation

Figure 4. Innovation Governance in Russia (Mini Country Report/Russian Federation 2011: 3)

On the level of research performers, the Russian Academy of Science (Rossijskaya Akademiya Nauk (RAN)) occupies the leading position. RAN is “a prestigious learning society” and a strong R&D institution with its own regional offices: the Urals, Siberian and Far Eastern branches. 15% of civil R&D budget is places at RAN disposal. (OECD 2011: 191).

In summer 2012, the organizational structure underwent several transformations again. The two main presidential consultative bodies were reintegrated: the Council for Science, Technologies and Education was reorganized into the Council for Science and Education, the Presidential Commission for Modernization and Technological Development as well as the Governmental Commission on High Technologies and Innovations were dissolved and reorganized into one body, the presidential Council for Economic Modernization and Innovative Development (Official website of the President of Russia 2013). The Governmental Commission, headed by Vladimir Putin from 2010 until its reorganization in August 2012, has played an important role as a managerial instrument of the legislative authorities. Thus, in March 2012 it made a resolution which required government-owned companies to pay 1% of their innovative development expenses for the account of the Skolkovo Centre Endowment Fund (as expected 30 billion RUB or 766 million USD in 3 years). (FORBES.RU 2012; The Governmental Commission on High Technologies and Innovations has been dissolved 2012)

Due to the constant staff reshuffle as well as organizational transformations, the system of management and control over the innovative policy in Russia fails to provide timely and responsive managerial decisions and follow up on them. The rigidity of the organisational structure obstructs significantly the feedback communication between the governmental authorities and the subjects of the policies that they exercise. While analytical centres successfully apply the foresight approach to back up the policy-making initiatives, such tool as policies output evaluation has not been yet fully implemented. Additionally, the lack of regular monitoring procedures accounts for the insufficiency of information flow about the actual state of affairs on the operational level. It equally impedes the assessment of efficiency of the implemented state

initiatives and policies. (Ivanov & Ivanova 2011: 53–54; Mini Country Report/Russian Federation 2011: 3)

3.3 Current Initiatives and Strategic Policy Documents

Following the collapse of the Soviet Union, the major imperative of the Russian innovation policy was to preserve the scientific heritage, which was left. After two decades of constant transformations in accordance with the criterion of market-oriented economy, the country's innovation policy has been reformulated. Its present-day goals, formalized in a number of fundamental documents, constitute a part of our analysis and are presented in the following subchapters.

3.3.1 Policy Framework of Science and Technology Development of The Russian Federation up to The Year 2010 and Beyond

Approved in March 2002 by the President of the Russian Federation at a joint meeting of the Security Council, the State Council and the Presidential Council for Science and High Technology, the Policy framework of science and technology development became the fundamental document of the past decade to define the priority research areas of the entire science and technology sector. (Ivanov & Ivanova 2011: 15)

The document determined the transition to the innovation-based development as the main goal of the Policy and the progress of national science and technology sector as one of the top national priorities. In view of the stated goal, the following objectives were outlined:

- Development of basic sciences and applied R&D;
- Improvement of the governmental regulation system in the field of science and technology;
- Formation of the national innovation system;
- More efficient application of the results of scientific and technical activities;

- Human resources development and retaining within the science and technology sector;
- Integration of science and education;
- Development of international scientific and technological cooperation. (Policy framework of science and technology development of the Russian Federation up to the year 2010 and beyond 2002).

Moreover, the provisions of the Policy set up the system of prioritizing, where "focus areas in basic sciences are defined by the academic community, and the priority sectors in technology and R&D by the President upon recommendations of the Government" (Ivanov & Ivanova 2011: 16).

Nevertheless, the progressive ideas of the Policy had not been realized by the announced deadlines due to the several policy divergences, which occurred in the years 2004–2006. The first important policy transformation affected the sector of research and development activities, which suffered from considerable restructuring. These reforms, aimed at optimizing budget spending on science, resulted mainly in downsizing the number of scientists and researchers, as well as the institutes within the Academy of Science. The second reform was based on the determination to implement the best practices of the developed countries where scientific research is mainly conducted in universities. According to that assumption, the Ministry of Science and Education of Russia issued the decrees reducing drastically the number of State scientific institutions and their property complex, and transferred academic institutions under the jurisdiction of universities. All these drastic measures were taken despite the fact that favourable situation on the markets of natural resources at that moment was allowing a considerable upgrade of R&D sector in order to attain the Policy's main objective and transit to the innovation-driven economy stage. (Ivanov & Ivanova 2011: 49–50).

Being focused on structural reforms, the Government disregarded earlier stated goals, among them the formation of a national innovation system and industrial policy, elaborating innovation development regional policies. As a result, sub-federal units of

the Russian Federation were deprived from contributing to the prepapration and implementation of the state scientific and technical policy, which partly demotivated regional administrations and businesses from investing in innovative scientific programs and projects. The transformations of the Policy resulted in a substantial degradation of the performance indicators in the science and technology sector and a deterioration of the positive results of the previous period. (Ivanov & Ivanova 2011: 51–52)

3.3.2 Strategy 2020

In July 2006 back then President Vladimir Putin assigned the Ministry of Economic Development to elaborate the *Concept of long-term socio-economic development of the Russian Federation for the period up to the year 2020*. The main objective of the Concept was to "define the measures to ensure in a long-term perspective (2008–2020) the sustainable increase of welfare of the Russian citizens, national security, dynamic economic development, strengthening of Russia's positions in the world community". (Ministry of Economic Development of the Russian Federation 2008: 3)

In November 2008 the Russian Government finally approved the Concept, which intrinsically became outdated at the moment of its ratification as the global economic crisis badly weakened the Russian economy. Two major factors made it obvious that the Concept required a second edition, adapted to the new realities. First of all, the crisis caused an abrupt decline of economic indicators and made it impossible to achieve the majority of the announced benchmarks that were to be realized in the first period 2007 – 2012. (Naumov 2011: A6) For instance, during the first stage it was planned to achieve some of the following macroeconomic indicators (in 2012 as compared to 2007): 137–138% of GDP growth, 180–185% of growth of investments in fixed assets, 153–154% of growth of population income, 5–6,5% of inflation decline etc. (Ministry of Economic Development of the Russian Federation 2008: 27)

Secondly, while the Concept stated the quantitative targets to be achieved by 2020, it was considerably lacking a deep analysis of future challenges and deficiencies of the

Russian economy and society (especially tax policies and pension reforms). Furthermore, the ways to achieve those ambitious economic indicators were formulated only declaratively. (Naumov 2011: A6)

The second variant or adaptation of the Concept was initiated in December 2010 by the Russian government (with Vladimir Putin as Head of the Government 2008–2012). The document, which received a new title "Strategy 2020", has been prepared by more than a thousand of Russian and foreign experts under the guidance of the State University - Higher School of Economics and the Russian Presidential Academy of National Economy and Public Administration. During less than a year 21 expert groups, each responsible of a specific aspect of the socio-economic development of the country, reached a conclusion that the only way for Russia to succeed in future was to change its economy model and apply a new social policy approach. (Strategiya-2020: Novaya model rosta – novaya socialnaya politika 2012)

According to the authors of the Strategy-2020, the economic crisis 2008–2009 demonstrated that "the previous model of economic growth, which was predominantly based on quick expansion of the domestic demand has largely exhausted its potential". The authors claimed that Russia was at the threshold of a new age of finding its own way to achieve sustainable and balanced growth, transit to the innovation stage of economic development and update its infrastructure to the level of post-industrial societies. The country could no longer rely only on the profits from exports of its natural resources, as it would condemn it for technological and institutional marginalization in global competition. (Strategiya-2020: Novaya model rosta – novaya socialnaya politika 2012: 3)

The new 864 pages long Strategy-2020 is a roadmap for modernization of the country's economic, social, political and scientific spheres. The new program has revealed to be similar in its goals and objectives to the European Strategy 2020, which obliges Member States of the EU to increase investment in R&D up to 3% of GDP and urges to recognize innovation policy as a top-priority in the political agenda. (European Commission 2010) The Russian Strategy-2020 appeals foremost for activating such

element of competitiveness as high quality human capital assets and scientific potential, which was omitted in the earlier version. It also proposes a new social policy oriented to the interests of the social classes with high potential of innovation-driven growth. (Strategiya-2020: Novaya model rosta – novaya socialnaya politika 2012: 3)

The new development model introduces the measures to "remove institutional barriers to economic growth". This model includes improvement of the business and investment climate, development of fair competitiveness; eliminating inefficient state regulations, fight against corruption and business hostile elements of law enforcement system. The authors of the Strategy-2020 take up the position that "only high level of competition may create a real demand for innovations, stimulates the economy to transform into innovation-driven one". (Strategiya-2020: Novaya model rosta – novaya socialnaya politika 2012: 4)

Innovations play a defining role in the concept of the Strategy-2020, being represented by the expert group entitled "Transition from fostering innovation to innovation-based growth" with Leonid Gokhberg, Vice-Principal of the State University - Higher School of Economics, as a head of it. As a result of numerous meetings with international counterparts, conferences and roundtables on the development of innovations in Russia, the group has concluded that the current innovation policy requires deep reforms to become more integrated and efficient. (Gokhberg 2011a) Along with this it was proven that a number of current political initiatives are obstructing the efficiency of innovations in Russia such as "bureaucratic administration of tax reductions, custom barriers, public procurement and funding of scientific institutions regardless their performance results" (Gokhberg 2011b).

3.3.2.1 Three possible scenarios of innovative development

The Concept 2020 presents three basic scenarios of possible development of innovation processes in Russia, taking into account estimated internal economic indicators and external technological changes. The most advisable among them is the progressive scenario that offers an accelerated integration into the global economy. It implies

extensive measures for developing and improving business environment, based on governmental subsidies along with an active market involvement (see Table 2).

Despite the fact that the progressive scenario implies the highest budget expenditures (2,2 trillion RUB or 63 billion USD in 2015 and 3,7 trillion RUB or 105 billion USD in 2020), it allows to achieve considerably higher target indicators than any other scenario. For instance, it enables to reach a triple increase of the volume of the innovation products by 2020 (from 5,3% in 2012 and 9,9% in 2015 up to 20,1% in 2020). As estimated, within the framework of progressive scenario, modern and effective incentive mechanisms would stimulate the growth of private business investments (up to 73% by 2020) in innovations and R&D activities. (The Concept 2020 2012: 85–86)

Table 2. Progressive scenario (The Concept 2020 2012: 77–78)

Innovations	Comprehensive reforms aimed at development and introduction of the instruments to stimulate the demand for innovations and support the offer of them.
Science	Comprehensive reforms together with performance evaluation of scientific institutions, which should be differentiated according to the focus area of research activities.
Manpower training for innovation-based economy	Modernization of educational programs, scientific and engineering qualifications. Emphasis on premium technical education.
Institutions, including legislation	Considerable improvement of the institutional conditions: • Promotion of fair competition (elimination of corrupt practices and reduction of administrative burdens) • Increase of tax exemptions and tariff preferences in order to promote innovations and ensure long-term economic growth.

The second scenario envisages a moderate and gradual developing of innovations (see Table 3). The main advantage of the moderate scenario is that it requires the lowest level of budget expenditures on innovations (1,9 trillion RUB or 54 billion USD in 2015 and 3 trillion RUB or 85 billion USD in 2020). However, it does not allow the country to make a necessary technological break-through and improve considerably its positions on the global innovation scale. The estimated proportion of innovation products in the total amount of goods and services production would increase moderately (from 5,2 % in 2012 up till 12% by 2020), which is insufficient to accomplish the ambitious goals of the government for social and economical development. (The Concept 2020 2012: 86)

Table 3. Moderate scenario (The Concept 2020 2012: 78)

Innovations	Employment of extra budgetary funds in innovations (forcing innovations in government companies, expulsion of old technologies and manufactures); support for creative class and favourable economic environment; large-scale innovation localization.
Science	• Targeted support for the best students; • Pre-emptive support for scientific research in academic institutions; • Stimulation of government companies to increase their investments in R&D activities; • Promotion of cooperation among the members of national innovation system.
Manpower training for innovation-based economy	Emphasis on training and retraining of available engineers, update of the training programs for engineers and researchers with involvement of foreign experts and successful Russian businessmen.
Institutions, including legislation	Gradual development of general economic environment and innovation infrastructure.

The least advisable is the inertial scenario, which implies maintaining the existing tendencies in economy dependent on natural resources and external markets (see Table 4). It combines high level of government spending and low level of the target indicators, which is the result of keeping the ineffective mechanisms of achieving economic profitability from public investment in innovations. Thus, by 2020 the share of innovation products in the total amount of goods and services production would reach only half of the level of the progressive scenario indicators at only 10% difference of the overall budget costs (2,1 trillion RUB or 60 billion USD in 2015 and 3,3 trillion RUB or 94 billion USD in 2020). (The Concept 2020 2012: 86)

Table 4. Inertial scenario (The Concept 2020 2012: 78–79)

Innovations	• Emphasis on situational decisions and soft reforms. • Adaptation of available technologies.
Science	Preservation of basic scientific institutions.
Manpower training for innovation-based economy	Gradual realignment of training programs for professional personnel according to the occurring demands.
Institutions, including legislation	Manual control of economy and innovations; pinpoint solutions to improve innovation climate. Soft reforms of legislation within the framework of traditional law.

Despite all complexities and challenges of the progressive scenario, it appears to be the most preferable as it allows the country to pull through the technological downfall by 2020 and overcome budget limitations by substituting the direct governmental expenditures on innovations by indirect expenses and private investments. Concurrently, it is very unlikely that one of the two extreme scenarios will be implemented without combining elements from the moderate scenario, because of the high initial and accrued costs of the progressive scenario and the stagnating aspects of

the inertial one. It is expected that the governmental policies will be allocated within the frames of these three scenarios depending on the rationality of the support provided and efficiency of the institutional and systemic measures. (The Concept 2020 2012: 80–86).

3.3.2.2 Conclusions and recommendations

As a result of a yearlong cooperative analysis, the experts of the Innovation Group for the Strategy-2020 have ascertained that despite the available potential of human resources and scientific achievements, innovative development of Russia is inadequate. This inadequacy is reflected in the low rate of innovative activities of Russian enterprises, small number of patents, path dependency of Russian science on soviet model, lack of cooperation between business and education, state support exclusively for high-tech industries instead of diffusion of innovations in all sectors of economy. Therefore, the government should primarily support those sectors of economy, which have potential or are already represented on the international market and successfully compete with other global players. Besides, it is highly recommended to develop the instruments of networking cooperation and engage transnational leaders into the Russian market of innovations. Another aspect to be improved is a currently low demand for innovations on behalf of Russian private sector. For this reason scientific and technological complex is to be restructured in order to strengthen its integration with business and education (academy). Moreover, the institutional measures to prevent the continuing brain drain and support the "creative class" of population through engaging a broader spectrum of society into innovative activities should also be enforced. (Strategiya-2020: Novaya model rosta – novaya socialnaya politica 2012)

Apart from these general recommendations the expert group has produced a list of concrete proposals for the Russian government with regard to the future development of national system of innovations (see Appendix 4). The main conclusion that the experts have come to is that "transition to the knowledge economy stage of development is an absolute imperative for the development of Russia". For that the country should shift from providing incentives for innovations towards the innovations-oriented growth. (Strategiya-2020: Novaya model rosta – novaya socialnaya politica 2012: 4)

3.3.3 *Go Russia!*

Elected as the President of the Russian Federation in 2008, Dmitry Medvedev designated economic modernisation and diversification to be the highest priorities of his presidency. In compliance to his presidential agenda Medvedev in May 2009 founded the Presidential Commission on Modernization and Technological Development of the Russian economy, whose members became almost all ministers of the Russian government, leading businessmen and academics. (Official website of the Presidential Commission on Modernization and Technological Development 2013)

In September 2009 in the article entitled "*Go Russia!*" and later on in his second address, Medvedev presented his programme of economic modernisation of Russia and outlined its five strategic areas. These key areas included: "energy efficiency and new fuels, medical technologies and pharmaceuticals, nuclear power engineering, information technologies, space and telecommunication". (Medvedev 2009)

In the article Medvedev rigorously criticized Russia's "primitive economy", "endemic corruption", "paternalistic attitudes", calling them the main "social ills" of the country that impede its progressive development. In comparison to the current situation, he referred to the cruelty and great human loss in the result of earlier attempts to modernize the country conducted by the Russian tsar Peter the Great and after the Revolution in 1917 by the Bolsheviks. Medvedev pointed out that this time Russia should demonstrate that it is capable of developing "in a democratic way", non-violently, providing benefits for all players of the system. He finally urged to discontinue "humiliating dependency on raw materials" and build a modern science-based economy. (Medvedev 2009)

Except for the appeals for fundamental changes and criticism of the vicious heritage of the Soviet system, which in the opinion of some observes (The Economist 2009, Pabst 2009) were neither new nor radical, Medvedev's article appeared more like "a wish list, rather than a presentation of a policy programme". (Eke 2009).

Despite the common scepticism about the efficiency of the announced programme, in

September 2010 Arkady Dvorkovich, Chief Economic Advisor to Dmitry Medvedev, presented the projects already launched in the frameworks of the *Go Russia!* Programme. They include (Official webpage of the Presidential Committee on Economic Modernization and Innovative Development 2013):

• Energy Efficient City and District: project, which aims at reducing the energy intensity in the housing sector and public institutions through usage of energy efficiency programmes. Considering the fact that energy intensity in Russia surpasses in 2,5 times the world average, Russian government set a goal of 40% decrease by 2020.

• Pharm 2020: the main objective of the project is to attract local and foreign investments amounting to 6 billion USD in order to restore the Russian pharmaceutical industry.

• New generation of nuclear energy technologies: 5,42 billion USD allocated to the series of projects, which aim to develop new technologies improving the efficiency of nuclear fuel usage and creation of secure and modern nuclear power stations.

• Supercomputer education: project to develop a national system of supercomputer education.

• Electronic government: recently created website www.gosuslugi.ru provides online access to public services, such as passport applications, property rights registration etc. It aims to create systems of regional e-document flows.

• Space telecommunications as a part of broadband access: project to provide by 2015 digital television and radio access for 90% of the Russian population and create the single information space for the whole Russian Federation.

• Skolkovo Innovation Center: “a hub for high-technology research and business” to provide “home-grown innovations”. The aim of the conceived innovation center is to cover all five priorities announced in the modernization programme of Dmitry Medvedev. (Dvorkovich 2010 “Go Russia”: Progress One Year Later”)

4 SKOLKOVO INNOVATION CENTER AS A KEY INITIATIVE OF THE RUSSIAN INNOVATION POLICY

Chapter four provides a detailed description of the underlying reasons of the creation of Skolkovo Innovation Centre, the legal and financial advantages that the project has received on behalf of the Russian government, the project's grant making policies, its organisational structure and the leading personalities involved in its creation and management. Such a descriptive approach is implemented with a purpose to provide a better assessment of the various aspects of the project using the SWOT analysis method to identify the available opportunities and possible threats to be considered.

4.1 The Preconditions of Skolkovo Creation

In November 2009 President Dmitri Medvedev declared publicly his new initiative "to create a unique innovation and technological centre in the country" (Khvostunova 2013), the new ecosystem aimed at fostering Russia's modernization (The Economist 2013), "Russia's own version of Silicon Valley" (Meyer 2013).

As reference, the authorship of the term "Silicon Valley", first mentioned in 1971, is attributed to the Californian entrepreneur Ralph Vaerst, who together with the journalist Don Hoefler used it to describe the spatial concentration of high-tech enterprises (involved in development of silicon semiconductors) in Northern California, near San Francisco Bay area (Wikipedia "Silicon Valley"). The success of Silicon Valley, characterized as "the confluence of venture capital, schools, lawyers" (Tobak 2008), is a result of more than 50 years of scientific research work and entrepreneurial efforts, due to which the Valley keeps its leading positions as a unique high-tech hub. This can be proved by the fact that among 10 top IT companies 6 of them (Cisco Systems, Google, Intel, Hewlett-Packard, Apple, and Oracle) are based there. (Tobak 2008)

As Rosenberg notices, Silicon Valley has become "a symbol for the way forward…it is not enough to admire or envy Silicon Valley: countries that have any pretence of joining

the ranks of the world's advanced economies have no choice but to imitate it" (quoted in Rowe 2013).

The idea of creating a Russian version of Silicon Valley appeared back in the early 1990s. Various locations were considered for its implementation, however the idea was not realized because of political instability and economical constraints of the post Soviet times. In mid 2000s dozens of technological parks started to appear in various parts of the country, mainly based around regional scientific institutions and industrial enterprises. Technoparks boom broke out in 2004 after the visit of then-President Vladimir Putin to the IT park Bangalore in India. At Putin's initiative, about 7 billion RUB (202 million USD) were allocated for the establishment of three science parks in the field of information technologies: the West-Siberian Innovation Center in Tyumen region, the IT Park in the Tatarstan Republic and the Center of Technological Support for Innovation in Novosibirsk region. However, weak outputs of this initiative and low financial profitability of technoparks have provoked a rather sharp criticism in scientific circles and in Russian media. (LENTA.RU 2012)

Although both Russian Presidents Vladimir Putin and Dmitry Medvedev have repeatedly highlighted the necessity of the country's modernization and creation of a modern centre, focused on technological innovations, it was Dmitry Medvedev, who declared in November 2009 "the new course aimed at overcoming the general backwardness of Russia through its general modernization" (Kuzmin 2009). In December 2009, Medvedev formed a new working group to establish "a territorially separate complex for development of research and commercialization of new technologies" (Glikin 2009). The initiative was given an immediate top-priority status and already in March 2010 the village of Skolkovo (19 km from down-town of Moscow) was chosen as a construction site of the new project. According to the government, 85 billion RUB (2.5 billion USD) of the federal funds will be allocated for the construction of the project's infrastructure until 2015, although the overall completion of the Center is expected by 2020 (buildings of the first priority are planned to be put in operation by the end 2014). (LENTA.RU 2012)

4.2 Skolkovo Overview

The Foundation for Development of the Centre of Research and Commercializing of New Technologies Skolkovo (further Skolkovo Foundation) was founded in March 2010 and is a non-profitable organization responsible for development and management of the Skolkovo Innovation Centre. (Skolkovo Foundation Annual Report 2011) The main underlying purpose of Skolkovo is to "bring start-ups, leading science and technology companies, research and education together at a new techno-park that will act as a catalyst for innovation across Russia". (Gorst 2013)

Thanks to Medvedev's enthusiasm and direct involvement, the project has received an unprecedented political support. Thus, in September 2010 the State Duma adopted the new Federal Law No. 244FZ "On the Skolkovo Innovation Centre" introducing a special legal order on the territory of the Centre, offering favourable tax incentives, custom duties and migratory policies for Skolkovo participants and partners. The Federal Law also determined the key areas of R&D activities of the Centre, which are in line with the five "presidential" priorities for Russia's modernization: 1) energy efficiency and energy saving (including the development of innovative energy technologies); 2) nuclear technologies; 3) space technologies, primarily in the field of telecommunications and navigation systems (including the creation of the relevant ground infrastructure); 4) medical technologies in the field of equipment and medication development; 5) strategic computer technologies and software. (Part 8 of article 10 "Features of the Project Participants' Activities" Federal Law No. 244FZ) Consequently, five research clusters (Energy, Biomedical, IT, Nuclear and Space) have been established to develop research of the chosen areas. The clusters' activities include providing research grants and consulting support for start-ups and innovative enterprises from the moment of the idea generation up to the product development and commercialization. (Skolkovo Foundation Annual Report 2011: 44)

Apart from research clusters, the Skolkovo ecosystem also comprises the following elements: Skolkovo Technopark, Skolkovo Institute of Science and Technology (graduate institute), Intellectual Property Centre, Customs and Finance Company (TFK

Skolkovo) as well as R&D centres of the Key Partners (see Figure 5 below).

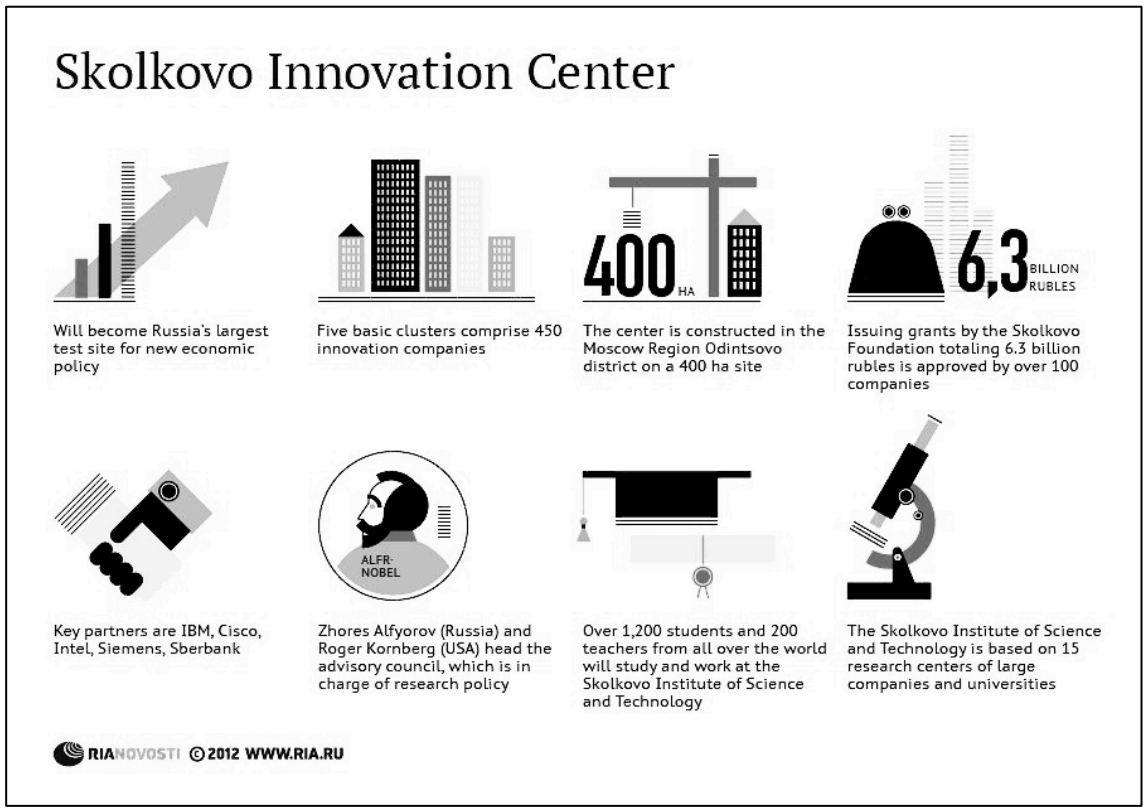


Figure 5. Infographic of the Skolkovo Innovation Centre (RIANOVOSTI 2012)

As Isabel Gorst (2013) rightfully remarks "Russia is famous for scientific talent, but not for entrepreneurial thinking that can turn bright ideas into profitable businesses". With this respect Skolkovo is claiming to be the first Russian initiative to break this stereotype, bridging the gap between academia and research, innovators and investors. (Gorst 2013) Despite the fact that the Foundation has been in operation only for four years, it has provided financial and organizational support to a large number of innovative companies. According to the Annual Foundation Report of 2011, more than 400 companies from all over Russian became Project Participants (see Appendix 5). By January 2013, Skolkovo Project Participants numbered 793 (with the competition of 5 companies per seat). Cumulatively over the entire period of the operation, the Foundation has received 4,075 applications and provided 184 grants for 9 billion RUB

(260 million USD). (Skolkovo Foundation Objectives and Results 2013: 27)

According to the official press releases of the Foundation, even though Skolkovo Innocity does not exist physically yet, it is already attracting scientists, students, investors and innovators. Project Partners of Skolkovo have become such major global and Russian corporations as Boeing, Lukoil, TATA, Astra Zeneca, Alstom, Cisco, EADS, Intel, Microsoft, Nokia, Siemens, Ericsson, TNK-BP, IBM, DOW, Johnson & Johnson, GE, ISS Reshetnev, RSC Energia, Sberbank, Rosatom (see Annex 4). By 2013 the Project Partners have signed the agreements on establishing 24 R&D centers in Skolkovo. 49 venture funds have signed the agreements on accreditation for a total of 19.6 billion RUB (567 million USD). 14 of them have co-invested the grants totalling 1.1 billion RUB (31 million USD). (Skolkovo Foundation Objectives and Results 2013: 7, 27)

4.2.1 Skolkovo Mission

Based on the analysis of various presentation materials and reports, the mission of Skolkovo Foundation comprises several elements. First of all, the Foundation is to: develop Russian human capital through research collaboration and teamwork with foreign specialists, foster the creation of "globally competitive products and services based on cutting-edge research" and accelerate the growth of Russian economy through innovations and integration of Russian technologies into the world economy. (First Steps. First Achievements 2010–2011: 6)

Apart from economical and educational priorities of its activities, Skolkovo also seeks to introduce a new ideology to the Russian business and scientific community, "the ideology of innovative constructive endeavour", which proclaims "innovative workmanship" as "prestigious, profitable, and important to the nation as a whole". (Skolkovo Foundation Annual Report 2011: 12)

4.2.2 Skolkovo's Unique Legal Status

All activities of the Skolkovo Foundation as a management company of the Skolkovo Innovation Center are regulated by two federal laws, which were adopted on September 28, 2010: Federal Law No. 244-FZ "On the 'Skolkovo' Center for Innovation" (further as "Skolkovo Law") and the Federal Law No. 243-FZ "On Amending Certain Legal Acts of the Russian Federation in Connection With the Adoption of the Federal Law 'On the 'Skolkovo' Center for Innovation'" (further as "Law on Amendments"). (Korotkova 2011)

These laws introduce "an unprecedented legal regime" for project participants and entrust the management company with an extraordinary organizational authority as a supervisor of the project implementation. (Korotkova 2011) The Skolkovo Law also specifies the conditions, under which companies are eligible to become project participants. A company should be a Russian legal entity, conducting research activities in the filed of one of Skolkovo's scientific clusters (IT, Biomedical, Energy, Nuclear or Space & Communications). A company is also required to have an office physically located on the territory of Skolkovo (project participants are to relocate to Skolkovo upon the completion of construction works, preliminary after 2014). The status of a project participant is valid for a period of 10 years. (Federal Law of the Russian Federation N 254-FZ 2011; Korotkova 2011)

Other significantly favourable provisions of the Skolkovo Law and the Law on Amendments include: exemption from VAT, property and corporate profits tax (provided that company's profit is less then 10 million USD/year and turnover is under 30 million USD/year) for a period of 10 years, reduced rate of mandatory pension insurance contributions for a period of 10 years, refund of import customs duties and of VAT expenses related to the import of goods necessary for construction of premises or for the implementation of research activities at the Centre. The residents of Skolkovo employing foreign specialists are also entitled to the simplified procedures of obtaining work permits and visas. Skolkovo Foundation in capacity of a Managing Company is responsible for all the paperwork and interaction with Russian migration

authorities. (Sitnikov 2010; Korotkova 2011) According to the Law, the Managing Company receives the land plot, buildings and structures within the boundaries of the project in its property, which will later be leased out to individual project participants. (Korotkova 2011; LENTA.RU 2012)

Under the pretext of avoiding corrupt practices and excessive bureaucratization, the innovation city will be excluded from the jurisdiction of the municipal authorities, and all the administrative and maintenance issues will be attributed to the scope of the Managing Company (Foundation) responsibilities. These legislative limitations on the power and authority of local administration indicate that the Centre is entirely under the control of the federal government. This amendment on one hand is a factual recognition of the high level of priority of the Project, but on the other hand it contradicts the Article 131 of the Russian Constitution on general principles of the organization of local government. This risks not only to influence the governance system of the territory, but also the life of future Skolkovo citizens, who will be practically deprived from the Constitutional right to participate in resolving issues of the local level. (Didikin & Kruzhkova 2010; Gavrilov 2011)

Unreasonably broad powers, delegated to the Managing Company (Foundation) under the Skolkovo Law, run contrary to the already existing Russian legal regulations and can create confusion and inconsistency in its application. As envisioned by the authors of the Law, the minimal interference of the public authorities in the activities of Skolkovo Innovation Centre was intended to decrease the administrative burden and bureaucratic barriers for the Project participants. However, a similar method of legal regulation has been largely unknown to the Russian legislation, which potentially jeopardizes the potency of the rule of law on Skolkovo territory. (Didikin & Kruzhkova 2010)

4.2.3 Funding Sources

Initially the budgetary financing of Skolkovo has been scheduled through 2015. According to the reports on the implementation of federal budgets and the law on

federal budget in the period 2013 – 2015, Skolkovo is about to receive cumulatively 109,49 billion RUB (3,41 billion USD). Despite the governmental commitment the public funding provided to Skolkovo is set to be gradually reduced in the coming years. (Papchenkova 2013a) "At a peak in 2012 the project received 26,6 billion RUB (803 million USD), but this is set to decline to 9,9 billion RUB (299 million USD) by 2015". (RIANOVOSTI 2013b)

Soon after the re-election of Vladimir Putin as the President of Russia in March 2012, Skolkovo Foundation, "brainchild" of now Prime Minister Dmitry Medvedev, was struck by a series of misfortunes. In autumn 2012, the Accounts Chamber revealed financial violations with regard to transparency of the grant procedures. Several months later, the Investigative Committee opened criminal cases against two Skolkovo senior executives over the alleged embezzlement of 800 000 USD. (Papchenkova 2013b) Moreover, in May 2013 Vladislav Surkov, one of the founders and the official curator of Skolkovo, often referred to as "a powerful Kremlin ideologue" and Russia's "grey cardinal", left his office of a deputy prime minister, withdrawing Skolkovo from his influential endorsement. His resignation followed the meeting with Vladimir Putin, who severely criticized the work of the Cabinet of ministers, of which Surkov was a member. (RIANOVOSTI 2013a) The decline of political support for Skolkovo after Surkov's resignation was subsequently succeeded by the cut back of state financing. On top of that, in June 2013 President Putin cancelled the previously adopted Medvedev's decree on compulsory contributions of the state corporations (in the amount of 1% of their innovation development budget) into the endowment fund of Skolkovo Institute of Science and Technology. (Moukine 2013b)

Some experts argue that the recent troubles happening to Skolkovo can be interpreted as the rivalry between Vladimir Putin and his predecessor and the current Prime Minister Dmitry Medvedev. As the newspaper *Vedomosti* states it, Vladimir Putin, who has never visited Skolkovo construction site, "considers the project artificial and has always distanced himself from it" (Papchenkova 2013b). However, according to Putin's spokesman Dmitry Peskov, the allegations that Skolkovo has been attacked "for political reasons" are groundless (Meyer 2013). Putin himself publicly asserts his belief

in the future of Skolkovo and the necessity to support it, alongside emphasizing that "the project, especially its financial part, should be carried out strictly within the limits of the law". (Russia Beyond The Headlines 2013)

The hard lines of Skolkovo were over in August 2013, when it was officially included in the state program "Economic Development and Innovation Economy", which specifies the funding plan of 502 billion RUB (15,2 billion USD) throughout the year 2020. Some political analysts explain it as a sign that the project has managed to regain the support of the government and President Putin above all. Even though Skolkovo has been initially financed in the format of private-public partnership, beginning from 2015 the amount of state investments will be gradually reduced in comparison with the private ones (Voronina 2013). Therefore, by 2020 the Russian government has agreed to provide the Project only with 136,6 billion RUB (4,1 billion USD), while the Foundation will have to raise 366,4 billion RUB (11,1 billion USD) in private investments. The state program also proposes a stricter allocation of public funds than before. As anticipated, 32 billion RUB (972,5 million USD) will be spent on research grants to project participants, the Skolkovo Institute of Science and Technology will receive 42 billion RUB (1,2 billion USD), the costs of infrastructure development will amount to approximately 37 billion RUB (1.1 billion USD), and another 57 billion RUB (1,7 billion USD) will be invested in the creation of the innovative environment. (Papchenkova 2013b; RIANOVOSTI 2013b)

Yet, the President of the Foundation, Viktor Vekselberg, finds the challenge of raising 367 billions RUB of private investments quite feasible. He anticipates Skolkovo to become a self consistent project by the year 2025. Moreover, Vekselberg expects that by the year 2020 Skolkovo's aggregated investment in the Russian economy will reach 213 billion RUB (6,2 billion USD), consequently surpassing the total amount of federal funding invested in the project. At the same time, the investment efficiency of the Project, as affirmed by the Management of Skolkovo, could be evaluated not earlier than by 2030, when the Innovation Center will start working at full operational capacity. (Voronina 2013)

Regardless the announced budget cuts, the privileged position of Skolkovo in the matter of state funding can be well illustrated through factual comparison of governmental support for other elements of the innovation system of Russia. According to the Ministry of Communications and Mass Media of the Russian Federation (2013), all 12 Russian IT technoparks received in total 19,5 billion RUB (613 million USD) of investments in the period 2007 – 2011, from which 7 billion RUB were provided from the federal funds, 8,5 billion RUB from regional budgets and 4 billion RUB from private investments.

4.2.4 Research Grants Policy

The Skolkovo Foundation provides non-repayable and non-refundable grants to innovative companies that have already been selected as Skolkovo residents and become participants of one of its five research clusters. The Foundation does not engage in equity financing, nor does it lay claim to revenue share. The Foundation finances projects, which meet the following criteria: the Project is aimed at the global market; the Company intends to possess all of the intellectual property rights required for commercializing the product/technology of the Project without breaking third parties' patent rights; the Company has long-term incentives. (Grant Policy 2011)

Once qualified, the company may apply for a grant by submitting a grant proposal, which includes an investment memorandum, a project presentation, a roadmap (project fulfilment plan), a financing plan, a budget estimate and its rationality. The application first passes the expert review of the relative cluster, then it is forwarded for the evaluation of the Grant Committee. The Grant Committee is responsible for the due diligence procedures that involves quality assessment and verification of the information. Several Foundation departments such as security department, legal department and finance department are engaged in the checks of reputation risks and the validity of financial estimates. Once all of the departments and experts involved in the due diligence procedure have finished their analysis, the project evaluation scorecard is issued and together with the original materials is forwarded to the regular session of the Grant Committee. (Skolkovo Foundation Annual Report 2011: 115)

The Grant Committee consists of 9 members, among them 3 academicians of the Russian Academy of Science, 2 representatives of a development institution, 3 employees of the foundation and 1 representative of the venture community. As of January 2013, 108 out of 156 grant applications have been approved amounting to 9 billion RUB (260 million USD). Because of the efficient application review procedures, Skolkovo Foundation announces that it takes 29 days for a project approval and 96 days for grant obtaining (as compared to 150 days of application review at Russian Venture Company, 210 days at SBIR (Small Business Innovation Research in US)). (Skolkovo Foundation Objective and Results 2013)

The transparency and objectivity of the granting process is achieved by compliance with the following regulations: 6 out of 9 members of the Grant Committee are independent experts; experts are non-employees of the Foundation, they are unknown both to applicants and to the employees of the Foundation, working with a grant applicant; all applicants may attend sessions of the Grant Committee; all decisions are made based on a simple majority vote and announced publicly; and there are strict observance of the guidelines to avoid conflicts of interest. (Skolkovo Foundation Objective and Results 2013)

The grant policy of the Skolkovo Foundation classifies projects by four stages of development (see Figure 6 below): pre-seed stage (concept stage), seed stage, early stage and advanced stage. Grant financing is mainly intended for a gradual development of the project from its current stage to the following one. The projects at a pre-seed stage are eligible for a mini-grant, which has gradually increased from 1,5 million in 2011 to 5 million RUB (USD 153 000) in 2012. Mini-grants are provided for the teams, which already have an innovative idea and need financing to create a business plan, a research program and to conduct a preliminary search for an interested investor. The Cluster Directors are entitled to decide on mini-grants without any approval on behalf of the Grant Committee. (Petlevoj 2012; Grant Policy 2011)

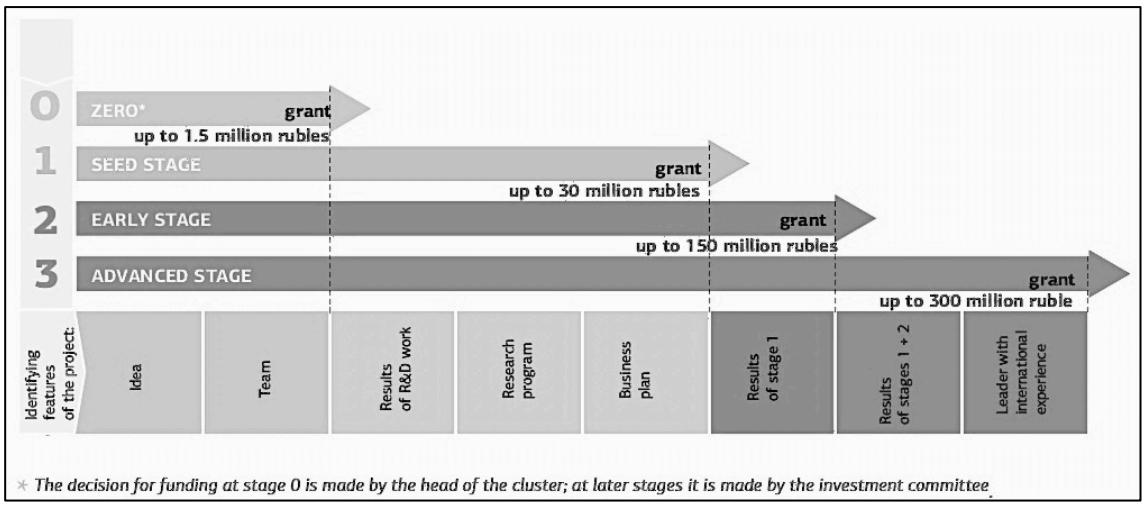


Figure 6. Grant policy of the Skolkovo Foundation (Skolkovo Innovation Centre 2011: 38)

At each further stage the projects have to meet specific requirements and follow various regulations. Moreover, the higher the requested amount of a grant is, the bigger share of external financing is required. Thus, the seed stage grant requires 25% of a third party investment, the early stage project needs 50% of a grant from a co-investor, 75 % of the advanced stage grant must be financed externally. (Grant Policy 2011)

The financing is provided in tranches of various amounts depending on the roadmap of a project. Each consecutive tranche is provided only upon the receipt of the performance report, stating measurable results of the project. "The Foundation examines the reports of completion of the Project's stages and with the help of external experts and auditors evaluates intermediate results and assures the proper use of funds." (Skolkovo Foundation Annual Report 2011: 115)

4.3 Skolkovo Ecosystem

The Skolkovo Foundation is assigned to create "a physical and virtual ecosystem to attract great minds from all over the world" to work and live there (Moukine 2013a). The ecosystem encompasses several strategic elements (see Figure 7).

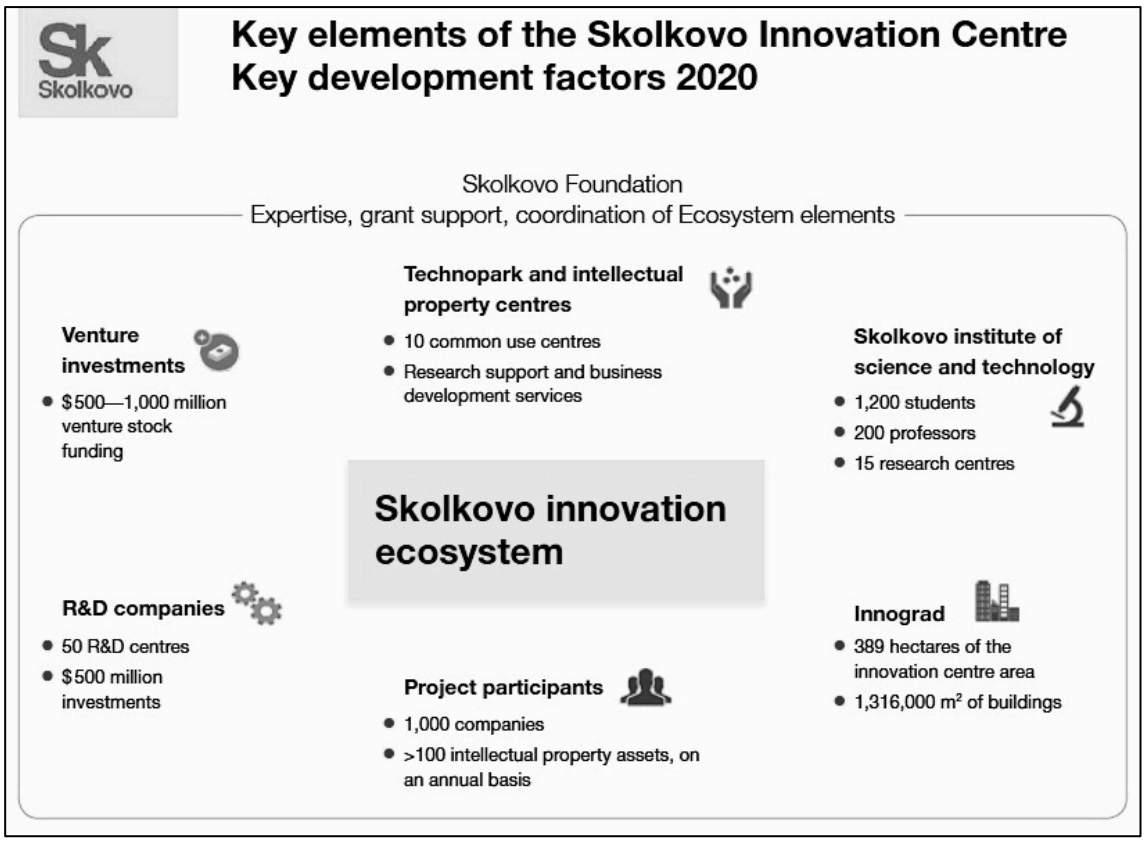


Figure 7. Key Elements of Skolkovo Innovation Centre (Skolkovo Foundation Objective and Results, January 2013: 8)

The cornerstone component of the educational and scientific unit of the innovation centre, according to the Foundation tops, should be the Skolkovo Institute of Science and Technology (further SkolTech), a graduate research university founded in cooperation with the Massachusetts Institute of Technology (MIT). In the meantime, Open University Skolkovo (OpUS), launched in 2011, has been designed with an aim to create a social network of open innovation though distribution of most recent scientific and technological findings among talented young people, interested in Skolkovo activities. OpUs has equally become a source of prospective students for SkolTech programs, as well as interns for Skolkovo's innovative companies. Network interaction is supported by regular on-line courses, seminars and lectures, held by prominent international and Russian experts and scientists. (Skolkovo Foundation Annual Report 2011: 76, 84–87)

Technopark Skolkovo acts as the main provider of research facilities and necessary services for the Project participants of all five clusters. The Skolkovo Intellectual Property Rights Centre (Skolkovo IP), incorporated as a part of Technopark in 2011, offers services to Skolkovo companies without engaging third parties. “The services include consulting on patenting technologies in the territory of Russia and other countries <...> facilitation of conclusion of license agreements.” (Skolkovo Foundation Annual Report 2011: 31) Apart from consultancy services, Skolkovo IP performs as a representative of the interests of Project participants abroad through direct cooperation with foreign patent attorneys. As of January 2013, Skolkovo IP performed 62 patent investigations and assisted in preparation of 143 applications for IP registration (among them 36 trade mark registration applications). (Skolkovo Foundation Annual Report 2011: 31)

The Skolkovo ecosystem also comprises the Customs and Finance Company of the Skolkovo Innovation Centre (TFK Skolkovo). Established in 2011 it is responsible for refunding customs duties to Skolkovo participants, providing them with the legal assistance concerning import and customs clearance, and acting as their custom representative. (Skolkovo Foundation Annual Report 2011: 30) However, in February 2013 the Investigation Committee of Russian Federation launched a criminal investigation on suspicion of misappropriation of 24 million RUB (USD 735 000) against Vladimir Khokhlov, the General Director of TFK Skolkovo and Kirill Lugovtsov, Director of the Finance Department of Skolkovo Foundation. Both managers were removed from the office. In addition, according to the Investigation Committee, for 2 years of its activity TFK Skolkovo, comprised of 10 employees with monthly salaries ranging from 300 000 to 600 000 RUB (from USD 9 187 to USD 18 374) (while an average salary in Moscow in 2013 was 60 000 RUB or USD 1 837), has executed only one custom operation. (INTERFAX 2013)

Another element of the Skolkovo ecosystem is venture funding, which refers to high-risk investments in start-up companies at a seed or early stage of business development at the prospect of higher-than-average return on investments. (European Commission 2014). Typical fields of venture capital investment are high technology industries, such

as biotechnology, IT and software. Venture capital is a type of private equity, which is a fundamental component of an innovative business environment. It is particularly attractive “for new companies that are too small and young to secure a bank loan or complete a debt offering” (Wikipedia definition). In return of high risks through investment in start-ups, venture capital funds acquire a considerable share of the company's ownership. As for January 2013, 49 venture funds, among which 19 are international, signed the agreement on cooperation resulting in accreditation agreements for 19,6 billion RUB (601 million USD) and 1,1 billion RUB (34 million USD) of co-investment for grants. (Skolkovo Foundation Objective and Results, January 2013: 14)

In 2011 Skolkovo signed 24 partnership agreements with the world leading industrial companies (among them Siemens, EADS, Nokia, Ericsson, GE, IBM, Intel, Sistema JSFC, SAP), which therefore assumed an obligation of creating corporate R&D Centres in the territory of the Innovation Centre with the agreed budget of 27 billion RUB (782 million USD). International leading companies play an essential role in the formation of the Skolkovo ecosystem, as they are the main providers of intellectual, scientific and financial capital, as well as an advanced business culture. They are also expected to facilitate integration of the Centre into the international innovation environment. (Skolkovo Foundation Annual Report 2011: 73)

4.3.1 Skolkovo Institute of Science and Technology (SkolTech)

Skolkovo Institute of Science and Technology (SkolTech) is a private, innovations and research oriented graduate university, which offers degrees (MSc and Ph.D.) in natural science, engineering and technology. The president of SkolTech is Edward F. Crawley, former Executive Director of the Cambridge-MIT Institute and chairman of the NASA Technology and Commercialization Advisory Committee. (Official Webpage of Skolkovo Institute of Science and Technology 2013)

Founded in 2011, SkolTech is a result of collaboration of 9 leading Russian universities and scientific organisations: Moscow Institute of Physics and Technology, Tomsk Polytechnic University, Moscow School of Management Skolkovo, New Economic

School, RUSNANO, Russian Venture Company (RVC), Bank for Development and Foreign Economic Affairs (Vnesheconombank), Foundation for the Assistance to Small Innovative Enterprises (FASIE), RAN Scientific Centre in Chernogolovka. (Official Webpage of Skolkovo Institute of Science and Technology 2013) The launch of SkolTech has been enabled through direct supervision of the Massachusetts Institute of Technology (MIT), which was contracted for it by the Skolkovo Foundation. Thus, MIT plays the main role of providing assistance in establishing administrative structure, faculty recruiting, degree programs designing, campus and laboratory planning. (Official webpage of Skolkovo Foundation 2013)

According to the perspectives of the President of Skolkovo Foundation, Victor Vekselberg, SkolTech should become the main element to bridge the gap between basic research and commercialization. This vision is reflected in the Triple Helix principle of the Institute:

> "- Graduate *educational* programs organized around broad themes rather than traditional academic disciplines, integrating science and engineering.
> - Multi-university, multi-disciplinary *research* focused on important problem areas.
> - *Industrial* impact by integrating education, research, and practice in *entrepreneurship, innovation and commercialization* (my italics)." (quoted in presentation of Prof. Duane Boning on SkolTech/MIT Initiative available at the Official webpage of SkolTech http://www.skoltech.ru/mit)

SkolTech undertakes a pioneering mission of creating "a university environment of innovation" through blurring "traditional disciplinary boundaries" and bringing together research, education and entrepreneurship, pursuing the objective to attract and retain talented researchers and scientists from Russia and abroad.

With an influential Board of Trustees, which includes Vladislav Surkov, a former Deputy Chief of Staff of the Presidential Executive Office and a Deputy Prime Minister and Herman Gref, President and CEO of Sberbank (the largest bank in Russia),

SkolTech plans to open its 200, 000 m2 high-tech campus (see Picture 1.) designed by the Swiss architectural bureau of Herzog de Meuron (famous for designing the Beijing Olympic Stadium) by 2018.

The Institute intends to involve some 1200 students, 200 professors, 300 post-doctorate associates in its five primary education and research programs (providing Master's and PhD's degrees only), which correspond to the Skolkovo research clusters. Information, Energy Efficiency and Biomedical Science and Technology programmes are already available for student applications. Space and civilian Nuclear Science and Technology programmes are still being designed. (Official webpage of SkolTech 2013)

4.3.2 Technopark

Created one year earlier than SkolTech, Technopark is the main research facility of the Skolkovo ecosystem. Its role is to accommodate start-up teams, business incubators and tenant companies and provide them with state-of-art research infrastructure to facilitate development of new technologies and products. On its 146, 000 m2, the Technopark intends to be open for its residents by the end of 2014 and accommodate 10 Centres of Collective Use, 400 participant companies, thus creating 9 000 new jobs. (Nielsen 2012) Technopark has already launched four out of ten Centres of Collective Use (CCU): Microanalysis (biomed, pharmacology, chemical industries), Optoelectronics, Prototyping (includes Engineering Laboratory, Laboratory of mechanical processing, Laboratory of Industrial Design and 3D Prototyping Laboratory). All CCUs are operated by the selected on competitive basis subcontracts in various cities of Russia. (Official webpage of Technopark 2013)

At present, the Foundation has provided financial, technical (through external partners) and consulting support (assistance in cooperation with other academic and research institutions) to more than 500 start-ups (total amount of grants reaching 2.9 billion RUB (90 million USD). "Start-ups will be eligible to become residents of the Technopark, the main research centre; if their products have not been commercialized by the time the facility opens in 2014". (Nielsen 2012)

The main functions of Technopark are claimed to comprise full-rang of services in business incubations, assistance in IP registrations, in providing contacts with international investors, facilitating the access to foreign markets and international expertise. (Efimoff 2012)

4.3.3 Research Clusters in Skolkovo

All activities of the companies-residents of Skolkovo are conducted within the frameworks of 5 clusters. As has been mentioned previously, the cluster policy of Skolkovo Innovation Centre strictly corresponds to the governmental priority areas within the innovation policy of Russia. These areas were determined by the former President Dmitry Medvedev and announced in his first presidential address to the Federal Assembly in November 2009. (Skolkovo Foundation Annual Report 2011: 44)

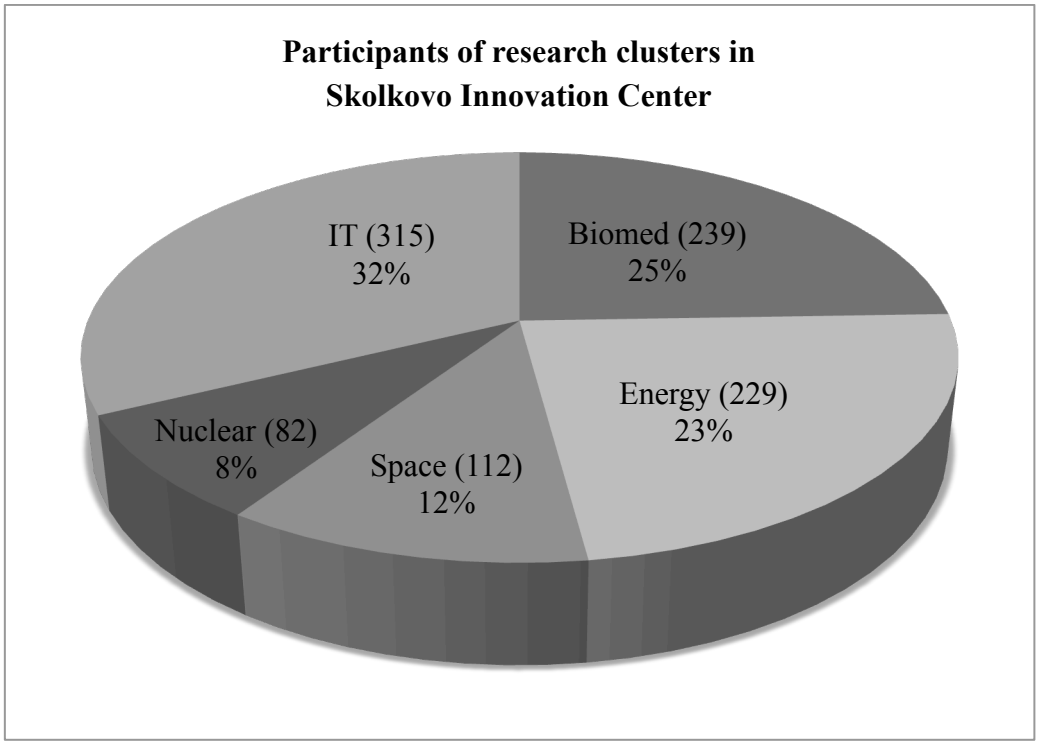


Figure 8. Participants of research clusters in the Skolkovo Innovation Centre (Created by the author on the basis of the data available on the official webpage of the Skolkovo Foundation and its Clusters)

Clusters are responsible for “determining priority fields of research within the chosen areas (foresight) to be approved by the Scientific Advisory Council, attracting researchers, supporting start-ups in their work and promotion of research results”. (Skolkovo Foundation Annual Report 2011: 45) As it is shown in the Figure 8 above, the clusters differ significantly by the number of participants, with IT Cluster being the most numerous of them (315 companies) and Space and Nuclear Clusters counting the lowest number of participants (112 and 82 companies respectively).

4.3.3.1 Cluster of Energy Efficient Technologies

The biggest country in the world, Russia possesses abundant reserves of natural resources. “Russia has the largest known natural gas reserves of any state on earth, along with the second largest coal reserves, and the eighth largest oil reserves” (Wikipedia “Energy in Russia” 2013).

From the year 2000 onwards under the presidency of Vladimir Putin the energy sector, seen as the main remedy to improve economic stability of Russia, has been almost entirely taken into the state ownership. In the result of nationalization process, the sector has been consolidated under the control of the three state corporations: GAZPROM (94% of Russia’s natural gas production; 16% of global natural gas production), ROSNEFT (12% of global oil production) and TRANSNEFT (transports 93% of Russian oil; the largest oil pipeline system in the world). (Goodrich & Lanthemann 2013; Wikipedia “Energy in Russia” 2013)

Russia is the main supplier of oil and natural gas to Europe and gradually increases its presence on the East Asian energy markets. Due to the dependency of European and most of CIS countries on Russian oil and gas, the energy sector has become a geopolitical instrument in the foreign policy of Moscow. Therefore, energy sector security has been raised by the Kremlin to the rank of “the primary issue for Russia's national security”. (Goodrich & Lanthemann 2013)

The revenues from energy exports constitute the major income item of the Russian

budget, which makes the country particularly vulnerable to oil and gas price fluctuations. Apart from that the Russian energy sector is faced with the disadvantages of the state monopoly over the sector. In absence of real competitors, state energy corporations are falling considerably behind their international counterparts in technologies and innovations, and are known for their hostility towards outside investors. (Goodrich & Lanthemann 2013) Moreover, corrupt practices constitute another bottleneck point. For instance, the Swedish economist Anders Åslund estimates that "50% of the state-owned Gazprom's investments are lost through corrupt practices" (Wikipedia article Energy Policy of Russia 2013).

In an effort to break the vicious circle of technological inferiority resulting in high losses and low efficiency of the Russian energy sector, Skolkovo's Energy Efficient Technologies Cluster supports "the development of the newest technologies of energy generation, transmission and accumulation, enhancement of consumption efficiency and "green" energy". (Cluster of Energy Efficient Technologies 2012: 2)

As a result of teamwork of Cluster's management and the representatives of Russian energy business, academic institutions, government bodies, national and foreign experts, the following Energy Cluster priority directions have been approved:

> " - Strengthening the existing areas of competitive advantage (gas-steam plants, energy efficient materials, hydrogen technologies).
> - Closing gap with mature countries (increase energy efficiency maturity, central heating networks, housing and industrial energy efficiency).
> - Participation in global energy trends and innovation (biogas, bio coal, smart grid)." (Official website Energy Cluster: http://edu-skolkovo.ru/en/energy/)

As of May 2013, 229 innovative companies from 32 regions (Russia has 46 regions in total) have become the participants of the Energy Cluster and have registered more than 200 patents. Skolkovo Foundation provided 1.9 billion RUB (57 million USD) in the form of grants, which matched over 2.2 billion RUB (67 million USD) raised from private investors. Most projects refer to the following areas: Renewable Energy (42),

Materials and Coatings (30), Production and Transmission of Oil and Gas (29), Chemistry and Petro-chemistry (28), Power Generation and Energy Transmission (26), Housing Services and Utilities Sector (23). (Cluster of Energy Efficient Technologies 2013: 2-5)

4.3.3.2 Cluster of Nuclear Technologies

The 20th century has seen unprecedented scientific achievements in nuclear physics, fundamentally affecting the peace and security of mankind: the creation of the atomic bomb and development of the nuclear reactor. The starting point of the Russian nuclear industry is connected with an atomic bomb project, initiated in 1942 by the USSR Defence Committee in response to the US Manhattan Project. Four years later, Igor Kurchatov, a Soviet nuclear physicist, produced his first self-sustaining nuclear chain reaction. The first Soviet reactor for plutonium production became operational two years later. Urged by the nuclear rivalry with USA, the Soviet Union tested its first hydrogen bomb in 1953. In the meantime, the USSR pursued nuclear research projects for civilian purposes, which resulted in the construction of the world's first nuclear power plant in Obninsk in 1954. At present, 10 nuclear power plants operating in Russia provide 30% of all electricity on the European part of Russia and more than 40% in its Northwest part. Therefore, nuclear industry similar to the energy sector is equated with the national top priorities, crucial for national energy security. (Official Website of State Corporation ROSATOM 2013)

Radiation technologies, namely radiation control and magnetic fields, have become the primary outcome of the nuclear industry development. Today radiation technologies are widely applied not only in energy sector, but also in various civil fields such as “nuclear medicine, sterilization and disinfection, safety and non-destructive testing, ecology and water treatment, mining and processing of mineral resources”. (Official webpage of Nuclear Cluster 2013)

That is why the priority areas of the Skolkovo Nuclear Technologies Cluster are not so much focused on the nuclear energy in its general meaning as on the radiation

technologies, which possess a higher potential of market growth. The Nuclear Cluster perceives its mission as to provide assistance to Russian scientists and engineers, working in such a traditionally closed sector, highly dependent on government procurement, as nuclear industry, to take part in creation of technological businesses. For this purpose the Cluster helps scientists in finding businessmen, who would be interested to invest in their ideas. (Kotlyar 2013)

As of August 2013, 82 companies from 301 applicants received the title of a "resident" of the Nuclear Cluster. The low number of residents can be explained by the fact that historically the nuclear sector has been associated with the defence industry in Russia. Its development has been little affected by competitive market conditions. That is the main reason why there are so few entrepreneurial initiatives in this field. Besides, the period of technology commercialization in this sector is considerably longer (average 5 years) than in other clusters. (Kotlyar 2013) 80% of the projects originate from the regional centers of competence in nuclear technologies (St. Petersburg, Yekaterinburg, Novosibirsk, Tomsk, Dubna, Sarov). (Official webpage of Nuclear Cluster 2013)

4.3.3.3 Cluster of Space Technologies and Communications

Space industry belongs to the limited number of areas where Russian expertise retains its competitiveness. Traditionally the main few stakeholders in this sector have been large state agencies. However, there are several segments, mainly specialized in ground-based application of space services, where Russian private companies can still participate, if only they withstand competition against foreign counterparts. Therefore, Skolkovo's Space Technologies and Communications Cluster is meant to address the main problems of the Russian space industry and develop national competitive environment for cutting-edge R&D projects with subsequent commercialization of their results. (Cluster of Space Technology and Telecommunication 2012: 2–5)

The Cluster is active in three particular areas. The first direction is assistance in "integrating of Russian start-ups into the "major" program for the development and use of space", which means bringing together small and medium businesses within one

project focused on “upstream-technologies” (Sensor & Systems 2013). The second area is referred to as “downstream” and entails practical usage of the findings of space research. To this highly competitive area belong the projects in the field of navigation devices, chipsets, information receiving antennas, etc. The third sphere of action lies within the technical support solutions for both aerospace and related industries (in avionics, for example). (Sensor & Systems 2013; Cluster of Space Technology and Telecommunication 2012: 26–30)

Skolkovo Space cluster is specifically intended to provide financial and informational support to small and medium innovative companies, often established by university staff members, employees of laboratories and research centres. The main barrier, impeding the selection process that Cluster’s management is facing at the moment is the general rule of Skolkovo grant policy. It requires that the product commercialization should meet the 3-year deadline, whereas for the aerospace sector this timeline is too short due to the research intensity specific to space projects. (Sensors & Systems 2013) As Sergey Zhukov, the Cluster Director, underlined in one of his interviews, “The time for development of research intensive technologies may often stretch over 15 years, that’s why we strive to modify this eligibility criterion for our Cluster.” (Strelnikov 2013)

The Cluster has become the first Russian development institution to provide assistance to SMEs in the aerospace field with 112 participants as on November 2013. It also plays an active role of intermediate between the private companies and governmental agencies, through participation in the leading national and international conferences and exhibitions, proving open and independent expert evaluation to “space” start-up, encouraging international cooperation, stimulating networking and developing additional tools to promote innovations in space activities. (Cluster of Space Technologies and Telecommunications 2013)

4.3.3.4 Cluster of Biomedical Technologies

Another focus area of Skolkovo is biomedicine. In the developed countries it is particularly the sector of biomedical research that receives the major part of financing and produces the highest number of extensively quoted scientific articles. In Russia the situation has been different for a very long time. Biology has been traditionally in the sidelines of physics and mathematics, whereas medicine is up till now separated from university education. In 1990s, during the years of a massive brain drain, many Russian biologists went abroad and achieved great success in their scientific carriers. In this connection Skolkovo's Cluster of Biomedical Technologies sets targets to support the existing scientific potential of Russian biomedical companies and attract Russian specialists living abroad to join the project and build research partnerships. (Sterligov 2011)

The Cluster is headed by Igor Goryanin, Professor at University of Edinburgh (UK) and Head of the Laboratory of Biological System at Okinawa Institute of Science and Technology (Japan), and is one of the most dynamic in Skolkovo. By the end of November 2013, it accounted for 239 participating companies working in four key directions: biomedicine, bioinformatics, biopharmaceuticals and industrial biotechnologies. (Official webpage of the Cluster of Biomedical Technologies 2013)

The management of the Cluster places a special emphasis upon scientific foresight of the current global tendencies in biology and medicine, as well as upon the challenges of the underdeveloped biomedical industry in Russia. From the perspective of the Cluster's experts, the goal of replacing of foreign imported medicaments by domestically produced substitutes should not be a primary one (which slightly disagrees with the point of view of the Russian government). Skolkovo Biomed thus focuses on assisting Russian companies whose research projects may result in truly scientific innovations, and not in high quality coping. (Batenjova 2011)

4.3.3.5 Cluster of Information Technologies (IT)

IT Cluster is the largest one in number of participants: as of November 2013, in the result of careful selection from 1838 applications, 315 companies joined the Cluster. 75 of them received research grants, subsequently creating 266 patents and IPs. In order to be chosen, a project should demonstrate its competitive advantages over global analogues, comprise a significant commercialization potential and accordingly qualified research team. Most of the IT projects account for such areas as new audio, video, image search and recognition solutions, processing and analysis of large data arrays, cloud computing and secure information technologies. (Efimoff 2013)

As reported by the World Economic Forum (WEF), the index of competitiveness of national economies largely depends on the level of IT and communication technologies development in the country. According to the ratings of the Global Competitiveness Report 2011–2012 of 142 countries conducted by WEF (2011), Russia occupies the 66th place (Finland – 4th, Germany – 6th, China – 26th, India – 56th). In support of the above-stated, the Global IT Report 2012 by WEF (2012) shows the following rankings: networked readiness index (propensity of a country to exploit the opportunities offered by ICT) of Russia is at 56th place (Finland – 3rd, Germany – 16th, China – 51st, India – 69th), as for the laws relating to ICT, Russia is at 99th place (Finland – 6th, Germany – 31st, China – 47th, India – 48th), Russia ranks 126th in the field of Intellectual Property Protection (Finland – 1st, Germany – 13th, China – 47th, India – 68th), Russian quality of education system is at 82nd place (Finland – 3rd, Germany – 17th, China – 54th, India – 38th) and finally the impact of ICT on new services and products in Russia is at 112th place (Finland – 11th, Germany – 24th, China – 38th, India – 35th).

Other factors hindering the development of Russian ICT sector include an aggravated deficit of skilled labour, low level of training of IT specialists, low number of world-class R&D projects in IT sector, deficiency of institutional conditions for IT business and weak government market for IT. Due to the alarming performance of the Russian IT sector, the government has worked out a special development strategy for the period 2014–2020. The Strategy was adopted in November 2013 and represents an integrated

systemic approach of the state towards the development of ICT sector. It is aimed at decreasing the dependency of national economy on export of raw materials through increasing of IT products export, increasing labour productivity by accelerating implementation of IT practices in the key fields of economy and improving of a general investment climate in Russia. (Ministry of Communications 2013)

The national IT sector satisfies only 25% of a Russian market demand, which is mainly due to the IT services segment. Almost 100% of IT equipment and more than 75% of software are imported in Russia. Against this background, it is not surprising that many residents of Skolkovo's IT Cluster are already successfully selling their new products abroad, since the local Russian market shows little interest and low demand for innovations. The IT Cluster pursues to change this situation and increase innovativeness of national business through development of working mechanisms to search, attract and retain innovative ideas and technologies in Russia. (CNews.ru 2013)

4.3.4 Innocity

The discussions on the architectural concept of the future Russian "Capital of Innovations" and the costs of its realization have drawn to it a considerable amount of public attention. In order to make Skolkovo an attractive place to live for international students, young researches, foreign entrepreneurs, employees of R&D centres of global companies, professors of SkolTech and their families, the Foundation strives to create a futuristic living environment (in comparison to the neighbouring Moscow realities) in compliance with the most recent engineering and architectural solutions.

It is planned that a 400-hectare city will house 15 000 residents, 11 000 of which will be directly engaged in innovative activities. Around 7 000–9 000 people are expected to come down to Skolkovo daily to work. As confirmed by a number of Innovative Managers from all over the world, it is due to "compelling lifestyles" (personal safety, freedom, favourable environmental situation, good infrastructure, schools and hospitals) offered by global leading clusters that make talented people willing to move there. "People are willing to relocate to Cambridge because it has become a low-risk

environment to do high-risk things in." (The Economist 2011: 12) Life quality matters the most. Committed to create the most favourable conditions for its residents, the City will feature not only administrative buildings and scientific premises, but also schools, hospitals, shops, restaurants, fitness centres, art galleries and a theatre. Property development costs are expected to reach 120 billion RUB (3.8 billion USD), half of which will be coming from the federal budget and another half being raised through private investors. Building and construction works of 1,6 million square meters of facilities will be preliminary completed by 2015. (Petrova 2011; Nielsen 2012)

The new innovation city will be built according to the 4E principles: energy efficiency, ecological compatibility, ergonomics and economic efficiency, providing "maximum convenience with the minimum resources used". (Skolkovo Foundation Annual Report 2011: 17) The city infrastructure is planned to suit at best both investors and innovators in order to encourage fruitful "intellectual atmosphere". (Skolkovo Foundation Annual Report 2011: 128)

For instance, Skolkovo's commitment to eco-friendliness can be proven by the city's transport policy. Thus, all vehicles with combustion engines will be prohibited to enter its territory. Residents and guests will be allowed to get around on foot, by means of public transport (buses on biogas), by bicycles or in electric cars. (Buck 2013)

The architects, engineers and landscape designers have been entrusted with a task to create "an image of the city as a laboratory", a place for open communications and continuous interaction among members of its community, providing equal access to all public and common use facilities. (Annual Report 2011: 33)

The unique city layout developed by the French company AREP is based on the principles of comfort, functionality and sustainability, uniting scientific and residential areas in one interconnected complex. According to the AREP's Master Plan, the City is divided into four planning districts and two planning zones. In the result of numerous competitions and tenders several world leading architects, among them Pierre de Meuron (Switzerland), Kazuyo Sejima (Japan), Jean Pistre (France) and Rem Koolhaas

(Netherlands) have taken charge of the architectural design of each planning district. (Skolkovo Foundation Annual Report 2011: 33)

Excessive focus of Skolkovo's Management on architectural solutions and material infrastructure of the future innovation centre (to a great degree at the expense of Russian taxpayers) has been widely criticized not only by local media (GAZETA.RU, Vedomosti, RBKdaily), but also by the former Chief Operating Officer of Skolkovo Foundation, Steven Geiger. In his article on the occasion of his resignation after two years of working at Skolkovo he underlined:

> "A typical mistake of global innovation projects in various countries is the initial desire to announce themselves as an insanely costly super-city that incorporates all the new architectural and technological wonders of the world. They look spectacular <…> but almost always they have little to do with innovations development. What is even worse is that they distract from funding real innovations." (Geiger 2012)

4.4 People of Skolkovo

According to the report "Fostering innovation-led clusters: A review of leading global practices" (2011: 4, 10), human talent is the cornerstone of success in developing clusters. Clusters Executives who contributed to the report all agree that "the availability of specialist skills" accounts for the key factor in determining the location of a cluster. This formula requires governments to ensure a constant disposal of high-skilled human resources and, when its own reserves are insufficient, to create such attractive living and working conditions that they would persuade external specialists to relocate. "Attracting a star name in a given field can be a crucial catalyst" (The Economist 2011: 4).

Moscow's Skolkovo disposes more than a star. The people involved in the Project constitute the Russian and foreign leading experts in science, finance and politics. Thus, in March 2010 Dmitry Medvedev announced that Viktor Vekselberg, Russian

aluminium oligarch, the 4th richest businessman in Russia and 52nd in the world (Forbes 2013), would be in charge of Skolkovo. Shortly afterwards, three advisory bodies were established to manage the Project (see Figure 9 below): Board of Trustees, Scientific advisory Council and Skolkovo Foundation Council. (LENTA.RU 2012)

The Board of Trustees of the Skolkovo Foundation is chaired by the former President Dmitry Medvedev. The Board also includes the Minister of Education and Science (Dmitry Livanov), the Minister of Communications and Mass Media (Nikolay Nikiforov), the Minister of Finance (Anton Siluanov), the Minister of Economic Development (Aleksey Ulyukaev), the Mayor of Moscow (Sergey Sobyanin) and several other prominent figures of Russian science, business and politics. (Official webpage of Skolkovo Foundation 2013)

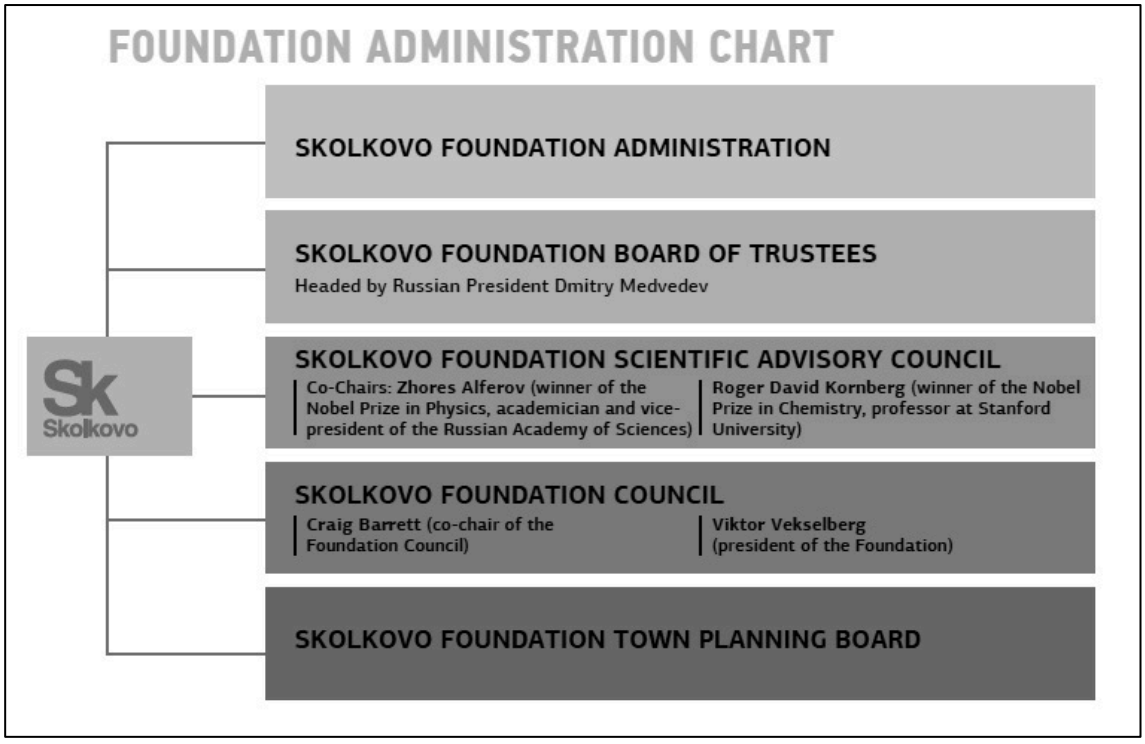


Figure 9. Skolkovo Foundation Administration Chart (Geiger 2011)

The Scientific Advisory Council is co-chaired by the two Nobel Prize Winners: Zhores Alferov, Vice-President of the Russian Academy of Sciences, Principal of St. Petersburg Academic University and Roger Kornberg, Professor of Stanford University. Principals and Professors of the leading European Universities and global research organization are members of the Council, such as Detlev Ganten, President of the World Summit on Health and Chairman of the Board of Directors of the "Charité Foundation", Richard Lerner, President of the Scripps Research Institute, Philip Frost, Chairman of the Board Teva pharmaceutical Industries, Ltd. (LENTA.RU 2012)

Viktor Vekselberg and Craig Barrett, the former CEO of Intel Corporation, are together in charge of the Skolkovo Foundation Council. The Council resembles to a board of directors of a large corporation where decisions are taken by majority vote. Rank-and-file members of the Council included at different times Esko Aho (Executive Chairman, Consultative Partner of Nokia Corporation), Anatoly Chubais (CEO of the Russian State Corporations of Nanotechnologies), Eric E. Schmidt (Executive Chairman of Google Inc.), John T. Chambers (CEO of the CISCO Systems Inc.), Peter Loescher (CEO of Siemens AG), Vagit Alekperov (CEO of LUKOIL). According to the comments of Viktor Vekselberg in the Russian media, the high profile of the Council members owes a lot to the connections of the Presidential Administration and personally to the involvement of Vladislav Surkov (Deputy Chief of Presidential Administration, Deputy Chairman of the Presidential Commission for Modernization), who was at the origins of the Project. As Vekslberg states, "all members of Skolkovo Foundation Council are appointed by the founding shareholders (see Government), and their candidatures are approved by the Presidential Commission." (Butrin 2010; LENTA.RU 2012; Official webpage of Skolkovo Foundation 2013)

Such starry cast of the Council members would be impossible without an active involvement of Conor Lenihan, the former Ireland's Minister for Science, Technology and Innovation, who since 2011 has been Skolkovo's Vice President for external economic relations. Initially hired as a senior advisor, he eventually took over the "key partners" department, in charge of attracting large international corporations to join the Project and locate their R&D offices at Skolkovo. The credit for Skolkovo having

partnership agreements with such giants as Samsung, Intel, Microsoft, Honeywell, Siemens, Johnson & Johnson, SAP and BP – all of which are either locating R&D centers or venture funding start-ups is mainly due to Conor Lenihan efforts. (Nikishenkov 2012)

4.5 Skolkovo Communication Strategy

Good PR support and a strong brand strategy is the 4th from 19 most success factors in creating an innovation centre. The society and particularly the target audiences should receive a clear explanation of the project's mission, specialization and the development strategy. Recently, because of the growing number of innovation centres in the world and as a result "increasing vagueness of the base brand "science park", the choice of a clear and effective brand positioning has become more complicated. Any innovation project is a long-term undertaking, whose image is easily affected by public expectations of its outcome in the future. The main danger occurs with the appearance of "negative feed-back" in the society, based on preliminary evaluations or comparisons with similar projects in other countries. This bottleneck can only be avoided by "constant explanatory work in the mass media". (Creating and Developing Innovation Centres: Guide 2012: 65–66)

There are two types of factors that are determinant in building a strong brand. The first type consists of environmental factors, which the innovation centre cannot influence such as science reputation of the base institute of higher education, academic institute, university; level of technological and infrastructural development of the region; level of socio-economic development of the region; level of the state support of the innovation economy. (Creating and Developing Innovation Centres: Guide 2012: 66)

The second type includes manageable factors, which are subject to the communication strategy of a specific centre: involving of big international companies; stories of successful development of the residents; significant positive effect on the regional, national economy (employment, taxes); quality of resident company selection

procedures; quality of management of the operations; quality and range of services provided to the residents; presence of well-developed network of informal contacts with businesses; effective system of the brand promotion and spreading of information about the centre (publications in the mass media, organization of conferences and other events for exchange of experience). (Creating and Developing Innovation Centres: Guide 2012: 66)

It seems that the Skolkovo Foundation has followed closely the recommendations of "Creating and Developing Innovation Centres: Guide" and implemented its brand development strategy according to the main principles. First of all, Skolkovo communication strategy includes involvement of the key representatives of target audiences: the state (numerous press-conferences with than President Dmitry Medvedev, members of the Committee for Modernization and Innovations), education and science (involvement of Nobel Prize Winners Zhores Alferov and Roger Kronberg; involvement of the leading experts of the Russian Academy of Science and Higher School of Economics), businesses (partnership agreements with the global companies such as Intel, Microsoft, Siemens etc.) and residents (Skolkovo regularly organizes a big number of Start-Up Tours in Russia and Road Shows abroad; weekly lectures and events of Skolkovo Open University).

Second, as it is mentioned in "Creating and Developing Innovation Centres: Guide", the brand should clearly formulate a competitive advantage of the project for its positioning at home and abroad. Skolkovo Foundation has managed to ensure an unprecedented informational support for the Project both at home and oversees. "Skolkovo Is Where Innovations Meet With Investments" and "Future Starts At Skolkovo" are just a few examples of the rhetoric of slogans, which have been used in brochures, factsheets, billboards and exhibition stands of Skolkovo in Russia and all over the world. (Annual Report 2011)

Below are several extracts from the speeches of the leading political figures about Skolkovo in the Russian media (Skolkovo Foundation Annual Report 2011: 6):

> "Skolkovo should promote a new view, a new approach to understanding what an innovative product and what an innovative process is, and what kind of potential Russia has." Viktor Vekselberg
>
> "Skolkovo is the largest project related to the modernization of the economy." Sergey Stepashin
>
> "Skolkovo is an open project; it has a clear mission – to create an innovation environment, but along with that a very flexible strategy that will be determined not by officials, but by involving distinguished scholars, engineers, and entrepreneurs in the project." Vladislav Surkov
>
> "Skolkovo is not a territory. Skolkovo is an ideology." Zhores Alferov
>
> "Russia is building a new city where scholars, designers, engineers, and businessmen together with young researchers will develop and implement innovative projects with global impact."
>
> "Skolkovo is a breakthrough into the future. The main asset of this city is <…> its unique innovation ecosystem capable of attracting scientists, engineers, students, and investors."

These extracts clearly demonstrate not only the overall importance of the project and its potential influence of the Russian modernization progress, but its political or "ideological" context as well.

According to Skolkovo's report on global communications, during the first year of its existence the Project has been promoted at both federal and regional levels through 160 news agencies and networks, 117 central and local TV channels and 32 radio stations. The creation of Skolkovo and the interviews with people related to the Project were mentioned in 580 printed publications. The number of followers in social networks more than tripled. As of September 2014, Skolkovo had more than 12 100 followers on its Facebook page (Facebook account of Skolkovo Foundation 2014), 14 266 followers in the Russian social network Vkontakte.ru (Vkontakte account of Skolkovo Foundation 2014) and 1 924 Readers on Twitter (Twitter account of Skolkovo Foundation 2014).

For international promotions, Skolkovo Foundation organized a number of events in Europe: a presentation of Skolkovo and signing of the agreements with Alstom, EADS

and AREP in Paris (France); presentations of the Space Technology and Biomedical Technology Clusters in Berlin (Germany) as part of the Russian-German Economic Congress; the presentations of IT, Energy and Biomed Cluster at the "CEBIT-2011 International Exhibition" in Hanover (Germany) and the "Science, Technology and Innovation Achievements of Russia 2011" exhibition in Madrid (Spain). The President of the Skolkovo Foundation, Viktor Vekselberg met with Prince Philippe of Belgium and a delegation of Belgian companies. Skolkovo also participated in the Russian Day at the annual Global Technology Symposium (CTS), where it initiated a discussion under the title "Russia: the cradle of innovation". Viktor Vekselberg gave interviews to "Les Echo", a leading French newspaper and the BBC channel. Craig Barrett, the Co-chairman of the Foundation Board, gave an interview to the Russia Today TV channel. (Skolkovo in global public communications 2011)

In December 2013 the Foundation Council adopted a new external communications strategy, aimed to be in line with the high world standards on one hand, and reflect specifics of the Skolkovo project on another. The new focus of the strategy has to be shifted from quantitative indicators of success and project's infrastructure to its human side, people involved in the project: innovators, scientists, start-uppers, SkolTech students. At present, no press releases, news or analytical articles about the new communication strategy are available. (Nikishenkov 2013)

4.6 Socio-Political Disputes around Skolkovo

Right from the very beginning the Skolkovo Project caused controversy and polemics in the Russian media, social networks and Internet community. Politicians, journalists and scientists do not stop to express their concerns about its actual relevance and future impact. In the years 2010–2013 Skolkovo discussions were permanently in the columns of newspapers, magazines, Internet media. On the pages of only one state-owned newspaper *Rossijskaya Gazeta* more than 6300 Skolkovo-related articles can be found, dating from March 2010 till November 2013.

Between the years 2010–2011 the Project was continuously mentioned in the speeches of the top public officials, which made many experts consider Skolkovo as the strategic point of Medvedev's prospective election agenda on the threshold of the presidential elections of 2012. Politicians-members of Medvedev's modernization team were declaiming from a rostrum of all important international forums and conferences about the high purposes behind Skolkovo, which was destined to become the very foundation, indispensable for boosting the future modernization of Russia. (KM.RU 2011)

The international nature of the Project and involvement of foreign experts has become the main characteristic of the vision of Skolkovo actively promoted by Medvedev. In his view Skolkovo should become "a place, where the categories of national and international are effectively elided and rendered irrelevant", where there will be no difference "who is "ours" and who is an "outsider"". (Rowe 2013: 5) However, the international image of Skolkovo prompted political tensions between pro-Medvedev liberal supporters and patriotically oriented members of the Russian Academy of Science, large number of experts and members of the State Duma. (Rowe 2013: 5)

On the other side of the political barricade, researchers and experts were perplexing the project proponents with the right question: why to copy a foreign, though a positive experience, while ignoring its own scientific facilities, created by strenuous and collaborative efforts of the great Russian scientists, engineers, thousands of talented specialists. Local scientific community was at a loss to understand why to build up an innovation centre from scratch, pumping in it enormous financial resources, while continuing a miserable funding of already existing scientific centres, formerly renowned not only in Russia, but throughout the world. (KP.RU 2011)

This scepticism towards foreign experience can be generally explained by the foreseeable complications of copying any kind of best practices, whether economic or political ones. As Wilson Rowe puts it, adoption of foreign models is often hampered by "national pride or patriotism". However, this distrust or resistance to any Western implication is particularly strong in Russia, "where many Russian politicians and citizens felt let down by models of 'Western' democracy and markets after the

tumultuous 1990s." (Wilson Rowe 2013: 5)

Some politicians, including the deputies of the State Duma (Russian Parliament) publicly declared that Skolkovo would be used solely and exclusively for the personal gains of its founders and finally would turn into "interior offshore territory", because of its special legal status and numerous financial privileges. The leader of the Communist Party Gennady Zyuganov publicly expressed his concerns about the feasibility of yet another scientific center, while dozens of already existing ones are underfinanced and underdeveloped. (LENTA.RU 2012)

The main Kremlin ideologist and the "godfather" of Skolkovo, Vladislav Surkov, responded to the outbursts against the Project and its "overlapping with the existing science cities" by saying:

> "We have wonderful scientific centres, that were founded in the Soviet time in Siberia and around Moscow and many other regions. Brilliant specialists, high-skilled scientists work there. <…> However, our task is to reach another stage of development and not to make a quasi upgrade of our Soviet premises, but to build a new Russia with a new economy, and this sometimes requires to start from scratch. <…> We sincerely hope that our new innovation complex will be wholly integrated within all scientific centres of the country." (Zarubin 2010)

In April 2011 a much-debated Skolkovo Project became the topic of a special opinion poll, organized by WCIOM (Russian Public Opinion Research Centre). The results were the following: 44 % of Russians were informed about Skolkovo in one degree or another. In general, the Project enjoyed a positive public image: most often it was associated with a science city (10.6%), a centre of state-of-the-art developments (6.4%), a city for scientists (3.8%), a prototype of the Silicon Valley (2.6%). (WCIOM 2011)

The share of "real audience" (those who had a clear idea of what Skolkovo is) accounted for 31,3% of the Russians. Another 1,8% of the respondents considered it as another "money laundering" project. 67,9% of the surveyed population was still among a "hard-to-reach audience" (those who are only familiar with the name or know nothing

about the project). Those 30% of the Russians would like to receive information about the project no more than once a month are younger than 45 years (34–36 %), well educated (36%) and wealthy (39%). Almost same number of people, 29% precisely, do not want to get any information about Skolkovo at all. (WCIOM 2011)

Despite the relatively low level of awareness about the project, the Russians were generally positive about it. For example, 65% were convinced that Skolkovo would allow talented young Russian scientists to realize their ideas. 51% believed that the establishment of the Centre would provide conditions for a technological breakthrough in fundamental research. At the same time, 53% of respondents were concerned that the project would not be fully realized. 24% stated that Skolkovo was a failure a priori. According to the General Director of WCIOM, Valery Fedorov, such a high level of doubt is quite characteristic for the Russian population which is traditionally suspicious about the state and large governmental projects, due to corrupt practices prevailing in the public sector. (WCIOM 2011)

In terms of importance, the Russians view Skolkovo less significant than the sport events that Russia is to host. Thus, Skolkovo was ranked by 22% of the respondents only the third among the most significant Russian projects of the XXI century: the Winter Olympic Games in Sochi in 2014 (74%) and the FIFA World Cup in 2018 (42%). (WCIOM 2011)

At the same time in April 2011, an independent Analytical Centre of Jury Levada (further Levada-Centre) also conducted a public survey among 1600 Russians aged 18 years and older in 45 regions of the country on their attitudes about the newly created Skolkovo Centre and the process of modernization in the country in general. In contrast to the official findings of WCIOM, only 10% of respondents were familiar with the project (among them 28% of Muscovites). 53% of Russians heard something about it, but could not say anything specific. 67% believed that the funding invested in Skolkovo project will bring some effect. 36% claimed that the money will be spent ineffectively, 27% insisted that the funds will be well spent, while 19% of the Russians presumed that the funds will be misused. Despite generally sceptical attitude of the Russians towards

the innovation zeal of Dmitry Medvedev, the Russian population displayed more favourable views about Skolkovo than about any other modernization projects of Medvedev. ("Russians about "Skolkovo" and modernization of the country" 2011)

The pathetic rhetoric of the Foundation Annual Report (2011: 12) on "uniqueness", "complexity" and "grandiosity" of its mission, as well as its ideological component, reflect the general tonality of political discourse about Skolkovo:

> "I would like for Skolkovo not only to become a good brand, because I believe that we have all the chances in that sense; but I would like for Skolkovo to become an *ideology* (my italics) that will penetrate our society's life and will be understandable to both senior citizens and very young people. If we do achieve that, Skolkovo will have a tremendous impact." President Dmitry Medvedev (Joint Meeting of the Commission for Modernization and Technological Development of Russia's Economy and the Skolkovo Foundation's Board of Trustees 2011)

However, there exists a different understanding of Skolkovo's ideological component expressed by the Head of its Scientific Advisory Council, Academic Zhores Alfyorov (Vice President of the Russian Academy of Science):

> "I have always been saying that Skolkovo is not a territory, but an *ideology* (my italics). This ideology should be spread in other science cities <…>. Skolkovo should not become an offshore territory, where large sums of money disappear and which grants provide certain benefits for certain organizations and individuals. Skolkovo should become the *ideology* (my italics) of the interdisciplinary ground breaking research." Zhores Alfyorov at Press Conference in Yekaterinburg (Tabarintsev-Romanov 2013)

Judging by the rhetoric employed by Russia's top leaders while speaking about the Project, Skolkovo has been used as a certain public tribune to promote "a particular future for Russia". (Wilson Rowe 2013: 7) It has been initially presented as much more than just innovations and new technologies, but as "a potentially social movement" (Wilson Rowe 2013) and "a testing facility of the New Economic Policy"

(RIANOVOSTI 2011). In one of his early interviews about the establishment of Skolkovo, Medvedev declared: “flexibility and adaptability are the words that have become more popular than stability and predictability. This does not make everyone happy, but the change will continue”. (Kuzmin & Kosheev 2010, quoted in Wilson Rowe 2013) Considering that Putin’s regime was mainly based on the contrary principles, that exactly of economic and political stability, Medvedev’s announcements on Skolkovo’s role for Russia’s development sound no fewer than revolutionary. (Wilson Rowe 2013)

4.7 Overall Appraisal of the Skolkovo Innovation Centre

Skolkovo’s fate has been challenging from the very beginning of its creation. Limited timeframe, involvement of top public officials and leading international corporations, political ambitions at stake, public scrutiny and initially high hopes set on the Project constituted the framework, which defined the development of Skolkovo. Its creation was pursuing the two key objectives: first, to promote innovative entrepreneurship in Russia, demonstrating “quick wins” through the number of technological start-ups nurtured by Skolkovo; and second, to create a testing site of a new innovative business environment, particularly attractive for foreign investors, that could be eventually introduced throughout Russia. According to Alexey Dolinsky, the second objective “made the project inherently political as it entailed changing a very broad range of regulations.” That is why the Project has often been associated with Russian politics rather than with innovations. (Dolinskiy, 2013)

The first difficulty on the way toward achievement of the ambitious presidential objectives was “the lack of legislative foundations”. The situation required a difficult choice, whether to change the current legislation, risking to entail countrywide time-consuming reforms or to create an unprecedented legislative oasis in Skolkovo. Despite the fact that the creation of special juridical and economic incentives on an isolated territory is compromising the very legislative framework of the Russian Federation, the Russian government advocated these special conditions for Skolkovo and thus officially

acknowledged the inadequacy of its own legislation. Given the short duration of a presidential term, the choice had been made, which turned Skolkovo into "almost an independent state inside a state". (Dolinskiy 2013)

Skolkovo's special status and Medvedev's endorsement could not but displease the almighty law enforcement agencies (usually associated with Vladimir Putin) and attract their particular attention. Series of criminal cases initiated by the Investigation Committee against Skolkovo have produced a shadow of doubt about the future of the Project. Many saw in it a behind-the-scenes political struggle; others regarded it as an evidence of endemic corruption and confirmation of pessimistic predictions. Involvement of the law enforcement agencies brought Skolkovo into challenge especially from the point of view of its foreign participants and investors, who do not particularly favour interventionist policies that Russian government is famous for. (Dolinskiy, 2013; Shelest 2013; Gorst 2013)

However, the prosecutors' allegations have not been proved. In November 2013, the accusations of misapplication of 125 billion RUB (3.9 billion USD) were finally removed. The Prosecutor General's Office announced that it had "no significant claims to the Foundation's management" which demonstrated "exhaustive measures to remedy the violations detected by the prosecutors." (RIANOVOSTI 2013c) Unfortunately, the power games against Skolkovo and numerous attempts to discredit it in mass media undermined general trust in it and injured the Project's reputation. Besides, all these events have significantly damaged an already flawed image of Russia and its investment climate on the international level. (Shelest 2013)

As any large-scale initiative, Skolkovo has supporters and critics. Those who are in favour of the Project claim that Skolkovo is already working and appeal to give it "at least a decade to prove its worth", reminding that it has taken more than 70 years to make Silicon Valley the world's leading innovation hub. (Gorst 2013) Thus, Kari Liuhto (2010: 99), Director of the Pan-European Institute of Turku School of Economics, characterises Skolkovo as one of "the best shots in Russia's current modernisation arsenal". Dan Grotsky (2011) calls it, "the most significant step that

Russia has taken toward modernization and innovation to date."

Yet, Skolkovo's opponents tend to outnumber its proponents. One of the most distinguished of them is the scientific community of the Russian Academy of Science (RAN). It has been accusing Skolkovo for the lack of scientific approach and diverting of financial resources from the true science. Ilya Ponomarev, one of the proponents of Skolkovo, believes that the main reason of no confidence towards the Project on behalf of RAN is that Skolkovo does not convey its true rationale correctly to the public. The audience is expecting scientific inventions and breakthrough technologies from Skolkovo, although Skolkovo is not a scientific organization. It has been primarily conceived for providing financial and consulting assistance to technological start-ups in development and further commercialization of their new technologies. (Shelest 2013)

Another aspect that refers to the often-repeated critics of Skolkovo is the choice of scientific areas of its clusters. Steven Geiger (2012), who worked at Skolkovo during two difficult start-up years as Chief Operation Officers before resigning in late 2012 says, "One of the key criteria of success in development of innovations is the right scale and focus". On a rather small territory of 400 ha (Silicon Valley 400 000 ha, Sophia Antipolis 2 400 ha, neighbouring Dubna Technopark 7 100 ha), Skolkovo has been set to develop 5 strategic areas: energy, IT, biotechnologies, space and nuclear technologies. Some experts consider this technological combination very obstructive, considering the fact that these areas differ drastically in terms of their capital costs, planning cycle, commercialization period, security measures and the level of security and control on the part of the regulatory agencies. Thus, Skolkovo should have followed the best examples and concentrate on a fewer number of research areas. (Gavrilov 2011: 142; Geiger 2012)

Despite the values of transparency, openness and internationalisation, actively promoted by Dmitry Medvedev and then Kremlin aide Arcady Dvorkovich, Steven Geiger claims that Skolkovo is still lacking foreign managers and foreign start-ups. If Skolkovo intends to become a revolutionary project in the innovation sector of Russia, it should attract the best ideas and people from all over the world regardless their citizenship.

Only an open and international platform can accelerate the transfer knowledge and technology, which is of vital importance for Russia, if it wants to stay competitive on the global level. Against this background the SkolTech, where the best Russian and foreign specialists are creating a potentially world leading research university, is a rare exception to the rule. (Geiger 2012)

Skolkovo has often been interpreted as a projection of Dmitry Medvedev's vision of future Russia, which is "a rule-of-law society of talented, highly educated and enterprising people <…> a society with high levels of social trust and unobtrusive, but effective government institutions." (Frolov 2010a) In pursuit of this vision through Skolkovo, Medvedev has attempted to create "a high-trust society in a country plagued by low social trust". (Frolov 2010a) It should be noticed that social trust appears only as the result of horizontal level of cooperation and never of the vertical structures of hierarchy. That is why experts are forewarning that without deep societal changes, political and administrative, and a nationwide fight against corruption "Skolkovo and Russian economic modernization are destined to fail". (Gorst 2013)

Another point of criticism is a frequent comparison of Skolkovo with earlier governmental initiatives, which did not prove their efficiency. Yet, none of the previous programs have been so strongly endorsed by the government both financially and politically. (Grotsky 2011)

In order to summarize the above-mentioned facts, a SWOT analysis appears to be one of the best options available to evaluate various aspects of Skolkovo Innovation Centre and identify possible pitfalls of the Project to be avoided. SWOT analysis is commonly applied in marketing and business as a method to evaluate Strengths, Weaknesses, Opportunities and Threats of a company, business unit, campaign or initiative. Its key role is to help single out internal (Strengths and Weaknesses) and external factors (Opportunities and Threats) that may affect the achievement of project objectives or a new business strategy. While the internal factors (human, financial resources, current processes) are within the control of an organisation, externalities represent all facets of a general environment, which are social, economic, legal, regulatory, national and

international occurrences. SWOT analysis is especially helpful in “identifying possible areas for change in a program and refining efforts mid-plan”. (Goodrich 2013)

Based on the analysis of the academic articles on Skolkovo, the information materials posted on the Skolkovo official webpage, numerous Skolkovo internal presentations available on www.slideshare.com, as well as English-language and Russian newspapers articles, reports and analytical essays of OECD, EBRD, the World Economic Forum about innovations in Russian and Skolkovo in particular, the following results have been obtained.

Skolkovo’s Strengths encompass:

- special legislative and economic incentives;
- guaranteed governmental support and funding;
- a conceptually new innovative ecosystem in Russia
- a new framework, which unites business, education and venture companies;
- international activities (agreements on cooperation with the leading world scientific institutions and innovative parks);
- domestic activities (academic cooperation between SkolTech and leading Russian universities; institutional cooperation with Russian technoparks and R&D centers of state corporations);
- high level of professionalism and reputation of the managerial team and scientific experts (scientific and business stars, Nobel Prize Winners, Ministers);
- already functioning SkolTech established jointly with MIT (strong research and professorial chairs);
- total expert anonymity of selection and granting processes (maximum objectivity and transperancy);
- efficient PR activities: informative webpage, active participation in social networks, blogs, various Internet communities, virtual SkolTech, video lectures of Open University;
- high level of innovation promotion activities: Road Shows in Russia and abroad, active participation in all leading innovative forums, exhibitions, conferences;
- creation of Intellectual Property Rights Centre (IPR start-up support is very

seldom elsewhere in Russia);

Skolkovo's Weaknesses are:

- political nature of the Project (endangered in case of confrontation of political groups Medvedev vs. Putin);
- building from scratch instead of using already existing facilities, for instance, of Novosibirsk Academic City or Dubna (as a result, extremely high construction costs);
- closeness to Moscow (high costs of living);
- top down initiative as opposed to Silicon Valley and to the general assumption that innovations can not be imposed;
- excessive focus on architectural and engineering infrastructure (best European architects and high construction costs);
- 5 various by nature and research requirements clusters in one relatively small location;
- lack of experience in realization of similar projects;
- burden of high hopes and expectations put on the Project;

Project Opportunities comprise:

- principles of openness and transparency announced by the top political figures;
- close public attention to the Project;
- foreign participation (learning from the best), promotion of internationalism and introduction of world class business standards;
- integration into global innovation networks;
- availability of resources;

Threats to Skolkovo include:

- high risks of corruption and misuse of financial and administrative resources (particularly during the construction phase of the Project) as Russia ranks 127 among 177 countries, according to the Corruption Perception Index 2013 by Transparency International, and it is the most problematic factor for doing business in Russia, according to *The Global Competitiveness Index 2011–2012*;

- general scepticism and critics of the Project, mainly due to fact that the external conditions of the Project (high administrative barriers, ineffective tax and legal rules and the above mentioned corruption) are in conflict with the internal artificially created conditions of Skolkovo (tax and legal exemptions, efficiency, transparency and openness);
- potential brain drain through R&D centres of foreign companies;
- state interventionist policies;
- low demand on innovations on behalf of Russian businesses;
- interruption of public funding.

Although Skolkovo has been very swift in building up its infrastructure, growing the number of its participants, residents, key-partners and completing academic cooperation agreements, it might take it decades to create the essential part of the ecosystem, an innovative culture. That entrepreneurial culture, which makes Silicone Valley unique, the culture of turning ideas into business, based on a critical mass of venture capitalists and enthusiastic businessmen.

In 2010 Esther Dyson mentioned in her article in The Moscow Times that Skolkovo should be treated "as a garden rather than a construction site". The analogy with the art of gardening was chosen for a reason as it implies "a combination of disciplined planning to create an almost self-sustaining ecosystem and the freedom of self expression." (Aervitz 2010) However, the possibility of a nurturing approach of the government towards the Project with due consideration of the current socio-political environment is highly unreal.

The urgent imperative of the modernization of the Russian economy and upgrade of its technological competitiveness leaves no room for doubts. However, many doubt, whether the modernization imperative should be solely concentrated on the Skolkovo Project, which since 2010 has been expansively dominating the public discourse on innovations. As the OECD Review of Innovation Policy in Russia 2011 concludes, Skolkovo has all potential "to provide an important boost to efforts to attract major overseas technology-based firms and promises to function as a useful <…> incubator

for policy experiments". At the same time the experts alert that its high costs and pervasive presence in mass media "risks diverting attention and resources away from much-needed reforms in other critical areas" (OECD 2011: 249–250).

5 CONCLUSION

The thesis analyses the challenges that the Russian innovation policy is facing at the moment and how these challenges are answered in the framework of governmental initiatives with the particular focus on one of them, namely, Skolkovo Innovation Centre. For this purpose, the theoretical foundation of national innovation systems (NIS) has been applied as the most appropriate concept, which unlike traditional technology-related analysis does not focus exclusively on inputs (among them research expenditures) and outputs (as, for instance, the yearly number patents) of the system, but on the linkages and interactions among all its elements.

The concept of NIS is based on the premise that flows of information and knowledge among the actors of the system (firms, universities, governmental and private research institutions and organisations) have the biggest impact on the overall success of a country's innovative development. Moreover, the concept reflects on historical, cultural and socio-political aspects of a country's development, which are responsible for the character of NIS institutions and their interaction. Since there is no one universal match-all model of a NIS, every country adapts a system, which reflects its political and economic traditions as well as socio-cultural peculiarities.

The notion of Innovation Communication naturally complements the NIS approach as it acknowledges similar foundations of successful innovative ecosystems: shared knowledge via shared language, high level of trust, focus on reputation and interconnectedness of all elements of the system. It underlines that innovation is never driven by one single element whether science, or business, or politics, but by their interaction. Research articles on innovation communication emphasize the need for scientists and managers involved in innovative activities to change their approach towards innovations and take on an active position in communicating their innovative ideas and breakthroughs. If this step is not taken, any undertakings of governments to establish a supportive general framework and of media to promote innovations into the public discourse have little chance to make a difference. Innovation communication, if implemented on the active strategy basis, contributes to a better public awareness of

innovative services and products available and improves a general perception of how well and in which directions society is progressing or not. (Mast, Huck & Zerfass 2005: 6)

Drawing on the analysis conducted, it can be concluded that despite a turbulent transition period of the last two decades, Russia has managed to maintain its R&D capacity through affluent reduction and restructuring of its large S&T complex, which the country inherited from the Soviet times. While transition from the state controlled to the free market economy and, as a result, the drastic changes in political and social environment could not but profoundly affect the national science and technology (S&T) system. At the moment, the innovation policy of Russia seems to possess all types of policy instruments, also available in the developed countries; however, they fail to result in a smoothly functioning innovative system.

Among the main reasons of Russian NIS inefficiency is a low connectivity and poor interaction among the system's elements. To one of the biggest barriers, impeding technological development of the country, belongs an extreme formality of Russian innovative process and the nonlinear developmental character of innovations, which is often disregarded in the governmental strategies. Although it has been globally recognized that network connections between the government, science and business are of crucial importance for the innovative performance of a country, in Russia they remain underdeveloped. These connections empower participation of other smaller agents, such as SMEs, consulting agencies, service companies, engineering centres etc. In Russia these linkages are hampered by the lack of entrepreneurial initiative, corruption and the bureaucratization of all spheres.

Consequently, the networking between public R&D institutions and private companies remain weak, which results in low demand for innovations on behalf of the business enterprises. Therefore, the poor innovation absorption capacity of the Russian business sector does not enable it to make any considerable impact on the country's economic growth. Poorly enforced and unsolved issues of the intellectual property rights for the government-funded research is reflected in the low number of public research contracts

and patenting. As there is no sufficient knowledge of transferring technology and knowledge into business applications, the Russian scientific sector in its current state is unable to meet the requirements of the industry and provide technological solutions of the required standards. Although the public R&D system has suffered significant transformations during the last 20 years, it has managed to preserve its rather heterogeneous character. Research organizations remain primarily concerned with the developmental work and demonstrate weak linkages with both education and business sectors. (OECD 2011: 181)

The situation requires a broad change in policy orientation and development of innovation-friendly business environment in the country. It goes both to the large firms and small innovative enterprises, which are an important NIS component, providing science with applications, taking risks of engaging in development of new products and technologies. Innovation activities at major state corporations are important, but cannot provide the critical mass effect, needed for the major changes in Russian innovation performance.

Innovative development is a long-term process that requires constant investment and time for the new products and technologies to be developed and introduced on the global market, and for the local business to gain its competitiveness. Russian political leadership appears to realize the acute need of the modernization and diversification of the country's economy. "Innovations" has become the buzzword in the modern political rhetoric. Russia has started to formulate its mid and long-term development strategies quite recently. *The Strategy-2020* was initially adopted in November 2008 and one year later the programme *Go Russia!* was ratified.

One of the most resounding projects, resulting from those programmes has become the Skolkovo Innovation Centre; a technological hub aimed at concentrating research capacitates and entrepreneurial competences to stimulate commercialization of Russian innovative technologies. The decision to create Skolkovo has triggered impassioned debates in Russian scientific and policy-making communities. From this point of view Skolkovo can be regarded as the first and one of most successful innovation

communication projects in modern Russia. It has managed to attract attention of the leading national and several foreign media channels. Its active media presence in 2010-2013 was unprecedented. Before Skolkovo the word 'innovation' was a largely unknown term in Russian general public and political discourse. Skolkovo Communication team was the first to introduce it in the lexicon of print and mass media.

Despite the image of a flagship project and the key element of the Russian innovation policy, Skolkovo has inherited general disbalances of the country's innovation system. First of all, it is argued that most of the top-down initiatives such as technoparks, incubators and special economic zones are less effective than cooperative locations, naturally organized by the local business and scientific community. Such constructed clusters are often characterized by high innovative and entrepreneurial activities, although they tend to create more global than local linkages and, therefore, have insignificant impact on the local economy. Secondly, Skolkovo (as most of the innovative programmes initiated by the Russian government) disregards the innovative potential of the low-technology industries, being designed exclusively to support high-tech companies. Thirdly, planned clusters are believed to be lacking natural procedures of tacit knowledge diffusion, which is essential for both cooperation and competitiveness. Besides, if such measures as enforcing the rule of law, eradicating corruption, overcoming the tendency to regulate national innovation system in a manual control regime (direct governmental involvement in economy and innovation), as well as fostering fare business competition and creating a favourable business climate in the country are not taken in the very near future, Skolkovo risks to be seen as another unsuccessful endeavour of the Russian government to get around rather than remove underlying bottlenecks hampering innovations. (Klochikhin 2012: 675; OECD 2011: 235- 236)

In general, it may be concluded that the current national innovation system of Russia is far from being well balanced. (Mindich 2012) Besides, the country needs to find a proper balance between adopting foreign models of development and working out its own, country-specific models, considering its historical heritage, strengths and

weaknesses. The analysis shows that further reforms and more efficient initiatives are required to improve the linkages between all the institutions involved in the knowledge generation, diffusion and its further commercialization. To reach that goal, the modernization programme should be regarded as a continuous process, engaging all spheres of life in the country. It is also important to design an innovative infrastructure in such a way that it meets the real needs of already existing innovative companies, both high- and low-tech, instead of being based on the assumptions of the governmental officials. Finally, the necessary transformations of Russia's innovation system will not happen overnight, however, they should not be protracted either, if Russia wants to retain its competitive advantage on the global level.

WORKS CITED

Ackermann, Malte (2013). "The Evolution of Innovation: A Lexical Perspective". *Innovation Journalism* 9 (1). [Cited 01.05.2014] Available at: http://www.innovationjournalism.org/archive/injo-9-1.pdf

Aervitz, Irina (2010). "High Tech and Vekselburgers". *RUSSIA PROFILE*. [Cited 29.11.2013] Available at: http://russiaprofile.org/business/a1277817186.html

Asheim, B.T. & A. Isaksen (1997). "Localisation, Agglomeration and Innovation: Towards Regional Innovation Systems in Norway?" *European Planning Studies*: 5, 299 – 330.

Batenjova, Tatyana (2011). "Innovatsionnosti ne khvataet" [Lacking Innovativeness.] *Rossijskaya Gazeta*, dated 01.11.2011. [Cited 02.11.2013] Available at: http://www.rg.ru/2011/11/01/skolkovo.html

Bergek, Anna, S. Jacobsson, B. Carlsson, S. Lindmark and A. Rickne (2008). "Analyzing the functional dynamics of technological innovation systems: A scheme of analysis." *Research Policy* (37) 3: 407–429.

Bresci, S. & F. Malerba (1997). "Sectoral innovation systems: technological regimes, Schumpeterian dynamics, and spatial boundaries" in Edquist, Charles (Ed.) *Systems of Innovation: Technologies, Institutions and Organizations*. Printer Publishers: London.

Buck, Christian (2013). "Engine of Innovation". *Siemens online magazine*. [Cited 12.11.2013] Available at: http://www.siemens.com/innovation/apps/pof_microsite/_pof-spring-2013/_html_en/research-in-skolkovo.html

Butrin, Dmitry (2010). "Sta Prozentov Vremeni Mne Ne Budet Khvatat" [100% of My Time Will Not Be Enough.] *Kommersant*, dated 21.06.2010. [Cited 24.11.2013] Available at: http://www.kommersant.ru/doc/1390132

Carlsson, B. & R. Stankiewicz (1991). "On the nature, function, and composition of technological systems". *Journal of Evolutionary Economics* 1, 93 – 118.

Casper, Steven & Frans van Waarden (2005). *Innovation and Institutions.* USA: Edward Elgar Publishing Inc.

Cluster of Biomedical Technologies. Official Webpage. [Cited 10.11.2013] Available at: https://community.sk.ru/foundation/biomed/

Cluster of Energy Efficient Technologies (2012). Presentation "Innovations in Energy Efficient Technologies supported by Skolkovo Foundation". [Cited 24.11.2013] Available at:

http://www.slideshare.net/SkolkovoFoundation/skolkovo-energy-eng

Cluster of Energy Efficient Technologies (2013). Presentation “Energy Portfolio”. [Cited 23.11.2013] Available at: http://www.slideshare.net/MaximMikhaylov3/sk-energyprojects092013

Cluster of Nuclear Technologies. Official Webpage. [Cited 18.09.2013] Available: http://edu-skolkovo.ru/en/nuclear

Cluster of Space Technology and Telecommunication (2012). Presentation “Strategic Directions and Priority Areas of Development for "Space Technology and Telecommunication" Cluster of the Skolkovo Foundation”. [Cited 01.11.2013] Available at: http://community.sk.ru/press/m/wiki/4254.aspx

CNews.ru (2013). “Gosudarstvo i Bizness: Innovatsii dlya Zavtra” [Government and Business: Innovations for Tomorrow], dated 26.11.2013. [Cited 27.11.2013] Available at: http://www.cnews.ru/reviews/index.shtml?2013/11/26/551281

Cooke, P., Uranga, M.G. & G. Etxebarria (1997). “Regional innovation systems: Institutional and organizational dimensions”. *Research Policy* 26, 475 – 491.

Corruption Perception Index (2013). [Cited 29.11.2013] Available at: http://cpi.transparency.org/cpi2013/results/

Crawley, Edward (2012). Presentation “Research Centers Concept”. [Cited 19.09.2013] Available at: http://www.skoltech.ru/sites/default/files/research-centers-concept.pdf

Dezhina, Irina (2011). “Policy Framework to Stimulate Technological Innovations in Russia”. *Journal of East-West Business*, 17:2–3, 90–100. [Cited 29.11.2013] Available at: http://dx.doi.org/10.1080/10669868.2011.634770

Didikin, A. & S. Kruzhkova (2010). “Pravovoj Status Innovatsionnogo Centra “Skolkovo”: Novelly i Protivorechiya Novogo Zakona” [Legal Status of Innovation Center “Skolkovo”: Novelty and Inconsistencies of the New Law.] *Current issues of humanities and social sciences*. Materials of the VIII Regional scientific conference of young scientists of Siberia. Novosibirsk State University. [Cited 03.10.2013] Available at: http://www.philosophy.nsc.ru/youngcons/mol/2010.pdf#page=23

Dolinskiy, Alexey (2013). “A Complicated Fate of Skolkovo.” [Cited 29.11.2013] Available at: http://valdaiclub.com/economy/59500.html

Dvorkovich, Arkady (2010). “Go Russia”: Progress, One Year Later”. [Cited 30.10.2013] Available at: http://www.huffingtonpost.com/arkady-dvorkovich/go-russia-progress-one-ye_b_716415.html

Dyson, Esther (2010). "Growing a Silicon Garden". *The Moscow Times,* dated 24.06.2010, Issue 4419. [Cited 28.11.2013] Available at: http://www.themoscowtimes.com/opinion/article/growing-a-silicon-garden/408970.html

Edquist, Charles (1997). "Systems of Innovation Approaches – their Emergence and Characteristics" in Edquist, Charles (Ed.) *Systems of Innovation: Technologies, Institutions and Organizations*. Printer Publishers: London.

Edquist, Charles (2001). "The Systems of Innovation Approach and Innovation Policy: An account of the state of the art". [Cited 10.01.2014] Available at: http://www.druid.dk/uploads/tx_picturedb/ds2001-178.pdf

Efimoff, Albert (2011). Presentation "Technopark Unit For Skolkovo". [Cited 30.09.2013]. Available at: http://www.slideshare.net/igorod2/technopark-skolkovo

Efimoff, Albert (2013). IT Cluster Skolkovo presentation at FRUCT.org Conference. [Cited 21.11.2013] Available at: http://www.slideshare.net/igorod2/it-cluster-skolkovo-presentation-at-fructorg-conference

Eke, Steven (2009). "Medvedev Sets Out Ambitious Vision". [Cited 26.03.2013] Available at: http://news.bbc.co.uk/2/hi/8357619.stm

Energy in Russia. Wikipedia (latest update October 2013). [Cited 24.11.2013] Available at: http://en.wikipedia.org/wiki/Energy_in_Russia#Overview

Energy policy of Russia. Wikipedia (latest update July 2013). [Cited 24.11.2013] Available at: http://en.wikipedia.org/wiki/Energy_policy_of_Russia#

European Commission (2010). "Europe 2020. A European strategy for smart, sustainable and inclusive growth". [Cited 20.10.2013] Available at: http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf

European Commission (2014). Glossary. Venture Capital. [Cited 14.10.2014] Available at: http://ec.europa.eu/enterprise/policies/finance/glossary/index_en.htm

Facebook account of Skolkovo Foundation (2014). [Cited 23.09.2014] Available at: https://www.facebook.com/FondSkolkovo

"Federalny Zakon Rossijskoj Federatzii ot 21 iyulya 2011 goda N 254-FZ "O Vnesenii Izmenenij v Federalnyj Zakon "O Nauke I Gosudarstvennoj Nauchno-Technicheskoj Politike"" (2011). [Federal Law of the Russian Federation dated 21 July 2011 N 254-FZ "On Amending the Federal Law "On Science and State Scientific and Technical Policy"".] [Cited 20.08.2013] Available at: http://graph.document.kremlin.ru/page.aspx?1567338

Feinson, Stephen (2003). "National Innovation Systems Overview and Country Cases." In *Knowledge Flows, Innovation, and Learning in Developing Countries*. [Cited 04.11.2013] Available at: http://www.cspo.org/products/rocky/Rock-Vol1-1.PDF

First Steps. First Achievements 2010–2011. (2011). Skolkovo Foundation brochure. [Cited 30.09.2013] Available at: http://www.slideshare.net/igorod/sk-book

Forbes (2013). Profile of Viktor Vekselberg. [Cited 29.11.2013] Available at: http://www.forbes.ru/profile/viktor-vekselberg

FORBES.RU (2012). "Medvedev uprazdnil pravitelstvennuyu komissiyu po vysokim technologiyam I innovatsiyam." [Medvedev has dissolved the Governmental Commission on High Technologies and Innovations.] [Cited 19.08.2013] Available at: http://www.forbes.ru/news/96123-premer-medvedev-uprazdnil-pravitelstvennuyu-komissiyu-po-vysokim-tehnologiyam-i-innovatsi

Freeman, Christopher (1987). *Technology, Policy and Economic Performance: Lessons From Japan*. Pinter Publishers: London.

Frolov, Vladimir (2010a). "Russia Profile Weekly Experts Panel: Is Skolkovo Another St. Petersburg?" *RUSSIA PROFILE*, dated 07.02.2010. [Cited 29.11.2013] Available at: http://russiaprofile.org/experts_panel/a1278072887.html

Frolov, Vladimir (2010b). "Russia Profile Weekly Experts Panel: Should Modernization Be Imposed?" *RUSSIA PROFILE*, dated 02.19.2010. [Cited 28.11.2013] Available at: http://russiaprofile.org/experts_panel/a1266602090.html

Gavrilov, A.V. (2011). "Projekt "Skolkovo" i sovremennyj opyt sozdania "naukogradov" [The Project "Skolkovo" and the Modern Experience of Creating "Science Cities"]. *Yaroslavsky Pegagogichesky Vestnik* 4, Volume1. [Cited 04.10.2013] Available at: http://vestnik.yspu.org/releases/2011_4g/29.pdf

Geiger, Steven (2011). Skolkovo Foundation Presentation. [Cited 24.09.2013] Available at: http://www.slideshare.net/Ishmidt/skolkovo-overview-november-2011

Geiger, Steven (2012). "Uroki Skolkovo" [Lessons of Skolkovo.] *RBK Daily*, dated 21.12.2012. [Cited 13.11.2013] Available at: http://www.rbcdaily.ru/politics/562949985372104

Glikin, Maxim et al. (2009). "Kremljovskaya Dolina" [Kremlin Valley.] *Vedomosti,* dated 15.02.2010. [Cited 01.10.2013] Available at: http://www.comnews.ru/print?nid=38225

Glossary of the European Commission. [Cited 20.08.2013] Available at: http://ec.europa.eu/enterprise/policies/innovation/glossary/index_en.htm#i

Godin, Benoît (2008). "Innovation: The History of a Category", Project on the Intellectual History of Innovation, Working Paper No.1. [Cited 25.12.2013] Available at: http://www.csiic.ca/PDF/IntellectualNo1.pdf

Gokhberg, Leonid (2010). "Principles for a new-generation innovation policy" In *Baltic Rim Economies Expert Articles* 2010, Electronic Publications of Pan-European Institute 2/2011. [Cited 03.12.2013] Available at: www.tse.fi/pei

Gokhberg, Leonid (2011a). "Perehod k innovatsionnoj ekonomike ne zavershitsya k 2020 godu." [Transition to the innovation-based economy will not be finished by 2020.] (News section of the official web site of the Strategy-2020) [Cited 10.04.2013] Available at: http://strategy2020.rian.ru/news/20111117/366201809.html

Gokhberg, Leonid (2011b). "Rossii neobhodima kompleksnaya innovatsionnaya politika." [Russia needs an integrated innovation policy.] (News section of the official web site of the Strategy-2020) [Cited 10.04.2013] Available at: http://strategy2020.rian.ru/news/20111014/366176903.html

Gokhberg, Leonid & Vitaly Roud (2012). "The Russian Federation: A New Innovation Policy for Sustainable Growth". *OECD Reviews of Innovation Policy: Russian Federation 2011*: 121–130. [Cited 28.08.2013] Available at: http://dx.doi.org/10.1787/9789264113138-en

Goodrich, Lauren & Marc Lanthemann (2013). "The Past, Present and Future of Russian Energy Strategy". *Stratfor Global Intelligence*, dated 12.02.2013. [Cited 24.11.2013] Available at: http://www.stratfor.com/weekly/past-present-and-future-russian-energy-strategy

Goodrich, Ryan (2013). "SWOT Analysis: Examples, Templates & Definition". [Cited 28.11.2013] Available at: http://www.businessnewsdaily.com/4245-swot-analysis.html

Gorst, Isabel (2013). "Russia's Skolkovo Technopark Needs a Decade to Work". *Financial Times*, dated 19.09.2013. [Cited 20.09.2013] Available at: http://www.ft.com/intl/cms/s/0/3f94bb38-1f7f-11e3-8861-00144feab7de.html#axzz2uBSWbKS7

Government's Communication on Finalnd's National Innovation Strategy to the Parlament (2009). [Cited 20.08.2013] Available at: http://www.tem.fi/files/21010/National_Innovation_Strategy_March_2009.pdf

Grant Policy (2011). Foundation for Development of the Center of Research and

Commercializing of New Technologies Skolkovo. [Cited 10.10.2013] Available at: http://edu-skolkovo.ru/files/Grant_Policy,_Skolkovo_Foundation_en.pdf

Grotsky, Dan (2011). "Skolkovo Is The New Perestroyka". [Cited 29.11.2013] Available at: https://miter.mit.edu/articleskolkovo-new-perestroika/

Hospers, Gert-Jean, Desrochers, Pierre & Sautet Frederic (2009). "The next Silicon Valley? On relationship between geographical clustering and public policy". *International Entrepreneurship and Management Journal* 5, Issue 3, 285–299. [Cited 24.10.2013] Available at: http://link.springer.com/article/10.1007%2Fs11365-008-0080-5

HSE (Higher School of Economics) (2011). *Science. Innovation and Information Society: Data Book*. Moscow: HSE

Innovatsionnoe razvitie – osnova modernizatsii ekonomiki Rossii: Natsonalniy doklad (2008). [Innovative development – the basis of economic modernization of Russia: National report]. Moscow: HSE.

INTERFAX (2013). "Skolkovo potratilo 750$ tys na Ponomareva" [Skolkovo has spent $750 000 on Ponomarev], dated 19.04.2013. [Cited 11.10.2013] Available at: http://www.interfax.ru/russia/txt.asp?id=302452

Ivanov V.V et al. (2006). "Natsionalnye innovatsionnye systemy v Rossii i ES" [National innovation systems in Russia and EU.] [Cited 29.04.2013] Available at: www.ras.ru/FStorage/Download.aspx?id=d9532b63-26a6-4eab-b781-3ba4c96fd191

Ivanova N.I. & Ivanov V.V. (2011). *Innovatsionnaya politika: Rossiya i mir: 2002–2010.* [Innovation Policy: Russian and the World: 2002–2010.] Russian Academy of Sciences: Moscow.

Johnson, Anna (1998). "Functions in Innovation System Approaches". [Cited 17.09.2013] Available at: www.druid.dk/conferences/nw/paper1/a_johnson.pdf

Kabakov, Yaroslav (2012). "Rano Horonit Skolkovo" [It Is Too Early To Berry Skolkovo.] [Cited 29.09.2013] Available at: http://ibusiness.ru/blogs/23294

Katz, Sylvan J. (2006). "Indicators for complex innovation systems". *Research Policy* 35: 893 – 909. [Cited 14.01.2014] Available at: http://www.csiic.ca/PDF/Katz_ICIS.pdf

Khvostunova, Olga (2013). "The Propaganda of the Putin's Era" in Institute of Modern Russia. [Cited 01.10.2013] Available at: http://imrussia.org/en/politics/443-simulated-democracy

Klochikhin, Evgeny (2012). “The challenges of fostering innovation: Russia’s unstable progress”. Int. J. Economics and Business Research, Vol. 4, No. 6: 659-678.

KM.RU (2011). “Skolkovo: ryvok v budusheje ili zakat otechestvennoj nauki?” [Skolkovo: a breakthrough into future or eclipse of the national science?] [Cited 20.11.2013] Available at: http://www.km.ru/front-projects/skolkovo-proryv-v-budushchee-ili-grandioznyi-raspil/skolkovo-ryvok-v-budushchee-ili-z

Korotkova, Evgenia (2011). “Law And Regulations In Russia: A Legal Perspective On Skolkovo”. [Cited 03.10.2013] Available at: http://www.thinkrussia.com/policy-initiatives/laws-and-regulations-russia-legal-perspective-skolkovo

Kotlyar, Pavel (2013). “Turistov podklyuchat k yadernym technologiyam” [Tourists will get connected to the nuclear technologies.] *GAZETA.RU*, dated 20.10.2013. [Cited 25.11.2013] Available at: http://www.gazeta.ru/skolkovo/2013/10/21_a_5717009.shtml

Krawatzek, Félix (2011). “Modernsation of Russia – moving beyond rhetoric?”. In *Selected articles on modernization and innovation in Russia*. Edited by Hanna Mäkinen. Electronic Publication of Pan-European Institute 4/2012: 26. [Cited 20.08.2013] Available at: http://www.utu.fi/fi/yksikot/tse/yksikot/PEI/raportit-ja-tietopaketit/Documents/Mäkinen%204-2012.pdf

Kuzmin, Vladimir et al. (2009). “President skazal svoje slovo” [President has made his statement]. *Rossijskaya Gazeta*, dated 13.11.2009. [Cited 01.10.2013] Available at: http://www.rg.ru/2009/11/13/poslanie.html

Kuzmina, Elena (2011). “Sovremennyje tendentzii razvitiya zakonodatelstva ob innovatziyah”. [Actual development trends of innovation legislation.] In *Molodoj Uchyonyj* Vol. 10 (2): 68–70.

LENTA.RU (2012). “Skolkovo – Innovatsionnyj Tsentr Bliz Moskvy” [Skolkovo – Innovation Center Near Moscow.] [Cited 19.09.2013] Available at: http://lenta.ru/lib/14203527/

Liuhto, Kari (2010). “Rosnano and Skolkovo are Russia’s best innovation promoting measures, but they are not enough to modernise Russia as a whole”. In *Baltic Rim Economies Expert Articles* 2010: 99. Electronic Publications of Pan-European Institute 2/2011, edited by Eini Laaksonen. [Cited 10.09.2013] Available at: http://www.utu.fi/fi/yksikot/tse/yksikot/PEI/raportit-ja-tietopaketit/Documents/BRE%20Expert%20Articles%202010%20netti.pdf

Lundvall, Bengt-Åke (2005). “National Innovation Systems – Analytical Concept and Development Tool”. Paper to be presented at the DRUID Tenth Anniversary Summer Conference 2005. [Cited 27.12.2013] Available at: http://www.druid.dk/conferences/Summer2005/Papers/Lundvall.pdf

Lundvall, Bengt-Åke (2010). *National Systems of Innovation – Toward a Theory of Innovation and Interactive Learning.* Pinter Publishers: London.

Luoma-aho, Vilma, Turo Uskali & Alisa Weinstein (2009). "Pitfalls of attention work in innovation ecosystem". In I*nnovation Journalism* 6 (4). [Cited 01.08.2014] Available at: http://www.innovationjournalism.org/ij6ac/papers/LuomaahoUskaliWeinsteinPitfallsofAttentionWork.pdf

Luoma-aho, Vilma & Saara Halonen (2010). "Intangibles and Innovation: The Role of Communication in the Innovation Ecosystem". In *Innovation Journalism* 7 (2). [Cited 02.09.2014] Available at: http://www.innovationjournalism.org/archive/injo-7-2.pdf

Maisch Bettina, Jochen Binder, Beat Schmid & Larry Leifer (2011). "The Dimensions of Trust – Building Confidence Through Innovation Communication". In *Innovation Journalism* 8 (1). [Cited 08.09.2014] Available at: http://www.innovationjournalism.org/archive/injo-8-1.pdf

Mast, Claudia, Simone Huck & Ansgar Zerfass (2005). "Innovation Communication: Outline of the Concept and Empirical Studies from Germany". In *Innovation Journalism* 2 (7). [Cited 05.09.2014] Available at: http://www.innovationjournalism.org/archive/injo-2-7.pdf

Medvedev, Dmitry (2009). "Go, Russia!" Programme document. [Cited 26.03.2013] Available at: http://eng.news.kremlin.ru/news/298

Mekhanik, Alexander (2013). "Sistemnyje Illyuzii" [System Illusions.] *Expert* 13 (845). [Cited 28.11.2013] Available at: http://expert.ru/expert/2013/13/sistemnyie-illyuzii/

Meyer, Henry (2013). "Kremlin Intrigue Threatens Russia's Silicon Valley". *Bloomberg Businessweek*. [Cited 20.09.2013] Available at: http://www.businessweek.com/articles/2013-07-18/kremlin-intrigue-threatens-russias-silicon-valley

Mindich, Dmitry (2012). "Kak ne spotknutsya na starte" [How not to stumble in the beginning.] In *Expert* 18 (801), dated 07.05.2012. [Cited 27.11.2013] Available at: http://expert.ru/expert/2012/18/kak-ne-spotknutsya-na-starte/

Mini Country Report/Russian Federation (2011). Thematic Report 2011 under Specific Contract for the Integration of INNO Policy TrendChart with ERAWATCH (2011–2012). [Cited 15.08.2013] Available at: http://ec.europa.eu/enterprise/policies/innovation/files/countryreports/russia_en.pdf

Ministry of Communications (2013). "Strategiya razvitiya oblasti informatsionnykh tekhnolohij v Rossijskoj Federatsii na 2014–2020 gody i na perspektivu do 2025 goda" [Development strategy of the IT-sector of the Russian Federation in 2014–2020 and further perspective up to 2025.] [Cited 20.11.2013] Available at: http://minsvyaz.ru/common/upload/Strategiya_razvitiya_otrasli_IT_2014-2020_2025[1].pdf

Ministry of Communications and Mass Media of the Russian Federation (2013). News section "Technoparks". [Cited 01.10.2013] Available at: http://minsvyaz.ru/ru/directions/?direction=25

Ministry of Economic Development of the Russian Federation (2008). "Konceptsiya dolgosrochnogo sotsialno-ekonomicheskogo razvitiya Rossijskoy Federatsii" [Concept of Long-term Socio-Economic Development of the Russian Federation.] [Cited 29.03.2013] Available at: http://www.economy.gov.ru/minec/activity/sections/strategicPlanning/concept/indexdos

Ministry of Economic Development of the Russian Federation. Kontseptsiya dolgosrochnogo razvitiya Rossijskoy Federatsii. [Concept of Long-term Development of the Russian Federation.] [Cited 28.03.2013] Available at: http://www.economy.gov.ru/minec/activity/sections/strategicPlanning/concept/

Mogalakwe, Monageng (2006). "The Use of Documentary Research Methods in Social Research". *African Sociological Review* 10 (1): 221–230.

Moukine, Guennadi (2013a). "Skolkovo Reality Becoming Less Virtual". *The Moscow Times*, dated 19.06.2013, Issue 5151. [Cited 03.10.2013] Available at: http://www.themoscowtimes.com/business/article/skolkovo-reality-becoming-less-virtual/481987.html

Moukine, Guennadi (2013b). "State Companies End SkolTech Financing". *The Moscow Times*, dated 24.06.2013, Issue 5154. [Cited 03.10.2013] Available at: http://www.themoscowtimes.com/business/article/state-companies-end-skoltech-financing/482133.html

Mungalov, Dmitry (2014). "Dvorkovich: Skolkovo – eto flagmansky project" [Skolkovo is a flagship project.] [Cited 20.01.2014] Available at: http://community.sk.ru/press/b/weblog4/archive/2014/01/17/a-dvorkovich-skolkovo--eto-flagmanskiy-proekt.aspx

Naumov, Igor (2011). "Vladimir Putin proveril rabotu nad oshibkami" [Vladimir Putin reviewed the corrections of errors.] *Nezavisimaya Gazeta*, dated 17.02.2011, A6.

Nelson, Richard R. (1993). *National Innovation Systems: A Comparative Analysis*.

Oxford University Press: New York.

Nielsen, Rachel (2012). "Skolkovo Construction as Challenging as Innovation". *The Moscow Times*, Issue 4849, dated 14.08.2012. [Cited 13.11.2013] Available at: http://www.themoscowtimes.com/business/article/skolkovo-construction-as-challenging-as-innovation/466518.html?

Nikishenkov, Oleg (2012). "An investor's pied piper". *The Moscow Times*, dated 25.06.2012. [Cited 23.11.2013] Available at: http://themoscownews.com/business/20120625/189885038.html

Nikishenkov, Oleg (2013). The Skolkovo Foundation Council approved key development priorities. [Cited 01.09.2014] Available at: https://community.sk.ru/news/b/articles/archive/2013/12/16/the-skolkovo-foundation-council-approved-key-development-priorities.aspx

Niosi, Jorge (2002). "National systems of innovation are "x-efficient" (and x-effective). Why some are slow learners". *Research Policy* 31: 291–302. [Cited 25.11.2012] Available at: http://www.er.uqam.ca/nobel/r21010/document/1326.pdf

Nordfors, David (2004). "The Role of Journalism in Innovation Systems". In *Innovation Journalism* 1(7). [Cited 02.09.2014] Available at: http://innovationjournalism.org/archive/INJO-1-7.pdf

Nordfors, David (2006). "PR and the Innovation Communication System". In *Innovation Journalism* 3(5). [Cited 01.09.2014] Available at: http://innovationjournalism.org/archive/INJO-3-5.pdf

Norman, Donald A. & Roberto Verganti (2014). "Incremental and Radical Innovation: Design Research vs. Technology and Meaning Change". *DesignIssues* 30: 78–96. [Cited 20.01.2014] Available at: http://www.jnd.org/dn.mss/incremental_and_radical_innovation_design_research_versus_technology_and_meaning_change.html

Nuclear Technologies Cluster. Sector Results. Official webpage of Skolkovo Foundation. [Cited 25.11.2013] Available at: http://community.sk.ru/foundation/nuclear/p/results.aspx

OECD (1996). Oslo Manual: The Measurement of Scientific and Technological Activities, Guidelines for Collecting and Interpreting Innovation Data. 2nd Edition. [Cited 05.01.2014] Available at: http://www.oecd.org/sti/inno/2367580.pdf

OECD (1997). National Innovation Systems. [Cited 04.06.2013] Available at: http://www.oecd.org/science/inno/2101733.pdf

OECD (2005). Oslo Manual: The Measurement of Scientific and Technological Activities, Guidelines for Collecting and Interpreting Innovation Data. 3rd Edition. [Cited 05.01.2014] Available at: http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/OSLO/EN/OSLO-EN.PDF

OECD (2011). OECD Reviews of Innovation Policy: Russian Federation 2011. OECD Publishing. [Cited 19.08.2013] Available at: http://www.oecd.org/sti/sci-tech/oecdreviewsofinnovationpolicyrussianfederation.htm

Official Website of State Corporation ROSATOM. Sector "Historical development of the Russian nuclear industry". [Cited 26.11.2013] Available at: http://www.rosatom.ru/en/about/nuclear_industry/history/

Orlikowski, Wanda J. (1991). *Radical and Incremental Innovations in Systems Development: An Empirical Investigation of CASE Tools.* [Cited 13.01.2014] Available at: http://dspace.mit.edu/bitstream/handle/1721.1/2350/SWP-3283-23735240-CISR-221.pdf

"Osnovy politiki Rossijskoy Federatsii v oblasti razvitiya nauki i technology na period do 2010 goda i dalnejshuyu perspektivu" (2002). [Policy framework of science and technology development of the Russian Federation up to the year 2010 and beyond.] [Cited 03.08.2013] Available at: http://archive.kremlin.ru/text/docs/2002/03/30293.shtml

Pabst, Andrian (2009). "President Medvedev's Project Of Modernization" [Cited 27.03.2013] Available at: http://www.huffingtonpost.com/adrian-pabst/president-medvedevs-proje_b_744182.html

Papchenkova, Margarita (2013a). "U Skolkovo konchaetsya chernaya polosa" [Skolkovo's Run of Bad Luck Is Over.] *Vedomosti*, dated 01.08.2013. [Cited02.10.2013] Available at: http://www.vedomosti.ru/politics/news/14796861/skolkovo-ostalos-pri-byudzhete

Papchenkova, Margarita (2013b). "Government extends Skolkovo funding through 2020". *Vedomosti*, dated 05.08.2013. [Cited 02.10.2013] Available at: http://rbth.co.uk/science_and_tech/2013/08/05/government_extends_skolkovo_funding_through_2020_28685.html

Patel, P. & K. Pavitt (1994). The Nature and Economic Importance of National Innovation Systems. STI Review, 14: 9–32, OECD, Paris.

Petlevoj, Vitaly (2012). "Skolkovo" uvelichilo objom grantov s 1,5 mln do 5 mln rublej" [Skolkovo increased its mini-grants from 1,5 million to 5 million rubles.] *RBK Daily*, dated 20.02.2012. [Cited 10.10.2013] Available at: http://rbcdaily.ru/media/562949982849042

Petrova, Julia (2011). “V “Skolkovo” zhile innovatoram budut davat na 10 let i ne besplatno” [In “Skolkovo” Innovators will be provided with the housing, but not for free.] *Vedomosti*, dated 16.05.2011. [Cited 13.12.2013] Available at: http://www.vedomosti.ru/realty/news/1274608/v_skolkovo_zhile_innovatoram_budut_davat_na_10_let_i#sel=11:1,11:96

Pietiläinen, Jukka (2011). “Russian modernization – technological or socio-cultural one?” In *Selected articles on modernization and innovation in Russia*. Edited by Hanna Mäkinen. Electronic Publication of Pan-European Institute 4/2012: 27. [Cited 20.08.2013] Available at: http://www.utu.fi/fi/yksikot/tse/yksikot/PEI/raportit-ja-tietopaketit/Documents/Mäkinen%204-2012.pdf

Porter, Michael J. (1990). “The Competitive Advantage of Nations”. In *Harvard Business Review*. [Cited 09.12.2013] Available at: http://kkozak.wz.cz/Porter.pdf

President of Russia. Official Webpage. Presidential Councils section. [Cited 17.08.2013] Available at: http://eng.state.kremlin.ru/council

Presidential Commission on Modernization and Technological Development of Russia. Official Webpage. [Cited 18.08.2013] Available at: http://i-russia.ru/all/comissions/staff.html

Pynnöniemi, Katri (2011). “What makes modernization a political project?”. In *Selected articles on modernization and innovation in Russia*. Edited by Hanna Mäkinen. Electronic Publication of Pan-European Institute 4/2012: 25. [Cited 26.08.2013] Available at: http://www.utu.fi/fi/yksikot/tse/yksikot/PEI/raportit-ja-tietopaketit/Documents/Mäkinen%204-2012.pdf

Rammer, Christian (2006). “Trends in Innovation Policy: An International Comparison”. *National Systems of Innovation in Comparison*, 265-268. [Cited 29.11.2013] Available at: http://link.springer.com/chapter/10.1007/1-4020-4949-1_15

RIANOVOSTI (2011). “Medvedev nadeetsya, chto “Skolkovo” stanet ideologiej vsego obshestva” [Medvedev hopes that ‘Skolkovo’ will become an ideology for the whole society.] [Cited 26.11.2013] Available at: http://ria.ru/nano_news/20110425/368022628.html

RIANOVOSTI (2012). Infographics “Skolkovo Innovation Center”. [Cited 20.11.2013] Available at: http://en.ria.ru/infographics/20120427/173061637.html

RIANOVOSTI (2013a). “Kremlin Ideologue Surkov Stepps Down As Deputy PM”. [Cited 03.10.2013] Available at: http://en.ria.ru/politics/20130508/181034246-print/Kremlin-Ideologue-Surkov-Steps-Down-as-Deputy-PM.html

RIANOVOSTI (2013b). “Government Back Skolkovo High-Tech Hub With Funding Pledge”. [Cited 02.10.2013] Available at: http://en.ria.ru/russia/20130802/182544563.html

RIANOVOSTI (2013c). “Russia’s ‘Silicon Valley’ Cleared Of Embezzlement Allegations”. [Cited 25.11.2013] Available at: http://en.ria.ru/russia/20131116/184754613/Russias-Silicon-Valley-Cleared-Of-Embezzlement-Allegations.html

Russia Beyond The Headlines (2013). “Putin Believes In Future Of Skolkovo”. [Cited 02.10.2013] Available at: http://rbth.co.uk/news/2013/04/25/putin_believes_in_future_of_skolkovo_25461.html

“Russians about “Skolkovo” and modernization of the country” (2011). Results of public opinion survey published by the Analitical Center of Jury Levada (dated 26.10.2011). [Cited 14.05.2013] Available at: http://www.levada.ru/26-04-2011/rossiyane-o-proekte-skolkovo-i-modernizatsii-strany

Scott, J. (1990). *A Matter of Record, Documentary Sources in Social Research.* Cambridge: Polity Press.

Schumpeter, Joseph (1939). *Business Cycles: A Theoretical, Historical, and Statistical Analysis of the Capitalist Process* (2vol). New York: McGraw-Hill.

Sensors & Systems (2013). “Skolkovo Space Business Cluster Leads Russia’s Space Business”, dated 26.07.2013. [Cited 29.10.2013] Available at: http://www.sensorsandsystems.com/news/top-stories/corporate-news/31088-skolkovo-space-business-cluster-leads-russia-s-space-business.html

Sharif, Naubahar (2006). “Emergence and Development of the National Innovation System Concept”. In *Research Policy* 35 (5): 745–766.

Shelest, Anna (2013). “Ilya Ponomaryev: V Skolkovo Net Nikakikh Izobreteniy” [Ilya Ponomaryev: There Are No Inventions In Skolkovo], dated 21.11.2013. [Cited 26.11.2013] Available at: http://pasmi.ru/archive/99273

Sitnikov, Alexei (2010). Presentation “Things you want to know about Skolkovo Innovation Center”. [Cited 13.09.2013] Available at: http://www.slideshare.net/davidklein/things-you-want-to-know-about-skolkovo-innovation-center-by-alexei-sitnikov

Skolkovo Foundation. Official webpage [Cited 02.12.2013] Available at: http://community.sk.ru/foundation/ team/p/popechsovet.aspx

Skolkovo Foundation Annual Report 2011. [Cited 29.09.2013] Available at:

http://community.sk.ru/press/b/weblog/archive/2012/06/20/skolkovo-foundation-annual-report-2011.aspx

Skolkovo Foundation Objective and Results, January 2013. [Cited 30.09.2013] Available at: http://community.sk.ru/press/m/skmedia/5100.aspx

"Skolkovo In Global Public Communications" (2011). [Cited 27.11.2013] Available at: http://pt.slideshare.net/igorod2/skolkovo-eng

Skolkovo Institute of Science and Technology. Official Webpage. [Cited 23.09.2013] Available at: http://skoltech.ru/about-skoltech

Skolkovo Technopark. Official Webpage. [Cited 28.09.2013] Available at: http://community.sk.ru/technopark/p/cuc-main.aspx#mikroanaliz)

Sovmestnoe zasedanie Komissii po modernizatsii i Popechitelskogo soveta fonda "Skolkovo" [Joint Meeting of the Commission for Modernization and Technological Development of Russia's Economy and the Skolkovo Foundation's Board of Trustees.] News section of the official webpage of the President of Russia, dated 25.04.2011. [Cited 01.10.2013] Available at: http://kremlin.ru/news/11079

Sterligov, Ivan (2011). "V Skolkovo poyavitsya biomeditsinsky klaster" [Biomedical Cluster will appear in Skolkovo], dated 02.02.2011. [Cited 20.11.2013] Available at: http://www.strf.ru/material.aspx?CatalogId=223&d_no=36752#.UqoeGaV4DQl

"Strategiya-2020: Novaya model rosta – novaya socialnaya politika" (2012). [Strategy-2020: new model of growth – new social policy.] [Cited 29.03.2013] Available at: http://2020strategy.ru/data/2012/03/14/1214585998/1itog.pdf

Strelnikov, Vasily (2013). Interview with Sergey Zhukov, Managing Director of the Skolkovo Cluster "Space Technology and Communication", dated 24.07.2013. [Cited 02.11.2013] Available at: http://www.comnews.ru/node/75863

Tabarintsev-Romanov, Sergey (2013). "Zhores Alfyorov na press konferentsii v Ekaterinburge" [Zhores Alfyorov at Press Conference in Yekaterinburg.] [Cited 26.09.2013] Available at: http://www.nakanune.ru/service/print.php?articles=7737

The Economist (2007). "The Age of Mass Innovation". [Cited 29.12.2013] Available at: http://www.economist.com/node/9928291

The Economist (2009). "Dmitry Medvedev's Building Project". [Cited 27.03.2013] Available at: http://www.economist.com/node/14973198

The Economist (2011). “Fostering Innovation-led Clusters. A review of leading global practices”. A report from The Economist Intelligence Unit. [Cited 20.10.2013] Available at: http://www.economistinsights.com/sites/default/files/downloads/EIU ATIC_Report2_Web_Revised.pdf

The Economist (2012). “Innovation in Russia: Can Russia Create a New Silicon Valley?” [Cited 13.09.2013] Available at: http://www.economist.com/node/21558602

The Global Innovation Index 2013. [Cited 06.08.2014] Available at: http://www.globalinnovationindex.org/userfiles/file/reportpdf/gii-2013-cover.pdf

The World Economic Forum (2011). “The Global Competitiveness Report 2011–2012”. [Cited 17.08.2013] Available at: http://www3.weforum.org/docs/WEF_GCR_Report_2011-12.pdf

The World Economic Forum (2012). “The Global Information Technology Report 2012”. [Cited 23.11.2013] Available at: http://www3.weforum.org/docs/Global_IT_Report_2012.pdf

Tobak, Steve (2008). “Silicon Valley: The True Tech Mecca?”. *CNetnews*. [Cited 24.09.2013] Available at: http://news.cnet.com/8301-13555_3-9954224-34.html

Twitter account of Skolkovo Foundation (2014). [Cited 23.09.2014] Available at: https://twitter.com/sk_EN

Venture Capital. Wikipedia definition (latest update 20.08.2013). [Cited 12.10.2013] Available at: http://en.wikipedia.org/wiki/Venture_capital

Vkontakte account of Skolkovo Foundation (2014). [Cited 23.09.2014] Available at: https://vk.com/skolkovo

Voronina, Yulia (2013). “Novshestva okupyatsya” [Innovations Will Pay Off.] *Rossijskaya Gazeta*, dated 13.08.2013. [Cited 02.10.2013] Available at: http://www.rg.ru/2013/08/13/skolkovo.html

WCIOM: “Innovations: Could they save Russia?” (2008). WCIOM - Wserossijskij Centr Izucheniya Obshestvennogo Mneniya [Russian Public Opinion Research Center]. [Cited 25.10.2012] Available at: http://wciom.ru/index.php?id=268&uid=9890

WCIOM: “Skolkovo” Innovation Center: views and opinions of the Russians” (2011). WCIOM - Wserossijskij Centr Izucheniya Obshestvennogo Mneniya [Russian

Public Opinion Research Center.] [Cited 25.10.2012] Available at: http://wciom.ru/index.php?id=459&uid=111523

Wikipedia article "Silicon Valley". [Cited 25.09.2013] Available at: http://en.wikipedia.org/wiki/Silicon_Valley

Wilson Rowe, Elana (2013). "The future, the foreign and the public–private divide: Socio-political discourses around Skolkovo". *Journal of Eurasian Studies,* Volume 5, Issue 1: 39–47. [Cited 03.01.2014] Available at: http://dx.doi.org/10.1016/j.euras.2013.09.003

Yurgens, Igor (2011). "Russia's modernization – a progress report". In *Selected articles on modernization and innovation in Russia*. Edited by Hanna Mäkinen. Electronic Publication of Pan-European Institute 4/2012: 24. [Cited 20.08.2013] Available at: http://www.utu.fi/fi/yksikot/tse/yksikot/PEI/raportit-ja-tietopaketit/Documents/Mäkinen%204-2012.pdf

Zarubin, Pavel (2010). "Rossiya budushego nachnetsya so Skokovo" [The Russia of tomorrow starts in Skokovo], printed version of the news broadcast dated 21.03.2010 on the First Russia TV Channel. [Cited 20.11.2013] Available at: http://vesti7.ru/news?id=17903

Zhongguancun. Article in Wikipedia (latest update 09.02.2012). [Cited 27.09.2013] Available at: http://en.wikipedia.org/wiki/Zhongguancun

Appendix 1. Russian Economy Profile (The Global Innovation Index 2013: 237)

Russian Federation

Key indicators

Population (millions)	147.0
GDP (US$ billions)	1,953.6
GDP per capita, PPP$	17,697.5
Income group	Upper-middle income
Region	Europe

		Score (0–100) or value (hard data)	Rank	
Global Innovation Index (out of 142)		**37.2**	**62**	
Innovation Output Sub-Index		30.6	72	
Innovation Input Sub-Index		43.8	52	
Innovation Efficiency Ratio		0.7	104	
Global Innovation Index 2012 (based on GII 2012 framework)		37.9	51	
1	**Institutions**	**56.0**	**87**	
1.1	Political environment	42.9	117	○
1.1.1	Political stability*	44.7	113	○
1.1.2	Government effectiveness*	27.3	90	
1.1.3	Press freedom*	56.6	119	○
1.2	Regulatory environment	57.2	100	
1.2.1	Regulatory quality*	40.3	102	
1.2.2	Rule of law*	26.2	113	○
1.2.3	Cost of redundancy dismissal, salary weeks	17.3	82	
1.3	Business environment	68.0	55	
1.3.1	Ease of starting a business*	83.6	69	
1.3.2	Ease of resolving insolvency*	46.5	49	
1.3.3	Ease of paying taxes*	73.9	53	
2	**Human capital & research**	**44.1**	**33**	
2.1	Education	62.0	42	
2.1.1	Current expenditure on education, % GNI	n/a	n/a	
2.1.2	Public expenditure/pupil, % GDP/cap	19.7	57	
2.1.3	School life expectancy, years	14.3	48	
2.1.4	PISA scales in reading, maths, & science	468.5	37	
2.1.5	Pupil-teacher ratio, secondary	8.5	11	●
2.2	Tertiary education	40.0	46	
2.2.1	Tertiary enrolment, % gross	75.9	13	●
2.2.2	Graduates in science & engineering, %	28.1	14	●
2.2.3	Tertiary inbound mobility, %	1.4	71	
2.2.4	Gross tertiary outbound enrolment, %	0.4	108	○
2.3	Research & development (R&D)	30.3	31	
2.3.1	Researchers, headcounts/mn pop.	2,580.6	32	
2.3.2	Gross expenditure on R&D, % GDP	1.1	33	
2.3.3	QS university ranking, average score top 3*	45.9	25	
3	**Infrastructure**	**37.2**	**49**	
3.1	Information & communication technologies (ICTs)	59.6	28	
3.1.1	ICT access*	66.9	34	
3.1.2	ICT use*	39.7	34	
3.1.3	Government's online service*	66.0	37	
3.1.4	E-participation*	65.8	19	●
3.2	General infrastructure	32.0	57	
3.2.1	Electricity output, kWh/cap	7,309.5	28	
3.2.2	Electricity consumption, kWh/cap	6,459.6	27	
3.2.3	Logistics performance*	39.5	95	
3.2.4	Gross capital formation, % GDP	23.5	63	
3.3	Ecological sustainability	20.1	115	○
3.3.1	GDP/unit of energy use, 2000 PPP$/kg oil eq	2.9	113	○
3.3.2	Environmental performance*	45.4	101	○
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.4	90	
4	**Market sophistication**	**45.4**	**74**	
4.1	Credit	23.6	116	○
4.1.1	Ease of getting credit*	50.0	93	○
4.1.2	Domestic credit to private sector, % GDP	46.8	71	
4.1.3	Microfinance gross loans, % GDP	0.0	82	○
4.2	Investment	37.1	32	
4.2.1	Ease of protecting investors*	47.4	102	
4.2.2	Market capitalization, % GDP	42.9	45	
4.2.3	Total value of stocks traded, % GDP	61.7	17	
4.2.4	Venture capital deals/tr PPP$ GDP	0.0	39	
4.3	Trade & competition	75.6	78	
4.3.1	Applied tariff rate, weighted mean, %	3.8	65	
4.3.2	Non-agricultural mkt access weighted tariff, %	0.3	41	
4.3.3	Intensity of local competition†	49.4	121	○
5	**Business sophistication**	**36.1**	**52**	
5.1	Knowledge workers	58.2	34	
5.1.1	Knowledge-intensive employment, %	40.7	10	●
5.1.2	Firms offering formal training, % firms	52.2	24	
5.1.3	R&D performed by business, % GDP	0.7	30	
5.1.4	R&D financed by business, %	27.7	57	
5.1.5	GMAT mean score	559.7	32	
5.1.6	GMAT test takers/mn pop. 20–34	66.7	72	
5.2	Innovation linkages	18.9	109	○
5.2.1	University/industry research collaboration†	40.3	83	
5.2.2	State of cluster development†	36.0	108	○
5.2.3	R&D financed by abroad, %	4.3	59	
5.2.4	JV–strategic alliance deals/tr PPP$ GDP	0.0	60	
5.2.5	Patent families filed in 3+ offices/bn PPP$ GDP	0.1	47	
5.3	Knowledge absorption	31.2	52	
5.3.1	Royalty & license fees payments, % service imports	6.8	18	●
5.3.2	High-tech imports less re-imports, %	10.3	45	
5.3.3	Comm., computer & info. services imports, %	5.5	49	
5.3.4	FDI net inflows, % GDP	2.8	73	
6	**Knowledge & technology outputs**	**30.4**	**48**	
6.1	Knowledge creation	34.6	25	
6.1.1	Domestic resident patent ap/bn PPP$ GDP	11.3	13	●
6.1.2	PCT resident patent ap/bn PPP$ GDP	0.4	42	
6.1.3	Domestic res utility model ap/bn PPP$ GDP	5.3	9	●
6.1.4	Scientific & technical articles/bn PPP$ GDP	10.6	72	
6.1.5	Citable documents H index	308.0	20	●
6.2	Knowledge impact	33.0	77	
6.2.1	Growth rate of PPP$ GDP/worker, %	4.4	21	
6.2.2	New businesses/th pop. 15–64	0.8	72	
6.2.3	Computer software spending, % GDP	0.3	45	
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	5.3	63	
6.2.5	High- & medium-high-tech manufactures, %	22.3	46	
6.3	Knowledge diffusion	25.7	68	
6.3.1	Royalty & license fees receipts, % service exports	1.6	28	
6.3.2	High-tech exports less re-exports, %	1.1	75	
6.3.3	Comm., computer & info. services exports, %	6.0	72	
6.3.4	FDI net outflows, % GDP	3.6	19	●
7	**Creative outputs**	**30.8**	**101**	
7.1	Intangible assets	27.0	125	○
7.1.1	Domestic res trademark reg/bn PPP$ GDP	21.4	63	
7.1.2	Madrid trademark registrations/bn PPP$ GDP	0.6	38	
7.1.3	ICT & business model creation†	43.6	121	○
7.1.4	ICT & organizational model creation†	43.6	103	○
7.2	Creative goods & services	32.2	81	
7.2.1	Audio-visual & related services exports, %	0.6	21	
7.2.2	National feature films/mn pop. 15–69	2.3	55	
7.2.3	Paid-for dailies, circulation, % pop. 15–69	7.5	67	
7.2.4	Printing & publishing manufactures, %	1.6	59	
7.2.5	Creative goods exports, %	0.2	93	○
7.3	Online creativity	37.1	44	
7.3.1	Generic top-level domains (TLDs)/th pop. 15–69	4.1	68	
7.3.2	Country-code TLDs/th pop. 15–69	50.9	36	
7.3.3	Wikipedia monthly edits/mn pop. 15–69	2,864.5	47	
7.3.4	Video uploads on YouTube/pop. 15–69	76.8	55	

NOTE: ● indicates a strength; ○ a weakness; * an index; † a survey question.

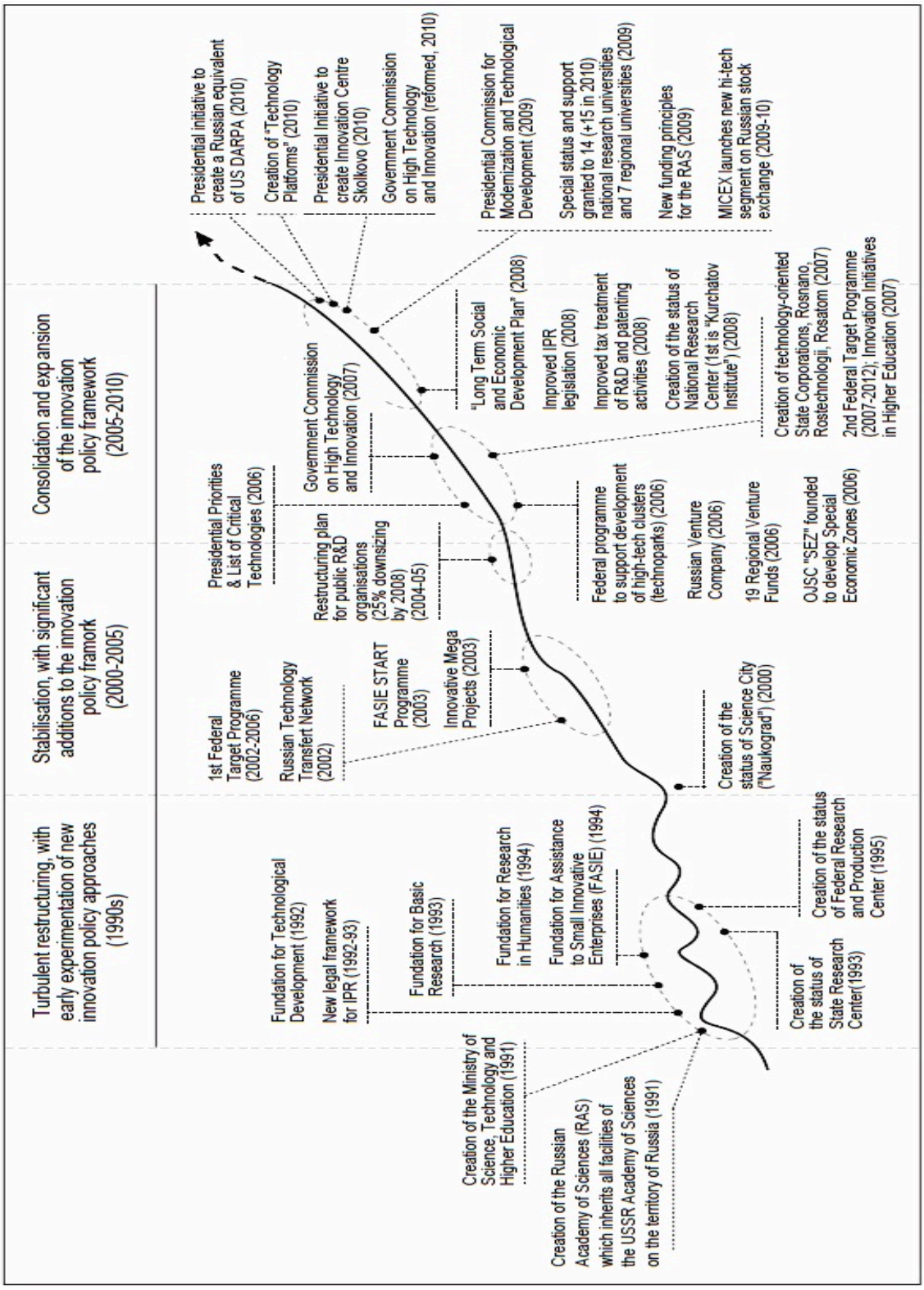
Appendix 2. Innovation policy: types of regulation and concrete measures
(Innovative Development: National Report 2008: 82–83)

Types of regulation	Concrete measures
1. Improvement of innovation support activities with the focus on diffusion of knowledge and technology transfer	Creation of Special Economic Zones Creation of Technoparks in high-tech sectors Tax incentives for the companies performing R&D projects, assistance for small innovative enterprises Decree on Introduction of temporary import tariffs on certain kinds of technical equipment Technical standards Reforms – Regulation on Technical Standards dated 2002.
2. Creation and development innovative instruments, networks and incubators, uniting universities, R&D institutes and enterprises, on regional and local levels as well.	Creation of Special Economic Zones FTP "Electronic Russia" (2002–2010) Creation of Technoparks in high-tech sectors Support for R&D within SMEs – Program START
3. Fostering of networking, via foreign direct investments as well	Creation of Special Economic Zones Creation of Technoparks in high-tech sectors Creation of Russian Venture Company Creation of Open Joint Stock Company "Russian Investment Fund of Information and Communication Technologies FTP "National technological base for the years 2007–2011" FTP "Development of Civil Aviation Technologies in Russia for the period 2002–2010 up till 2015"

4. State procurement focus on innovative products and services	FTP “National technological base” for the period 2007–2011 FTP “R&D in priority areas of Russian science and technology development for the period 2007–2012” Federal Space Program for the period 2006–2015 FTP “Electronic Russia” for the period 2002–2010 FTP “Development of Civil Aviation Technologies in Russia for the period 2002–2010 up till 2015” FTP “Ecology and Natural Resources for the period 2002–2010” Blueprint of a plan of measures to promote the development of consumer industry
5. Access facilitation to the local and foreign financial resources	Creation of Russian Venture Company FTP “National technological base” for the period 2007–2011 FTP “R&D in priority areas of Russian science and technology development for the period 2007–2012” Creation of Open Joint Stock Company “Russian Investment Fund of Information and Communication Technologies
6. Improvements in Intellectual Property Rights (IPR) legislation	Measures to ensure the legal protection of the rights to intellectual property, which was created at the expense of the state budget IV Part of the Civil Code of RF
7. Reinforcement of innovative capacity of small innovative enterprises	Co-financing of R&D projects performed by small innovative enterprises

	Support for R&D within SMEs – Program START Tax incentives for the companies active in the field of IT

Appendix 3. Russian innovation policy stages of development (OECD 2011: 183)



Appendix 4. Key measures to promote science and innovations (Strategiya-2020 2012: 87– 88)

I. Fostering of large-scale innovations in all sectors of economy, assistance in creation new innovation markets.

1. Introduction as obligatory sections on innovations in national, sectorial and regional strategies.

2. Introduction within federal and regional authorities as well as within the companies of public ownership a new job position of Deputy director on innovations; their recruitment among the members of the National Council with the function of examination of the laws and regulations drafts to evaluate their impact on the innovative development.

3. Development of the mechanisms to enforce innovations in the companies (monitoring the programs of innovative development; implementation of innovative technical regulations; strengthening of ecology, sustainability, quality and safety requirements).

4. Introduction of the benchmark of "innovativeness" in the practices of Government procurement and large scale infrastructural projects; their obligatory process audit and evaluation of their innovative capacity).

5. Systematization of tax incentives in innovation sector and improvement of their administration.

6. Boosting imports of new technologies (search system for the best available technologies for priority sectors, customs and tax regime, state guarantees).

7. Development of a program to attract foreign investors of brand technologies.

8. Promotion of long-term programs of subsidy assistance for the high-tech productions with suspense conditions of prolongation (in the frameworks of cooperation of enterprises with universities and scientific organizations).

9. Creation of the national network of experts for long-term science and technology forecasting with participation of a wide range of interested players (big companies, leading Universities and R&D centers, business associations, innovation-driven territories).

II. Increase the effectiveness of innovation policy.

1. Develop the system of technological platforms in partnership with business structures, science and academic institutions, as well as the network of centers of open innovations and technology brokers.
2. Create the network of service and educational centers in the sectors of engineering, design and prototyping.
3. Introduce the system of innovative vouchers to stimulate the outsourcing of innovative services.
4. Create the national database of new products and technologies, the network of industry expertise centers of scientific and technical information.
5. Support innovation-driven territories (Skolkovo Innovation Center, regions active in innovations, special economic zones (SEZ), science towns).
6. Organize competitions among innovative solutions for social, infrastructural and ecological problems on the city and regional levels.
7. Develop self-regulatory organizations in the sector of innovations and support business associations (preparation of standards, expertise, representation of interests of the participants etc).
8. Develop the system of informing the authorities and government companies about the available innovations and the advantages of their implementations (internet portal, departmental expert councils, working groups); demonstration of capabilities of the most advanced technology solutions in order to promote them within big companies).

III. Upgrading innovations quality.

1. Support the creation of centers of excellence and of the program of growing competitive teams within the promising sectors; continuous technological audit of all governmental research institutes and construction offices and optimization of their networking.
2. Scaling operations of governmental funds for science.
3. Formation of the national program of fundamental research to be open for all participants.
4. Develop the system of a compulsory assessment of activity for all governmental research organizations and non-mandatory for other

organizations, which carry out R&D activities based on the internationally recognized practices.

5. Create a development program for pre-competitive R&D activities focused on the real sector of economy (technological platforms, cooperative institutes, open innovations centers).

IV. Implementation of the social functions of innovations.

1. Formation of support programs for innovative ventures, promotion of scientific and innovative activities.
2. Support for internships of young researchers and engineers in the leading scientific centers, universities and companies.
3. Implement up-to-date standards of rendering of innovative services in education, healthcare, social services and governance, and specifically in the interests of vulnerable populations; provide support measures to ensure their access to innovative products and services.

Appendix 5. Geography of the Skolkovo Participants
(Skolkovo Foundation Annual Report 2011: 20)